

International Federation of Engineering Education Societies
Global Engineering Deans Council

Rising to the Top

VOLUME V



Arab World and
Southeast Asian
Women Engineering
Leaders Share Their
Journeys To Success

RISING TO THE TOP

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Arab World and Southeast Asian Women
Engineering Leaders Share Their Journeys to
Professional and Personal Success

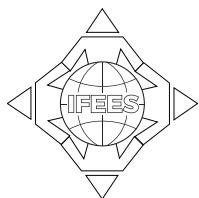
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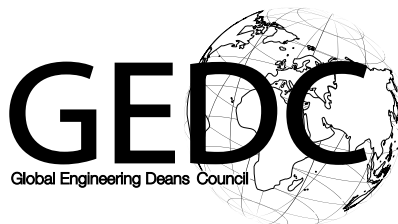
INTERNATIONAL FEDERATION OF
ENGINEERING EDUCATION SOCIETIES

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GLOBAL ENGINEERING
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International Federation of
Engineering Education Societies



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Editors:	Neelix Bihani, Viral Marketing Trends Nermine Diab (Arab World) Isai Amutan Krishnan (Southeast Asia)
Copy Editor:	Sfurti Sahare, Viral Marketing Trends
Project Manager:	Jessica Londoño
Production Consultant:	Kayla Hellal and Alik Pappas
Production Editor:	Soma Chakrabarti

Rising to the Top: Volume V

Arab World and Southeast Asian Women Engineering Leaders Share Their Journeys to Success

Rising to the Top: Volume V provides a heartfelt, engaging, and insightful look into the diverse experiences that have shaped the lives and careers of women leaders from the Arab and Southeast Asia Regions.

This part of the world faces unique challenges, including complex socio-political dynamics, cultural traditions, and limited access to education and professional opportunities for women. Yet, the Arab and Southeast Asia Regions are also rich in innovation, creativity, and a strong commitment to community progress. The stories within this book capture these remarkable contrasts, showcasing the journeys of women who have risen to prominence through determination and hard work. These accounts are presented as interviews, memoirs, and third-person narratives that vividly bring these trailblazing women's personal and professional paths to life. Women leaders are essential in addressing global challenges and driving progress in all areas of society. As the world continues to evolve, it is crucial to ensure that women's voices and perspectives are represented in all fields, fostering inclusive and comprehensive advancements.

By sharing their personal and professional journeys on these pages, the authors from the Arab and Southeast Asia Regions aim to inspire future generations of leaders. They offer valuable insights into women's unique challenges and opportunities, demonstrating that remarkable achievements are within reach with perseverance and vision.

A special thank you to the Coordinating Committee

Tagwa Musa

Khairiyah Mohd Yusof

Alaa Ashmway

Hans Jürgen Hoyer

About IFEES

The International Federation of Engineering Education Societies connects engineering education societies worldwide to leverage the collective strengths of its members and community to improve engineering education worldwide. IFEES' network enhances global engineering education through collaboration between educational, corporate, and other organizations interested in engineering education. Learn more at IFEES.net.

About the GEDC

The Global Engineering Deans Council serves as a global network of engineering deans, industry affiliates, former deans, and other leaders in the field, leveraging its members' collective strengths to advance engineering education and research. GEDC Regular Members include deans, rectors, or principals of engineering colleges and faculties. The GEDC's goal is to provide a space for leaders of engineering institutions to connect and share the successes and challenges of delivering world-class engineering education programs in an increasingly interconnected and fast-paced world community. Learn more at GEDCouncil.org.

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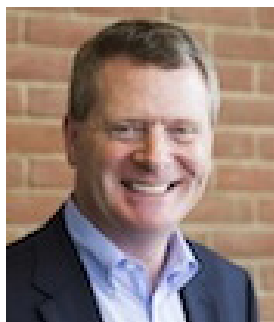
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A special thank you to ABET whose generous support has helped make this book possible.



Introduction by Book Sponsor

Michael K. J. Milligan, PhD
Chief Executive Officer, ABET



Engineering has long been entrenched in a male-dominated culture, but we are witnessing a gradual shift towards greater inclusivity. While more women are pursuing careers in engineering than ever before, the road to gender equality in the field remains fraught with challenges. Despite Progress, the representation of women in leadership positions within higher education, particularly in computer sciences and data sciences, remains disproportionately low.

As the Chief Executive Officer of ABET for the last 13 years, I have observed firsthand the importance of diversity, equity, and inclusion in engineering education and practice. However, I am acutely aware of the barriers that women engineers continue to face, from implicit biases to systemic barriers that hinder advancement and opportunities to thrive.

My global travels, involving conversations with engaging students and professionals across different industries, emphasize the vital need to advocate for equitable engineering representation. Education is paramount in driving meaningful change and dismantling the societal norms that perpetuate gender inequality.

In this volume of *Rising to the Top*, the authors courageously share their personal journeys, shedding light on the obstacles they have overcome and the opportunities that lie ahead. Their stories serve as a powerful reminder of the indispensable contributions of women engineering leaders and the urgent need for a more inclusive and equitable future.

As you delve into the narratives of these remarkable women, I urge you to reflect on the challenges that persist in the engineering profession and the collective responsibility we bear in addressing them. Together, let us work towards a world where every aspiring engineer, regardless of gender identity, has the opportunity to thrive and make a lasting impact.

A special thank you to our sponsors,
without whom this initiative would not be possible.



ISEP INSTITUTO SUPERIOR
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School of Engineering



Introduction by Coordinating Committee Members

Khairiyah Mohd Yusof and Tagwa Ahmed Musa

Picture yourself venturing through the hallowed halls of engineering, where tales of exceptional women abound. This book is the “hallowed halls of engineering,” revealing stories of extraordinary women engineering leaders from the Arab world and Southeast Asia. These individuals dared to challenge societal norms, carving out their niche in innovation. These women encounter numerous obstacles in their journey toward success, yet their resolve remains unshaken. Their triumph over adversity is a testament to their unwavering determination and resilience. From navigating familial expectations to overcoming societal biases, they shattered barriers with grace and grit. Their narrative resonates deeply, reflecting a steadfast commitment to excellence and a willingness to seize opportunities. Hands-on and driven by a passion for their craft, they continue to make meaningful contributions to the engineering profession, leaving an indelible legacy for generations.

Many of these women contribute to the advancement of engineering and leave an indelible mark on the global landscape. Among them stand Lydia G. Tansinsin, Mya Mya Khaing, Hanan Farhat, Roselawati Pg Hj Halus, Amalia A Widyasanti, and Batool Abdulaal Al Fahad. Each of them epitomizes the pursuit of excellence, navigating their journey with determination and serendipity. Their interesting path to becoming professional engineers is a testament to their unwavering commitment and active involvement in shaping their careers and the society they serve. In her multifaceted career, Lydia Tansinsin has fostered collaboration and innovation through her leadership roles in professional organizations, notably as the first lady president of the Philippine Institute of Chemical Engineers and the Philippine Association for the Advancement of Science.

Similarly, Hanan Farhat's journey exemplifies the transformative power of embracing challenges. By choosing to pursue STEM, she opens doors to a world brimming with possibilities. These women excel in their respective fields and use their platforms to champion causes close to their hearts, inspiring future generations to follow in their footsteps.

Looking at engineers from various fields, we find inspiring individuals like Diana Ghanem, Teresita Dangat-Balba, Ghaida Aburumman, Siti Hawa Hamzah, and Rachida Ajhoun. Their lives can be described as a lifelong journey marked by the belief that the sky is the limit, transcending boundaries, fearlessly exploring new frontiers without hesitation, and confronting obstacles with unwavering determination. They embody a relentless pursuit of knowledge and growth, never faltering in their quest for deeper understanding and new skills. Fueled by their belief in continually reaching the highest aspirations, they push beyond perceived limitations, aiming for extraordinary heights. Guided by their mantra of going beyond boundaries, they fearlessly venture into uncharted territories, defy limitations, and embrace innovation and creativity in all their endeavors.

On the grounds of innovation and academia, these individuals stand as pillars of inspiration, embodying the ethos of resilience and dedication. Tahani Attia's visionary leadership in electrical and electronic engineering has propelled her career and fostered groundbreaking advancements in sustainable practices. Reem Bahgat's mastery of information technology has revolutionized digital landscapes and opened doors to new realms of possibility in data analytics and cybersecurity. Maria Natalia Roxas Dimaano's expertise in construction engineering has shaped skylines and fortified infrastructure against the test of time, ensuring the safety and efficiency of urban environments. Maria Dimaano's chemical engineering expertise has shaped innovative solutions and illuminated pathways for future generations. As a distinguished faculty member, her pioneering research in thermal energy storage and biofuel conversion has garnered international acclaim. Ibtisam Kamal's pioneering spirit in engineering has elevated industry standards and paved the way for inclusive and

equitable access to technological solutions. Rana Maya's unwavering commitment to excellence in engineering has defied the odds and inspired generations to pursue their passions fearlessly. Together, their collective narrative transcends boundaries, igniting a beacon of hope and possibility in the ever-evolving landscape of professional achievement. Leong Wai Yie and Yasmina Ziari stand as luminaries in their respective domains. Leong Wai Yie's journey as an engineer began with a spark of curiosity in her youth, propelling her towards academic excellence and culminating in a PhD. Her relentless pursuit of knowledge mirrors Yasmina Kerboua Ziari's quest to overcome obstacles in the industrial engineering field, both driven by a vision of shaping a better future.

In the industry, Basema AlMahroos, Asma Almani, Sui Kau Alice LIM, and Naseema Abdullah each represent a unique journey shaped by determination and perseverance. While their paths may differ, their unwavering commitment to excellence is a common thread woven through their stories. Basema Taher AlMahroos, amidst familial responsibilities, embodies resilience in striving for workplace equality. Similarly, Asma Almani's pioneering role in the oil and gas industry reflects a determination to break barriers and inspire others. Meanwhile, Sui Kau Alice LIM's legacy in civil engineering is marked by her ability to navigate the complexities of career and motherhood, leaving a lasting impact on her profession and family. The young professional Naseema Abdullah emerges as a beacon of inspiration. Through her experiences in the oil and gas industry, she achieves personal success and advocates for gender equality. Her story underscores the importance of resilience and persistence in adversity. Though their backgrounds and challenges vary, these women share a common strength in defying expectations and leaving a profound mark on their respective fields.

If you believe in leading with the heart, you can take inspiration from Thea Kurniawan, who pondered her career path and its potential impact on the world. Fortunate to have been guided by exceptional mentors advocating for engineering as an inclusive career, she led rather than followed, inspiring

others to trail behind her. Imen Makhoul's writing reflects a similar ethos, creating a favorable impression of the career journey. Her alignment with significant milestones in her career path is impressive. Likewise, Wan Siew Ping, an aspiring engineer, gained diverse experience in various fields.

Discover the inspiring life experience in getting ahead and making their marks in ground-breaking technologies in the industry. Diah S. Darmawaty, an aircraft structural engineer, finds promise in exploration over entrepreneurship, guided by the mantra 'do your best' to nurture a legacy of excellence in every endeavor. Zanita Zainuddin, with a focus on resilience, served her nation with distinction in the automotive industry at Proton. Her progression from Group Leader to Lead Engineer signifies a prestigious career track. Artificial intelligence (AI) has been reshaping the world, with Aseel Addawood as a leader in KSA today. Her influence has a profound impact on current emerging trends in AI. Following her, May Rose Imperial, a consultant, shares her journey of personal success. As an Electronics Engineer by profession, she has demonstrated extensive leadership skills, which are marked by a relentless pursuit of excellence and a commitment to challenging gender stereotypes in engineering.

Similarly, Polana Pramesti is a pioneering figure in aviation, advocating for women's independence and discouraging reliance solely on men, a principle evident in her career. Her achievements underscore the significance of personal growth and financial stability in one's career. Emiliana Patal-Dela Cruz narrates her victory, enriched by a determined lifeline. Her journey from a humble background to a successful engineer and entrepreneur is inspiring, showcasing resilience and determination."

In conclusion, the collective journey of these remarkable women engineering leaders reflects the diverse landscape of the profession across academia, industry, and the government sector. Their stories underscore the universal values of determination, resilience, and excellence that transcend boundaries and disciplines. From pioneering research in academia to groundbreaking innovations in industry and policy-making

in government to advocacy for gender equality, each co-author brings a unique perspective and contribution to the table. Together, they embody the spirit of progress and inspire future generations to continue pushing the boundaries of engineering, ensuring a brighter and more inclusive future for all.

Last but not least, we would like to thank Marlene Kanga, Siti Hawa Hamzah, and Leong Wai Yie for their help during the invitation and selection stage for the Southeast Asia co-authors, as well as Nur Hidayah Ishak and Nabilah Zaini for their assistance as the local committee for the Southeast Asia chapters.

JOURNEY 1

Do Your Best, and God Will Do the Rest

Lydia G. Tansinsin

Chairman of The Accreditation and Certification Board for Engineering
and Technology (ACBET)
Philippines

Our parents, Attorney Rosendo J. Tansinsin and Ms. Luz B. Gonzalez, studied at the University of the Philippines (UP). In 1929, my father earned his Bachelor of Law degree from UP Law and passed the Bar examination that same year. After his father's death during high school, he worked at the government Bureau of Lands to support himself. Although Father excelled in sciences and mathematics during his earlier education and aspired to become an Engineer, UP's scheduling constraints forced him to attend law classes in the afternoons instead of the morning engineering classes.

My mother came from Iloilo Province. When my father courted her, she was in her fourth year at UP College of Education. She eventually chose marriage over completing her BS in Education. Given Bulacan's cultural norms, which required wives to stay home and care for children, and considering our family's size—eight children—she became a full-time homemaker.

I grew up in Manila, except for a brief evacuation to Bulacan during World War II from December 1941 to August 1945. In early 1942, our parents sent our two sisters, Luz and Lilia, and brother Rosendo Jr. to Iloilo, while Sister Leonida, brother Rosendo III, and I remained in Manila. We later moved to Bulacan for two years when news of the Japanese advance reached us. During this tumultuous period, our mother demonstrated remarkable leadership, particularly when Japanese soldiers advised us to relocate to avoid impending dangers.

After the war, our parents struggled to sustain our family with Father's limited legal practice. Mother started a variety store, showcasing her

managerial skills by delegating responsibilities among us children. She entrusted me with managing finances and purchasing goods from Divisoria for resale in our store.

Despite supporting our educational pursuits, our parents occasionally encouraged us to follow Father's legal path. My elder sister, Leonida, graduated magna cum laude with a Bachelor of Commerce (CPA) degree from Far Eastern University before studying law at UP. Similarly, two of my younger brothers began their pre-law studies at Ateneo de Manila University before transferring to UP Law. Our sisters pursued degrees in business administration, chemistry, education, and social work while I completed my Chemical Engineering degree at the University of Santo Tomas.

During my schooling at Holy Ghost College (later College of the Holy Spirit) near our Manila residence, I played various games until dinner. Mother consistently emphasized academic excellence and moral values, shaping our upbringing with reminders to pray, uphold honesty, and refrain from using profanity.

When choosing a college major, I expressed interest in Chemical Engineering, inspired by the country's industrial development plans requiring technical expertise. Despite my mother's initial surprise, both parents fully supported my decision. At the University of Santo Tomas, I encountered a balanced gender ratio in my engineering classes, fostering a supportive learning environment.

Faculty members and fellow students encouraged me throughout my college journey. Despite occasional challenges in laboratory settings, male classmates offered assistance, contributing to a collaborative atmosphere. The university's facilities accommodated both male and female students, albeit with some distinctions like separate staircases. In my first year, the school honored me with the title "Lady Engineer" during Engineering Day festivities, though I'm unsure if this tradition continues today. I

participated in school-organized field trips to various industrial plants, which I thoroughly enjoyed and offered glimpses into my potential future career.

At the UST Faculty of Engineering, I dedicated myself to my studies without needing to prove myself to classmates or teachers. Given my exposure and experience in the field, choosing chemical engineering proved a wise career decision. My student days challenged me to interact with peers and superiors, fostering significant personal growth. Our professor, Engineer Felix Ty Hoanchay, who headed Chemical Engineering, taught core subjects and shared valuable insights into practical applications of the theories he imparted. His connections in the pharmaceutical industry allowed him to share experiences that helped us avoid common mistakes in the field.

After graduation, I immediately began my job search. Unfortunately, many companies at the time preferred hiring male chemical engineers. While graduate studies offered an opportunity to join academia, I chose to enter the industry directly. One kind professor briefly offered me a position at his company. Subsequently, I prepared for the professional licensing exam for chemical engineering administered by the Philippine Professional Regulation Commission. I performed well, securing the second position after the examination results were released.

The industry hesitated to employ female engineers, erroneously believing they might not handle the demanding tasks required in chemical engineering. A prevailing notion suggested female engineers suited only quality control activities and might lack the commitment or capability to handle tasks typically undertaken by their male counterparts. Given that production operated continuously on a 24/7 basis, they doubted female engineers' ability to remain on the production premises throughout the day. However, in the 1960s, a courageous female chemical engineer friend challenged the status quo and secured an industry position. She monitored the production line and even worked night shifts. Her successful experience

led to a significant change in the industry's hiring practices, which began to include female chemical engineers.

Finding a job as a female chemical engineer proved challenging, as the industry initially believed women engineers unsuitable. I decided to apply for a position at the government's newly established National Science and Development Board (NSDB). Fortunately, they offered me the opportunity to join this office in its early stages. Some initial staff members were seasoned professionals, and I had apprehensions about their reception. However, they welcomed me as part of the team and even expressed surprise at seeing me drive our Volkswagen Beetle, as I was the only female driver in the office.

Before joining the office, my parents shared a list of “DOs and DON'Ts” for interacting with colleagues and superiors. Their advice greatly helped me adjust to the workplace. Knowing I was well-prepared for my role and could offer fresh ideas as a recent graduate, I integrated seamlessly into the team. I proposed suggestions to streamline our work processes and increase efficiency. As a single woman without family responsibilities, I found balancing work and personal life relatively easy. Unlike my married female engineer colleagues, I had more time to focus on my career.

I received significant support throughout my career, including during my time as a ‘Monbusho’ scholar at the Tokyo Institute of Technology in Japan. My parents provided additional financial support, as the Japanese scholarship stipend proved insufficient to cover living expenses, especially considering the higher cost of private boarding houses and Japanese homes. This occurred in the early 1960s when Japan began to industrialize and was less prosperous than today. The stipend they provide now could support an entire family living in Japan.

I only disclose my profession as a chemical engineer when relevant to professional interactions. However, I've become an inspiration for many women in the field and received notes of gratitude for paving the way.

I'm delighted to have supported my female colleagues. As a female engineer, surviving in a male-dominated environment requires alertness, attentiveness, and responsiveness. Staying well-informed and up-to-date with the latest developments in the field is essential for effective contributions. To encourage knowledge sharing and collaboration, I introduced weekly sessions for exchanging ideas and staying current with industry trends.

Women have been present in Philippine engineering since the 1930s when a female chemical engineer graduated from Adamson University in Manila. While engineering wasn't a popular choice for women then due to limited opportunities, it gained popularity in the 1940s, with more women enrolling in various engineering disciplines. Today, female engineers excel in their respective fields, often outperforming their male counterparts.

As a female engineer, I feel empowered by the growing acceptance of women in the industry, corporate world, and academia. Many sectors now prefer women engineers as more male engineers transition to different careers. In my government work before retirement, I adhered to established rules and regulations, making exceptions only when outdated policies needed revision. Changes over time have led to greater acceptance of women in the workplace, with women engineers proving reliable and committed.

I founded the Philippine Technological Council (PTC) in 1978 and played a key role in establishing the ASEAN Federation of Engineering Organizations (AFEO) in 1980. Women engineers now take on more significant and crucial roles within these organizations. In 2019, I received the WFEO-GREE "Woman in Engineering Award" for Distinguished Achievement in the Service of Humanity, becoming the second female engineer to receive this honor. This recognition highlights Southeast Asian women engineers' competitiveness on the global stage.

Throughout my career, I didn't actively seek leadership positions. Colleagues selected me for such roles based on their trust in my integrity, honesty, and

competence. I became the first female president of the Philippine Institute of Chemical Engineers (PICHE) from 1977 to 1980 and held several other significant positions. I currently serve as the PTC adviser and chair of the Accreditation Board of Engineers and Technologists (ACBET).

Here's a story I'd like to share with fellow female engineers: During my time as the Planning and Programming Division Chief in 1970, some chemical engineers and the Deputy Chief approached me, expressing difficulty understanding my instructions and preparing the "Document of Prioritization." I asked if they had read engineering journals and pursued further education, to which they had replied negatively. I recommended they enroll in graduate school, allowing them to leave the office early to accommodate their studies. Many earned master's degrees, and some completed doctoral studies. I took the risk of signing their official timecards when they provided proof of enrollment and their grades. These individuals who completed their studies later received appointments to top positions within the organization. I proposed to management that they extend scholarship opportunities to other office personnel, a policy later approved and implemented. We aspired to build a highly educated and credible team to evaluate projects submitted for grants-in-aid.

One significant dream for women engineers is to gain full recognition and equality with their male counterparts in knowledge, capability, and commitment. Another aspiration is for women engineers to experience job satisfaction and equal compensation. I encourage my female colleagues to pursue engineering careers, present their ideas, and contribute to innovation. I believe in sharing opportunities and supporting others, as my parents supported my journey. Their guidance to pray, seek divine guidance, and express gratitude has proven invaluable.

About the Author



Lydia G. Tansinsin has had a distinguished career in engineering, academia, and leadership roles in professional organizations. She earned a Chemical Engineering degree from the University of Santo Tomas, a master's in engineering from the Tokyo Institute of Technology, and a Doctor of Science from Bulacan State University. She holds prestigious certifications, including Career Executive Service Officer II eligibility from the Development Academy of the Philippines.

Throughout her career, Tansinsin has held significant positions such as Cabinet Assistant Secretary of the Department of Science and Technology and Acting Cabinet Undersecretary. She has contributed to academia as a Professorial Lecturer III at the University of Santo Tomas Graduate School and served as Chair of the Licensure Board Examination for Chemical Engineers.

Tansinsin has actively participated in various professional and alumni organizations, including serving as the first female president of the Philippine Institute of Chemical Engineers and the Philippine Association for the Advancement of Science. She has received numerous awards recognizing her outstanding contributions to engineering and science. Tansinsin is also dedicated to philanthropy, providing scholarships to disadvantaged students in San Jose, Bulacan, Philippines. Her commitment to education and service underscores her remarkable legacy in the engineering community.

JOURNEY 2

Road to A Professional Engineer

Mya Mya Khaing

ASEAN Chartered Professional Engineer (A.C.P.E)
in Mechanical Engineering
Myanmar

Heavy rainfall marked the early morning hours of my birth in 1966 in Kyaukpadaung, a small town in the heart of Myanmar. My father, an esteemed government engineer, diligently fulfilled his duties, while my mother excelled as a remarkable homemaker and nurturing parent. Our family of seven thrived on my father's income as the sole financial source, with my mother adeptly managing our finances. I grew up with two elder sisters, one younger sister, and our youngest sibling, a brother.

I engaged in imaginative play during my childhood, often assuming roles as a teacher, vendor, or even a soldier. Our parents consistently emphasized the importance of education, urging us to apply ourselves rigorously. They motivated us with rewards linked to our examination results, propelling us to strive for excellence. Throughout my educational journey, I encountered a range of subjects but found a particular passion for English, Mathematics, and Physics. Recognizing my aptitude for Mathematics, my father encouraged me to pursue a career in engineering, while my mother aspired for me to become a doctor. Yet, at that time, I lacked any concrete dreams.

After excelling in our national matriculation examination, where we could select professional paths such as medicine, law, engineering, economics, or teaching based on our scores, I attended the renowned Rangoon Institute of Technology (R.I.T.), a hub of education in Southeast Asia. I held steadfast to the belief that I could only achieve greatness by giving my utmost in every endeavor, a principle I held dear. Our society's norms dictated that girls balance education with household responsibilities, avoiding passivity

and hesitation.

Upon enrolling at R.I.T. in 1982, located in the capital city of Rangoon, my unconventional choice of pursuing engineering surprised me and met opposition from conservative relatives. However, my parents stood by me, encouraging my chosen path. The R.I.T. campus, a gift from the Russian Government, boasted magnificent buildings and lush greenery spanning around a hundred acres. It offered comprehensive facilities, including a library, sports courts, canteen, and medical clinic.

As a female engineering student, I resided in “Tha Zin Hall,” a spacious four-story off-campus building, alongside approximately two hundred fellow female students. Our living quarters were single rooms with shared facilities, and the hostel provided nutritious and delectable meals. We adhered to strict daily routines, requiring permission for special outings. Male students had similar arrangements with distinct timings. The year’s highlight was the annual dinner for the entire hostel zone, fostering a sense of community.

University life in the bustling capital introduced small-town teenagers like me to various complex, innovative, and diverse experiences. After two years of foundational studies, we had the opportunity to specialize. Some fields, like petroleum and mining, were off-limits to female students due to their working environments. Civil, mechanical, and electronics engineering were the most popular options. Intrigued by machines, I chose mechanical engineering.

Each final examination was followed by a five-week group industrial training period. Industry mentors guided us, emphasizing both practical and theoretical learning. This immersive experience exposed us to heavy machinery, modern manufacturing processes, and real-world applications, boosting our confidence and practical skills.

An unexpected turn of events disrupted my final year: the 8888 uprising

caused a three-year delay in completing my degree. During this hiatus, I returned to my hometown and contributed to my sister's teaching efforts. As I taught Mathematics to eager elementary school students, I discovered a passion for education, unknowingly setting the stage for my future career. In 1991, I finally completed my bachelor's degree in mechanical engineering.

Upon graduation, various job opportunities opened in sectors such as Industrial No1, Industrial No2, and the Ministries of Construction, Electrical Power, and Education. This pivotal juncture demanded a decision about my professional trajectory. With my parents' support and confidence in my abilities, I ultimately joined the Department of Mechanical Engineering at Rangoon Institute of Technology as an Instructor, a role equivalent to Assistant Lecturer. I diligently honed my teaching skills while pursuing postgraduate studies, earning a Master of Philosophy in 1997 and a Master of Engineering in 1998.

Since its inception in 1995, I have actively participated in the Myanmar Engineering Society (MES). My engagement in its endeavors led to my election as a central executive member in 2005. The journey from childhood dreams of acting to becoming a dedicated educator and leader in the engineering community has been both fulfilling and transformative.

While pursuing postgraduate studies, I married Captain Aung Kyaw Lwin in April 1996. The ceremony took place in the southern part of the Shan state, where he was stationed for work. A holder of a Bachelor of Science degree with a major in Physics, he served in the military intelligence sector. My decision surprised many, especially my students. Interestingly, we had been neighbors and close friends in my hometown before marriage. However, after tying the knot, our duties led us to different towns, making our family time rare. Our desire to have children went unfulfilled, but despite living apart, we maintained a warm and faithful relationship.

After completing my M.E. (Mechanical), I was promoted to Lecturer in

2003. While instructing engineering students, I concurrently conducted research based on my M.E. thesis, which focused on designing, fabricating, and testing a small-scale centrifugal blower. This provided me with valuable experience. My research pursuits continued, culminating in attaining my Ph.D. (Mechanical) in 2004. Subsequently, I advanced to Assistant Professor in 2005. Additionally, I pursued further education at Yangon University, obtaining a postgraduate diploma in Global English in 2009.

I recognized the significance of peer evaluation for research papers worldwide and presented my findings at international conferences. These included the 27th Conference of the ASEAN Federation of Engineering Organizations (CAFEO) in Singapore in 2009, the 31st CAFEO in Indonesia in 2013, and the 35th CAFEO in Thailand in 2017. I authored ten international papers as the primary author, and twenty-eight as the secondary author. After earning my Ph.D., I supervised numerous postgraduate students, guiding 26 Ph.D. and 20 M.E. candidates. One noteworthy research endeavor involved designing, fabricating, and testing a crossflow turbine for a Ph.D. thesis. We conducted numerical simulations using ANSYS CFX 19.0 software to validate our experimental findings. The excellent results led to presentations at international conferences held in Myanmar.

I joined national and international organizations to contribute my knowledge and experience to the engineering community. Starting in 2010, I became part of the ASEAN Engineers Register (AER), participating in the Associate ASEAN Engineers Register (AAER) assessment committee. I also played a role in the Assessment Committee at MEngC, evaluating applicants for professional engineers, registered senior engineers, registered engineers (RE), and Registered Senior Engineers (RSE). In 2014, I achieved promotion to professor at Yangon Technological University, the pinnacle of academic achievement. While this was not my initial dream, it reflected the culmination of my relentless efforts. However, this title brought increased duties and responsibilities, prompting me to strive for further contributions.

Throughout my academic journey, I pursued various international training opportunities. In 2013, the Myanmar Engineering Society selected me to attend a training program on Renewable Energy in Israel at Kibbutz Ketura of the Arava Institute. This experience, sponsored by Israel's Agency for International Development Cooperation Ministry of Foreign Affairs (MASHAV), exposed me to practical experiments in renewable energy. The training covered biodiesel, biomass, hydroelectric, solar, and sustainable energy, imparting valuable knowledge. As one of twenty-nine trainees from around the world, this experience also allowed me to visit the Holy Land.

Another significant opportunity arose through the Lotus Staff Exchange Program in Belgium. Hosted by ERASMUS academic short-term training, the program took place at Vrije Universiteit Brussels. This training allowed me to conduct a comparative analysis of their curricula, syllabi for undergraduate and postgraduate Mechanical Engineering courses, and their laboratory equipment and experiments. I observed their advanced teaching and learning techniques and industry collaborations. During this time, I immersed myself in the research culture of the Mechanical Engineering Department, witnessing professors engaged in continuous research. One professor, renowned for the strength of materials and metal deformation, focused on materials for medical equipment, applying his research to human body replacements like knees, legs, and arms. This month-long training afforded me innovative experiences and insights.

Between 2013 and 2019, I actively participated as a technical committee member in standardizing automotive products in Myanmar. As an ASEAN member, our country needed to adhere to rules and regulations for industrialization across ASEAN nations, necessitating the definition of automotive sector standards.

In 2014, I pursued and attained Professional Engineer (P.E.) status in Mechanical and Building Services, culminating in the ASEAN Chartered Professional Engineer (A.C.P.E.) designation in the same fields. Becoming

a professional engineer involved meeting rigorous theoretical and practical knowledge requirements. My experience in assessing AER, AAER, RE, and RSE candidates significantly contributed to fulfilling these prerequisites.

In 2015, I joined the Committee for Quality Control of High-Rise Building Construction Projects (CQHP) under the oversight of the Ministry of Construction. This role extended beyond my academic background, requiring applied knowledge in high-rise building design. My responsibilities included reviewing building service designs such as water pumping, firefighting, and air conditioning systems. Participating in this committee proved exceptionally rewarding, exposing me to numerous foreign investment projects and enabling interactions with senior Professional Engineers across various disciplines. We convened for seminars twice weekly, during which project managers presented their initiatives, and our committee provided suggestions to align with CQHP guidelines. In 2020, the committee evolved into the High-Rise and Public Building Projects Committee (HPBC), where I served as an External Expert in ACMV.

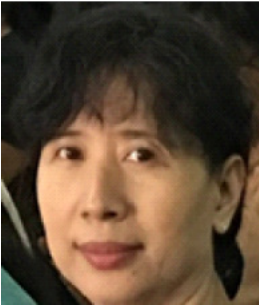
In 2019, I and other CQHP members visited China to study high-rise building projects, exploring modernized technology, construction materials, and expedited construction methods. Subsequently, I underwent training in Japan, which is renowned for its cutting-edge technology. The program, facilitated by the Project for Enhancement of Engineering Higher Education (EEHE) in Myanmar under the Japan International Cooperation Agency (JICA), spanned from September to November 2017. During this training at Nagasaki University, I gained extensive knowledge in experimental and Computational Fluid Dynamics (CFD) simulation analysis, Particle Image Velocimetry, PIV Measurement, 2-dimensional optimized blades with and without tip clearance, and 3-dimensional optimized blades. These topics closely aligned with my M.E. thesis and greatly interested the hosting professor. The training provided access to modern laboratory equipment unavailable in my home institution, allowing hands-on experience and fruitful research.

These experiences enriched my professional engineering knowledge and provided invaluable networking opportunities. Despite the challenges of solo travel and my husband's unexpected, forced retirement from military service, we overcame these hardships together. Encouragement, hobbies, and a new career path gradually helped him find contentment.

I continued my active participation in the Myanmar Engineering Society (MES) and became the Secretary of the Women Engineers chapter in 2015. Additionally, in 2018, I was nominated as one of the country representatives for the Asia Pacific Nations' Network (APNN). A significant achievement under my leadership was the First Myanmar Women Engineers Summit in Yangon in 2020. Themed "Gender, Engineers, and Myanmar," the summit attracted over 400 women engineers from diverse engineering sectors across Myanmar. Distinguished keynote speakers included Marlene Kanga, the president of the World Federation of Engineering Organizations (WFEO), and Chia-Li Wu, the chair of the International Network of Women Engineers and Scientists (Asia and Pacific Nations Network) (INWES-APNN). This event underscored women's empowerment in engineering and facilitated networking among global women in science, engineering, and technology.

Reflecting on my journey, I see it has been a mix of successes and challenges. As a child, I lacked specific dreams, but my commitment to giving my best, speaking the truth, and aiding others guided me toward becoming a successful professional engineer. I extend gratitude to those who mentored and nurtured me, contributing to the growth of my journey.

About the Author



Mya Mya Khaing's career has been dedicated to academia since obtaining her B.E. (Mech) in 1991. She has steadily advanced from an Assistant Lecturer to a Professor at Yangon Institute of Technology (formerly Rangoon Institute of Technology). Alongside teaching, she pursued higher education, completing an M.Phil. (Mech) in 1997 and a Ph.D. (Mech) in 2004. Throughout her

academic journey, she has been actively engaged in research, resulting in numerous publications in prestigious international technical journals. Beyond academia, she has achieved significant professional milestones, attaining Professional Engineer (P.E) and ASEAN Chartered Professional Engineer (A.C.P.E) status in Mechanical Engineering. She has contributed to assessment committees and played a role in project quality control committees. Her commitment extends to professional societies such as the Myanmar Engineering Society (MES), where she has served as a Central Executive member and Secretary of the Women Engineers chapter, advocating for diversity and inclusion. Additionally, she has represented Myanmar in the Asia Pacific Nations' Network (APNN). With pride in her accomplishments, she remains dedicated to making meaningful contributions to academia and the broader engineering community.

JOURNEY 3

Milestones Along the Path: Celebrating Success

Naseema Abdullah

Director of E&D, Somali Petroleum Authority

Yemen

Mathematics and engineering design have always fascinated me, fueling my passion for petroleum engineering. However, I never openly shared this interest with my family due to the complexities and potential challenges of pursuing a career in the oil and gas industry as a Yemeni woman. Growing up in Hadramout governorate, a region steeped in conservative customs and traditions, I faced numerous social constraints within my household as my family held firmly to these traditions.

My late father, a mechanic who owned a contracting office collaborating with oil companies in Hadramout, inadvertently exposed me to the industry that captivated my interest. While in secondary school, I approached him with a request to work alongside him, which led to an opportunity within the public relations department. There, I cultivated relationships with various oil companies, solidifying my affinity for the industry. This experience granted me insight into the workings of Yemen's oil sector but also brought uncertainty regarding the feasibility of becoming a petroleum engineer in Yemen as a woman. It was undeniably a daunting challenge to contemplate.

Upon completing secondary school and securing the national certificate required for admission to the College of Engineering and Petroleum at Hadramout University, I embarked on the journey to pursue my dream. I was apprehensive that my parents might oppose my decision, as their aspirations for me diverged from mine. While they did not impose a specific field of study, petroleum engineering clashed with my father's expectations.

The prospect of entering the medical sciences, which my parents favored, evaded me due to my oversight during registration. Left with options in humanities, social sciences, and engineering, fortune smiled upon me.

Accompanied by my father for enrollment, I faced resistance when I declared my choice for petroleum engineering. His disapproval was palpable, citing concerns over the appropriateness of the field for women. Even the registrar echoed this sentiment, cautioning against the complexities of the oil industry and suggesting “more suitable” alternatives like computer or architectural engineering. Undeterred, I stood my ground, resolute in pursuing my passion for petroleum engineering.

Navigating through a predominantly male cohort of one hundred and seventy students at the College of Petroleum Engineering, I persevered with unwavering determination, buoyed by the support of a few professors and peers. However, securing practical experience proved arduous as foreign companies consistently rejected my applications for internships solely based on gender bias. Despite this setback, an internship at the Petroleum Exploration and Production Authority offered a glimpse into the industry.

After graduation, my endeavors to secure employment with multinational corporations met with repeated setbacks, yet encouraging responses spurred me on. A turning point arose in 2014 when I seized an opportunity for capacity building with the Austrian OMV company, emerging as the sole female candidate. After enduring grueling journeys for selection stages, I eventually secured a spot facilitated by the Director of the Department of Petroleum Engineers, Isbelle Zabblaza.

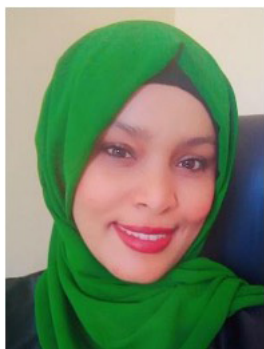
Relocating to Sana’a to commence my career as a reservoir engineer marked a significant milestone, albeit amidst societal constraints and the onset of Yemen’s civil unrest in 2015, which disrupted the oil sector. Despite the adversity, I channeled my expertise into training and mentoring roles until the industry’s resurgence in 2018.

Venturing beyond Yemen, I embarked on a new chapter in Somalia, facing familial resistance and grappling with cultural disparities and security concerns. Nevertheless, I acclimatized through language acquisition and cultural immersion, eventually assuming leadership as the head of the exploration and development department at the Petroleum Exploration and Production Authority.

Navigating the marine oil fields of Somalia presented fresh challenges and opportunities, allowing for professional growth and establishing capacity-building programs. Representing Somalia's oil and gas sector on international platforms underscored the strides made, further fueling my passion for the industry.

In defiance of gender stereotypes, I champion equality of opportunity, advocating for women's inclusion in traditionally male-dominated domains. Upholding resilience and a steadfast commitment to learning, I continue to pursue my aspirations, unwavering in the face of adversity. Life's trials are growth opportunities, and with perseverance and resilience, I embrace the challenges, shaping my journey in the oil and gas industry.

About the Author



Naseema Abdullah brings nearly a decade of rich experience in the oil and gas sector. She earned her bachelor's degree in petroleum engineering from Hadramout University and later pursued a master's in business administration. Naseema coordinated for the Hadramout Petroleum Training Center (HPTC) after her undergraduate studies. In 2014, she embarked on her journey with OMV Company as a reservoir engineer. From 2015 to 2018, she transitioned into a trainer role, delivering numerous courses within the oil

and gas domain for both students and industry professionals.

Additionally, Naseema assisted petroleum engineering students in executing their graduation projects. Between 2017 and 2021, she was Deputy Director of the Research Department at Dar Almaaref for Research and Statistics (DAMRS). Her responsibilities included conducting data analysis and applying statistical methodologies for research purposes. Notably, through her published work, Naseema has made significant contributions to the discourse on women's empowerment in Yemen and the wider region. Presently, Naseema Abdullah serves as the Director of Exploration and Development at the Somali Petroleum Authority, where she continues to demonstrate her expertise and leadership within the industry.

JOURNEY 4

Possibilities Are Unlimited When Combined with Perseverance

Hanan Farhat

Senior Research Director, Corrosion Center
Qatar Environment and Energy Research Institute
Libya

I was born in Athens, Greece, where I spent my early childhood before moving to Libya for my primary education. My father, a medical doctor, completed his education in Greece, which is why my oldest sisters and I were born there. My mother, a dedicated schoolteacher, sacrificed her career for the family, but her love for reading and self-education never waned. She tirelessly encouraged us to seek knowledge, often taking us to the local bookstore to purchase magazines and books. Education was paramount in our household, with my mother emphasizing the importance of a successful career and independence.

Meanwhile, my father supported our pursuit of STEM education, dedicating time to help us with math and science assignments and urging us to excel in school. High academic performance always earned rewards of visits to the nearby toy store when we brought home our report cards, fostering our pride in educational achievements. Throughout my schooling, I consistently ranked among the top 10 students and frequently secured the coveted position of #1. My most notable achievement was scoring 100% in every subject for one term during high school. This upbringing instilled in me the belief that hard work pays off and that dedication can make anything possible.

In Libya, during grade 11, students must choose between STEM or social studies and art. I faced a dilemma as I was torn between my love for writing and my proficiency in science and math. While I aspired to pursue a career

in journalism, my father, who had always dreamed of us studying medicine and opening a family clinic, advised me to opt for the STEM stream. Although medicine didn't appeal to me, engineering seemed a plausible alternative. However, my heart still leaned toward journalism. I ultimately chose the STEM stream, influenced by the fact that STEM students could later transition to universities offering art and social studies, whereas the reverse wasn't possible.

Choosing the STEM stream was the perfect fit for me. I thoroughly enjoyed it. It allowed me to engage in language arts, social studies, and history while studying math, physics, chemistry, and biology. Physics fascinated me, chemistry became one of my favorite subjects, and math was a fun challenge. I would solve math problems during car rides and even before bed, perceiving it more as a game than schoolwork. Fortunately, I had exceptional math and physics teachers in high school. My physics teacher would start the class by presenting challenging problems on the whiteboard, sparking discussions where we debated solutions and identified weaknesses. This experience illuminated the practical applications of math and science in everyday life.

The education system in Libya is government-funded, including universities. This was beneficial but challenging, as we had to fill out a form in the middle of 12th grade to express college preferences, with admission based on achieving the required grades. At that time, I was quite sure that medicine was not what I wanted to pursue. I was leaning towards engineering. When I told my father my choice, his first response was, "Engineering is not for women. No woman can work as an engineer. You will not be doing real engineering work even if you get the degree." He advised me to choose medicine as the best option for me as a woman.

His words unexpectedly fueled my determination to become an engineer and challenge societal perceptions about women in the field. I thought, "If this is what an educated man thinks about women's ability to become engineers, what do others think?" I decided to become an engineer to prove

to him and others that women can excel in engineering. My two older sisters pursued careers in medicine while I chose a different path, opening up new possibilities for my younger siblings. This decision didn't sit well with my father. He told me, "You will regret it and fail in Engineering." However, these words became my motivation. Starting university at 17, I dedicated myself to proving him wrong. It took time, but eventually, my accomplishments made him proud, and he expressed his pride in me.

The university environment exposed me to a predominantly male presence in many of my classes, often with only one or two other women or sometimes none. I was the only woman in my first lab class, a workshop involving grinding, filing, forging, casting, and welding. Initially, the instructor suggested that I watch and take notes while the boys shared their results with me for report writing. However, I refused to be a passive observer. Women in Libya at the time had limited exposure to hands-on work, and I wanted to learn and understand these processes first-hand. Despite the physical challenges, such as the heaviness of the hammer during forging, I managed to overcome them. Welding became a particularly enjoyable experience reminiscent of painting. Through these activities, I began to appreciate the artistry involved in the workshop and realized that this work was not as difficult as it initially seemed. I felt proud of the products I created, and to my surprise, some of my male classmates admired my work. Over time, they became my friends, and I gradually built a strong network of friendships.

During my first year of engineering in 1989, I had to choose my desired engineering discipline. Computer engineering was the most sought-after field then, but admission required passing an entry exam. Unfortunately, I missed the exam because I didn't see the announcement on the billboard where it was posted. This setback meant waiting two more terms to reapply. Determined, I approached the department head, hoping for an opportunity due to my high school GPA. On my way to the computer engineering department, I asked for directions and coincidentally encountered a passing professor who happened to be the head of Materials and Metallurgical

Engineering. Curious about this unfamiliar field, I agreed to visit his office after my meeting. Despite my perseverance in computer engineering, my request was denied. However, spending time with the materials and metallurgical engineering department head revealed a fascinating discipline I ultimately chose to study. It's remarkable how often we realize what we obtain is even better when we desire something intensely and don't achieve it. Looking back, I couldn't imagine a more fulfilling job than my materials and metallurgical engineering work. It's a reminder that, as the saying goes, "If you knew the unseen, you would have chosen the destiny."

While at university, I excelled in my studies and chose a practical graduation project focused on a corrosion-related failure in a Libyan oil refinery. The project involved laboratory work in simulated field conditions. I had a male student partner, but unfortunately, the division of work was unequal. I conducted most of the experimental work while my partner handled parts procurement and attended stakeholder meetings. I disliked this arrangement, as it seemed women were expected to do all the work while men attended meetings and handled external interactions. What bothered me most was that our academic supervisor consistently credited my male partner despite my better performance throughout the project, including during project defense. This experience was my first encounter with such dynamics in the professional world. Unfortunately, I faced similar situations throughout my career, which compelled me to learn how to defend my rights.

After graduating from university, few women chose to pursue careers. Many saw obtaining an engineering degree as a status symbol and either got married or taught math and science in all-girls high schools. I disagreed with this mindset and had discussions with these women, believing they were occupying seats in the College of Engineering that could have been used by those truly passionate about becoming engineers. It seemed wasteful for them to study something they didn't truly want to pursue, utilizing government funds. I advised them to consider studying subjects more relevant to their interests, such as psychology, history, or child education. It troubled me that these women contributed to reinforcing stereotypes about

women in engineering.

Several people and environments played a significant role in shaping my mindset. I became a member of Libyan Girls Guides at age five and eventually became a brownies leader for a group of 42 young girls. We would meet once a week, and I would teach them skills and arts and crafts, and we would do volunteer work. They often inquired about my studies and aspirations, inspiring me to become a positive role model. I would explain to them the positive impact women engineers can have on the world. The Girls Guides' motto, "Girl Guides do good every day," instilled a sense of pride in doing good deeds and making a difference.

Another influential person in my life was Khadijah Al-Jahmi, a prominent Libyan figure who was the first Libyan woman writer and broadcaster. Despite the era when society largely disregarded women's rights, she advocated for them. I connected with her during my university years and maintained regular visits until her passing. Her strength and advocacy for women's rights instilled a passion for the same cause. Although my attempts to create an organization for women engineers during university were unsuccessful, I dedicated more efforts to supporting women in STEM and engineering in the following decades.

After graduation, I embarked on a 9-month government work assignment, receiving a nominal salary while my male counterparts joined the army. Fortune led me to the Agip Oil Company, where I joined the quality assurance department, anticipating that I would be conducting engineering work. I was disappointed when assigned document controlling and filing tasks instead of the engineering work I had hoped for. Despite expressing my dissatisfaction to the department head, it became apparent that this was my designated role, leaving me disheartened. While my male colleagues engaged in genuine engineering work, I was relegated to mostly office tasks. I borrowed books from the department library and spent my less busy hours reading.

A turning point came when a senior engineer from Scotland noticed my discontent and engaged me in conversation. He became my mentor, involving me in technical evaluations of bids and offers related to field equipment replacement. Gradually, I gained more responsibilities and eventually performed independent technical evaluations and material selection. However, my lack of field experience remained challenging as women were not allowed in Libya's oil and gas fields then.

Seeking more practical experience, I transitioned to the Advanced Center of Technology. I initially worked as a materials engineer and later managed the metallurgical and materials engineering laboratory. My experience in the quality assurance department facilitated my contributions to equipment purchases for the newly developed center. Over the next couple of years, I managed four laboratories: the metallurgical lab, mechanical testing lab, Non-Destructive Testing lab, and heat treatment lab.

Upon joining the center, I faced challenges as the only woman engineer among 40 male engineers. Meetings with the executive director were particularly difficult, as I often found no chair. Over time, I learned to arrive early to secure a seat at the main table, although I still felt the weight of unwelcome stares from my male colleagues.

Despite my contributions, I faced obstacles such as not being provided a computer like my male counterparts. I had to rely on administrative assistants to write my reports, who frequently interrupted my work. Additionally, due to my shyness, I tolerated disrespectful behavior from some male colleagues.

An opportunity to travel to Taiwan for training marked a significant shift in my perspective. Being away from familiar surroundings allowed me to reflect on my situation and decide to change it. Upon returning, I became more assertive, confidently expressing my dissatisfaction with mistreatment and advocating for myself.

Despite my efforts, challenges persisted, such as being assigned tasks outside

my responsibilities and abruptly canceling my nomination for graduate studies without consultation. Feeling disrespected, I eventually resigned from the center. However, my reputation as a pioneering materials engineer in Libya opened new doors for me. I joined another government technical support center, focusing on welding and related techniques, where I became the first woman in Libya to work in welding metallurgy and inspection. Despite initial challenges, I quickly advanced to higher positions, eventually serving as the Technical Service Manager.

Managing male colleagues taught me valuable lessons in handling conflicts and focusing on organizational success. I dedicated myself to providing significant technical support to Libya's oil and gas industry and manufacturers while managing the training department, obtaining the highest non-destructive testing (NDT) certification, and becoming the first Libyan level III certified in NDT. Despite skepticism and rumors from male colleagues, my achievements garnered recognition, even reaching the Minister of Education and Vocational Training in Libya and being reported in an interview by a German newspaper. However, frustrated by societal challenges for women in Libya, I decided to leave the country and immigrate to Canada, where I pursued further studies, aligning with my aspirations for personal and professional growth.

Upon immigrating to Canada in 2004, I embraced a culture that cherishes freedom and respects human rights. Leveraging my professional background, I pursued a Master's in welding metallurgy. Upon enrollment, I secured a teaching assistant position at the university, where I instructed undergraduate students in NDT, mechanical testing, and materials labs. My academic journey culminated in a graduation project focused on optimizing welding processes for high-pressure pipelines, collaborating with a pipeline company.

Subsequently, opportunities arose with the pipeline company and an NDT firm offering managerial roles. However, I met my husband during this time, who taught engineering in Qatar. Familial challenges arose when seeking

approval for marriage to a non-Libyan man, as cultural norms in Libya posed hurdles. Despite my educational and professional achievements, cultural traditions dictated that male consent was paramount, leaving my desires overlooked. This struggle persisted for two and a half years before finally gaining familial approval.

Following marriage, I relocated to Qatar to accompany my husband, initially facing setbacks in securing suitable employment. Despite being overqualified, my applications were met with silence or automated rejections, reflecting Qatar's limited opportunities for women in engineering roles such as inspection or corrosion engineering. Eventually, I accepted a scholarship for PhD studies and a temporary position as a lab technician, which unexpectedly led to a breakthrough opportunity at Qatar Fertilisers Company (QAFCO).

After joining QAFCO as a senior inspection engineer, I spearheaded the implementation of Risk-Based Inspection (RBI) practices, enhancing plant safety protocols. However, challenges persisted, including discriminatory practices and a toxic work environment. Despite adversity, I persisted in my professional and academic pursuits, concurrently undertaking PhD studies in corrosion engineering.

Tragedy struck during this period as I endured the loss of my baby girl due to hospital negligence. This experience prompted me to reassess my priorities, focusing on family and seeking a healthier work environment. Eventually, an opportunity arose at Qatar Petroleum, where I led corrosion engineering research, fulfilling my passion for fieldwork and research inquiry. Concurrently, I joined the College of the North Atlantic-Qatar faculty, fostering industry-academia collaboration. My tenure at the college provided a platform to mentor and empower students, facilitating their entry into the workforce.

Additionally, I co-founded the Forum for Corrosion and Materials Engineering, advocating for industry-academia dialogue and collaboration.

Inspired by my experiences, I founded the Qatar Women Engineers Association (QWEA) and later the MENA Women in Engineering (MENA-WIEN) group, championing equity, diversity, and inclusion in the field and initiating a successful mentoring program. Through workshops, seminars, and networking initiatives, I strive to empower women engineers, ensuring their voices are heard and their talents are recognized.

Recognizing the immense need for a Corrosion Center in Qatar, I consulted with industry professionals and received their support for its creation. I attempted to establish it at CNAQ, but unfortunately, I was unsuccessful. I was told it was too ambitious and that I was a dreamer. However, this didn't deter me. I sought support elsewhere. Presenting the proposal to Qatar Foundation's VP of RDI, I received backing from him and the executive director of the Qatar Environment and Energy Research Institute (QEERI), which is part of Hamad Bin Khalifa University. I established the Corrosion Center at QEERI in September 2019, and I'm still acting as the Senior Research Director of the center.

I successfully built a state-of-the-art corrosion and materials research facility within two years. Despite the setback caused by the COVID-19 pandemic, the center made significant progress and became a key contributor to Qatar's industry asset integrity and QEERI's research portfolio and revenue. The center gained international recognition and formed several international alliances. I prioritized recruiting and developing young talent, fostering a collaborative and supportive work environment where everyone feels valued and encouraged to learn and grow. The center's success results from the team's united efforts and the belief that a positive work environment brings out the best in employees.

I'm immensely proud of the center's achievements, and I owe much of my success to the unwavering support of my family. Fortunately, my supportive engineer husband is my sounding board, offering valuable advice and encouragement through work challenges. Without his support, I would not have completed my PhD study or managed the responsibilities of parenthood.

Together, we share the responsibility of raising our two children, Jasmine and Camille. Although I sometimes feel guilty about working long hours, I prioritize being there for my kids. My daughter sees me as her best friend, while my son aspires to become an engineer or scientist, undoubtedly influenced by his father and me.

I have instilled in my children the values of hard work, persistence, and a strong work ethic as the keys to success. Teaching them that making a positive impact on others is more fulfilling than receiving awards or accolades, I take pride in witnessing them follow the path we have paved for them. Additionally, I express my gratitude to God and to everyone who has supported me throughout my career and contributed to my accomplishments.

My journey reflects resilience in adversity and a commitment to fostering positive change within the engineering community.

About the Author



Hanan Farhat is a leading figure in corrosion and materials engineering in the Middle East. She is Senior Research Director at Qatar Environment and Energy Research Institute and founded the Corrosion Center. With a PhD in corrosion engineering and a master's in mechanical engineering from the University of Saskatchewan, Canada, she's also a registered professional engineer in Canada and the first Libyan to achieve NDT level III certification.

Dr. Farhat has held various technical service and inspection engineering positions, as well as academic roles, emphasizing her diverse expertise. She represents Qatar in international organizations like the International Association of Oil and Gas Producers (IOGP), the International Standard

Organization (ISO), and the GCC Standardization Organization. Dr. Farhat founded the Qatar Forum for Corrosion and Materials Engineers, showcasing her commitment to knowledge sharing and collaboration.

Beyond her professional achievements, Dr. Farhat is dedicated to promoting diversity in STEM fields. She founded the Qatar Women Engineers Association (QWEA) and initiated the MENA Women in Engineering initiative, challenging gender stereotypes and inspiring women in male-dominated industries. Her contributions have been recognized with awards such as the Distinguished Women Engineer Contribution Award from the Canadian Association of Professional Engineers and Geoscientists in 2005, the Women of Change Award for Engineering Creativity by the Doha Women Forum in 2022, and the Middle East Women Leaders Award by the World Women Leadership Congress in 2023.

JOURNEY 5

The Power of Sharing Knowledge

Roselawati Pg Hj Halus

Chairperson,
The Asian Division of The Institution of
Engineering Technology (IET)
Brunei

My extraordinary journey to a successful engineering career began after completing my A levels in science subjects. Despite facing obstacles in my aspiration to become a pilot due to vision-related requirements, I redirected my focus towards engineering. I enrolled in Electrical Engineering at Brunei Darussalam's inaugural institution, which offered a Higher National Degree program. Here, lecturers from the United Kingdom guided me to excel academically.

During this formative period, I grappled with choosing an engineering specialization for my degree. Esteemed UK universities presented offers, and after careful consideration and mentors' recommendations, I chose the extended Communication and Electronic Engineering program at Bath University. Despite personal challenges, including marriage and welcoming my eldest son during my final year, I remained determined to excel. The university accommodated my circumstances, allowing me to take the final exam at the hospital following childbirth. With unwavering resolve, I triumphantly attained my degree.

Upon completing my studies, I returned to Brunei and began my career in the public sector. Although I found fulfillment in my work, my thirst for further education persisted. Despite initial setbacks in securing sponsorships for postgraduate studies, I persevered and eventually obtained approval for a one-year study opportunity in the UK. This endeavor presented its own challenges, including managing familial responsibilities while pursuing

academic excellence. Nonetheless, with Allah's blessings, I excelled again, achieving a distinction in Engineering Management.

Returning to work ignited with new passion, I advocated that parenthood need not hinder professional aspirations. My example demonstrated that one can overcome obstacles with determination and an unwavering spirit. As an engineer, I embraced commitment and responsibility, engaging in diverse projects and assuming managerial roles that honed my decision-making skills under pressure. Throughout my academic and professional journey, meticulous preparation emerged as a cornerstone of my success. I endorse cultivating disciplined study habits and proactive readiness, recognizing that ongoing learning is indispensable for continued growth. This mindset seamlessly transitioned into my professional life, enabling me to confront challenges confidently and prepared.

Over the years, I have received numerous medals and national acknowledgments for my dedication and accomplishments in engineering. I attribute these successes to my family's support, particularly my understanding husband and four children, who have adapted to the demands of my career. We instill in our children the importance of perseverance and pursuing their dreams.

As I approach retirement, I remain committed to mentoring aspiring engineers and contributing to the field. I volunteer at a local university, appraising students' projects, and serve on committees related to Health and Safety in the construction industry. My passion for environmental stewardship has led me to explore initiatives in energy efficiency to shape a greener tomorrow.

In conclusion, discipline, determination, and knowledge sharing are essential for progression in engineering. Reflecting on my journey, I am grateful for the opportunities and support that have propelled me forward. I am resolute in my commitment to continue advancing and contributing further to the field.

About the Author



Ir. Dk Roselawati PG Hj Halus's academic journey began with a bachelor's degree in electronic and communication engineering from the University of Bath in 1991. It culminated in a Master's in Engineering Management from Brunel University in 2004. Committed to personal and professional growth, she contributed significantly to the Ministry of Development, actively participating in critical projects and committees.

Her involvement in international conferences and programs, such as the World Workplace Asia Conference and the International Green Building Conference, enriched her expertise. Certified as a Green Mark Manager by the Building & Construction Authority of Singapore, she recently retired after dedicating years to the engineering industry.

Now serving as the Chairperson for the Asian Division of the Institution of Engineering Technology (IET), Roselawati focuses on advancing engineering and fostering collaboration across the region. She attributes her success to a strong work ethic, gratitude for opportunities, and support from mentors and colleagues. She aspires to share her wealth of knowledge and experiences to inspire others in their career pursuits. Reflecting on her journey, she emphasizes the importance of passion, perseverance, and continuous learning in achieving remarkable accomplishments. Roselawati approaches retirement with humility and gratitude, cherishing the chance to continue making a meaningful impact in engineering.

JOURNEY 6

Triumphs of Tenacity: A Journey of Achievement

Amalia A Widyasanti

Ministry Of National Development Planning (Bappenas)
Indonesia

Growing up in Bogor and later in Bandung, Indonesia, my journey toward personal and professional success was shaped by various factors, including my family's support and the wisdom imparted by community elders. This essay explores my upbringing, the life advice I received, and my aspirations to pursue higher education and a career in STEM. Additionally, I discuss the challenges I faced and the importance of perseverance in achieving success.

My parents played a significant role in my upbringing. My father served as a Director at a state-owned enterprise, while my mother was a dedicated homemaker. Both were incredibly supportive of my higher education aspirations. Their unwavering encouragement and guidance gave me the tools to pursue my educational goals. They also provided financial support, ensuring I had the resources to succeed academically.

During my childhood, I engaged in various games. Outdoors, I enjoyed playing tag, hide and seek, and hopscotch, which fostered my social skills and physical activity. Indoors, I reveled in board games like Monopoly, Scrabble, and Clue, which honed my critical thinking and strategic abilities. The advice I received from my parents and elders revolved around self-belief and embracing challenges. They instilled in me the importance of having confidence in my abilities, pursuing my dreams with determination, and viewing obstacles as opportunities for growth and learning.

My interest in STEM, particularly engineering, blossomed during my formative years. Fascinated by subjects such as math, physics, and chemistry, I found joy in the logical thinking and innovation that engineers exhibit. However, my family initially desired a different path for me, hoping I would become a doctor. Despite their reservations, I engaged in extensive discussions to convince them that my true passion lay in chemical engineering. Ultimately, they supported my decision to pursue my dream by enrolling me at the prestigious Bandung Institute of Technology.

While I am not an entrepreneur, my journey to success involves overcoming daily obstacles and embracing a mindset of continuous improvement. Sparky Anderson's quote resonates deeply, emphasizing that success is not a chance occurrence but a result of dedicated effort, learning, and sharing. In my quest for success, I constantly strive to deliver my best in every aspect of life. Unsatisfied with complacency, I seek to refine my skills, innovate, and continuously evolve to create a positive impact in my endeavors.

Society should encourage and empower girls to pursue higher education, choose their career paths, and seize opportunities for personal growth and fulfillment. Girls should be equipped with the tools and support to explore their interests, discover their potential, and contribute positively to society. However, it is equally important to emphasize avoiding harmful or illegal activities that could jeopardize their well-being or harm others. By embracing positive actions and choices, girls can shape a brighter future for themselves and their communities.

Various factors, including family support, valuable life advice, and personal determination, have influenced my journey toward success. Through the encouragement of my parents and the wisdom imparted by my community, I pursued higher education and ultimately embarked on a career in STEM. Overcoming obstacles, embracing continuous improvement, and adhering to positive principles have been crucial in my pursuit of success.

Join me on an exhilarating journey as I share my experience of choosing

a career in engineering. I'll take you through the ups and downs, the challenges, and the incredible support I received along the way. From making the bold decision to pursue engineering to navigating the reactions of those around me, I will uncover the various considerations I faced as a woman entering a male-dominated field. Furthermore, I'll delve into the empowering impact of personal determination and the freedom to forge my career path.

During Senior High School, I discovered a passion for problem-solving and a strong inclination toward math and science. Recognizing the potential to make a tangible impact on society through engineering, I consciously decided to pursue this field. The prospect of using logical thinking and innovative approaches to create something new and meaningful resonated deeply with me.

When I announced my intention to study engineering, reactions from those around me varied. While some expressed concerns about the challenges of entering a male-dominated field, others were intrigued by my decision. However, after engaging in productive discussions and addressing doubts or misconceptions, I received support from my family and friends. They recognized my passion and determination and understood the potential for success in the engineering field. Despite initial discussions on more “girl-appropriate” career options, my family ultimately respected my autonomy and decision-making power. They provided advice and shared their thoughts but never imposed their preferences upon me. I am grateful for the freedom they afforded me, allowing me to choose a career path based on my own interests and aspirations.

Pursuing a career in engineering presented its own set of challenges. As a woman entering a male-dominated field, I had to navigate preconceived notions and stereotypes. However, I remained committed to my decision, knowing my passion and dedication would propel me forward. I sought out support systems and mentors who helped me overcome obstacles and encouraged me to strive for excellence.

Although engineering was not initially on my radar, some decisions happen serendipitously. Exploring my interests and strengths, I discovered a deep affinity for engineering, ultimately becoming a life-changing choice. The unexpected alignment between my skills, passions, and the opportunities offered by the field solidified my resolve to pursue a career in engineering.

Throughout my journey, I never had to prioritize my career over my brother's. Our career choices were seen as individual pursuits guided by personal aspirations rather than gender-based expectations. We were encouraged to follow our passions and explore the paths that resonated with our unique strengths and interests.

Choosing a career in engineering as a woman required courage, determination, and the support of my loved ones. Through productive discussions and a commitment to my passion, I was able to pursue a path that aligned with my interests and aspirations. The freedom to choose my career, coupled with the belief in my own abilities, has propelled me on a rewarding journey of personal and professional growth. By breaking barriers and embracing my chosen field, I strive to inspire others to pursue their dreams and challenge societal norms.

I will share my experiences as a woman in STEM, focusing on my college years and the changes I observed in the present generation. From the ratio of boys to girls in my college to the treatment received from classmates and faculty, I will discuss the environment's women-friendliness. Additionally, I will touch upon incidents where gender stereotypes were challenged and reflect on whether things have improved for the present generation.

In my college, the ratio of boys to girls was around 7:2. Despite being a minority, I found the treatment from my classmates and faculty to be respectful and supportive. Living in Indonesia, where humility is prevalent, I experienced no objections or discriminatory behavior. The people around me, both students and faculty, were kind, welcoming,

and embraced diversity. The campus I attended was women-friendly, considering various factors. Firstly, there was an equal number of women's restrooms conveniently located and easily accessible throughout the college. The timing of facilities was accommodating, ensuring that women could access them without hindrance. Transportation services, such as shuttles and buses, were provided to cater to the needs of all students, including women. The college also prioritized security, ensuring safety in public areas. During my journey, I encountered incidents where gender stereotypes were prevalent, with some male colleagues underestimating their capabilities.

Field experience and internships are indispensable in shaping one's career trajectory, particularly in STEM fields. They offer practical exposure, skills development, and a profound understanding of real-world challenges. Moreover, a supportive environment is paramount for fostering growth and overcoming obstacles, providing individuals with the necessary resources and encouragement to thrive. Women in engineering encounter a myriad of challenges, including gender bias and workplace culture disparities. Despite these hurdles, many pursue further education to deepen their expertise and explore new interests. Advanced education enhances knowledge and opens doors to research opportunities and teaching positions, empowering women to contribute significantly to their field's advancement.

Family support is pivotal in women's journey to engineering, offering encouragement and assistance. Their unwavering belief in capabilities serves as a driving force, motivating women to strive for excellence and overcome societal expectations. Rejecting norms such as dowry promotes equality and underscores the celebration of the union of families based on love and respect. Women in engineering demonstrate resilience, determination, and ingenuity in the face of adversity. By challenging stereotypes, advocating for inclusivity, and nurturing a supportive environment, we can pave the way for a brighter future where women thrive in all STEM disciplines.

Women in engineering have historically faced barriers to entry and advancement in the field due to discrimination and bias. However, recent efforts to promote diversity and inclusion have led to greater opportunities. This essay will discuss the ease or difficulty of finding a job, the challenges faced, the treatment by male colleagues, and the unique perspectives women bring to academic or industry jobs. The ease or difficulty of finding a career in engineering as a woman depends on various factors, including experience level, specific engineering field, industry or company, and location. Women may face challenges in traditionally male-dominated sectors, such as construction or oil and gas, where bias and discrimination are prevalent. However, industries prioritizing diversity and inclusion, such as renewable energy or biomedical engineering, may offer advantages.

Unfortunately, women often face unwarranted doubts about their commitment and capabilities in the workplace due to their gender. Discrimination and bias manifest in unequal pay, fewer opportunities for advancement, and derogatory comments or harassment. These obstacles hinder women's professional growth and perpetuate gender inequality. Organizations must recognize and address these biases, promoting a fair and inclusive environment where women can thrive based on their skills and merits, free from gender-based discrimination.

Many men treat their female colleagues equally, showing support and respect. However, it is crucial to acknowledge that gender biases and discriminatory behaviors may still exist in some cases. Organizations and institutions play a pivotal role in fostering a culture of respect and inclusion, implementing policies and programs that address bias and harassment. Promoting diversity and inclusion at all levels creates an environment where everyone feels valued and empowered. Addressing departmental issues should focus on finding the most effective approach, regardless of gender. This may involve a collaborative approach incorporating multiple perspectives or a direct and assertive approach if necessary. The emphasis should be on resolving the issue and fostering a positive and productive work environment.

Unequal pay remains a significant issue, with women often receiving lower compensation for performing the same job roles as their male counterparts. This wage disparity undermines women's value, motivation, and professional growth. Organizations must actively work to close this gap and provide equal opportunities and recognition for all employees, regardless of gender. Workplace safety is essential for all employees, regardless of gender. Employers are responsible for ensuring a safe work environment free from physical, psychological, and emotional harm. Preventive measures against accidents, injuries, and violence are crucial for creating a secure and supportive workplace. Women bring valuable perspectives to academic and industry jobs. Balancing multiple responsibilities in their personal and professional lives has honed their multitasking and problem-solving skills. Additionally, the historically limited representation of women in various fields has provided them with a unique viewpoint, fostering innovation and leading to fresh and inventive approaches to problem-solving.

Women in engineering have made significant strides in overcoming challenges and contributing to the field's advancement. However, work must be done to dismantle biases and barriers. Organizations, institutions, and individuals must continue fostering inclusivity, challenging discriminatory practices, and promoting equal opportunities. By embracing diversity and recognizing women's valuable perspectives, we can drive innovation and create a more equitable and welcoming environment for all engineering professionals.

Balancing work and family life is a common challenge many individuals face, particularly women pursuing careers in engineering or STEM fields. This essay explores the experiences and strategies to maintain a healthy work-life balance while navigating professional commitments and family responsibilities. It will delve into the values brought into the household, the potential opposition faced, and the importance of self-care and effective communication.

A healthy work-life balance requires careful prioritization, effective time management, and open communication. By creating a list of important tasks and responsibilities, individuals can prioritize based on urgency and importance. This approach helps to focus on critical tasks, minimizing feelings of overwhelm. Additionally, practicing self-care through adequate sleep, a healthy diet, and regular exercise enhances overall well-being, increasing productivity and balance. Receiving support and encouragement from family members is invaluable when pursuing a career or higher education. The belief and motivation provided by loved ones boost confidence and drive. Active involvement demonstrates their unwavering dedication, enabling individuals to pursue their goals diligently. By maintaining a strong support system and open communication, individuals can effectively balance work commitments without compromising family commitments.

Historically, women have faced challenges in the professional world, often feeling the need to downplay their achievements in male-dominated environments. However, societal attitudes are evolving, recognizing the value and contributions of women in various fields. Efforts toward gender equality and inclusive work environments are underway, empowering women to express their accomplishments confidently. It is crucial to continue working toward a society where individuals can proudly share their professional successes without fear of discrimination or judgment. As a working woman in the engineering or STEM field, several values are imparted in the household. Responsibility plays a crucial role in creating a stable and healthy family environment. Accountability for one's actions fosters trust, reliability, and respect within the family. Additionally, compassion is essential for building empathy and understanding toward family members and supporting them during vulnerable moments. Strong family bonds are forged by embodying these values, fostering cooperation and harmony.

Women may face opposition or criticism for dedicating significant time to their work. Effective communication of priorities and goals with family

and friends is vital. Setting boundaries and striving for a healthy work-life balance can help manage challenges. Seeking support from colleagues, mentors, or professional counselors can provide guidance and assistance in navigating these complexities.

Balancing work and family life as a woman in engineering or STEM requires intentional effort and effective strategies. Prioritization, self-care, and open communication are essential in maintaining a healthy work-life balance. The support and encouragement received from family members bolster confidence and determination. Strong family bonds are nurtured by embodying values such as responsibility and compassion. Overcoming opposition and setting clear boundaries are crucial in navigating potential challenges. With continued progress toward gender equality and inclusive work environments, women can confidently express their achievements and contribute to society's advancement.

In today's rapidly evolving world, the need for gender equality and women's empowerment in the workplace is more important than ever. As a society, we must recognize the value of diverse perspectives and women's immense potential in engineering and STEM fields. This essay explores the role and responsibility of promoting women in engineering and allied fields, the challenges they face, the changing perceptions of society, and the dream of achieving gender equality in the modern workplace.

Several strategies must be implemented to encourage more women to pursue careers in engineering and STEM fields. Firstly, providing mentorship and role models is crucial. By showcasing successful women in these fields, young women can envision what is possible and feel inspired to follow in their footsteps. Mentorship programs can provide guidance and support throughout their educational and professional journeys.

Additionally, scholarships and financial support can help alleviate financial barriers often hindering women from pursuing engineering careers. By providing equal access to resources, scholarships, and financial assistance,

we can level the playing field and ensure that talented women have the opportunity to excel in these fields.

Creating a supportive environment is also essential. Implementing policies that prevent discrimination and harassment, providing childcare and family leave resources, and fostering networking opportunities for women in engineering can help create a welcoming and inclusive environment where women can thrive.

Several changes are necessary to create a less hostile environment for women. Society's attitudes and norms must evolve to promote gender equality and respect. Comprehensive educational programs addressing gender bias and discrimination should be implemented. Businesses must ensure equal opportunities and fair pay for women. Legal systems should enforce stringent measures against harassment and violence. Inclusive leadership and amplifying women's voices are vital to fostering a more welcoming environment. Balancing work and personal responsibilities is a significant challenge for women. Traditional gender roles and societal expectations often place the burden of caregiving on women, affecting their ability to commit fully to their duties in the workplace. Supportive policies, flexible work options, and equal sharing of caregiving responsibilities can help create a more balanced and inclusive environment. Society's perception of working women has changed over time. The feminist movement of the 1960s and 1970s played a crucial role in advocating for gender equality and women's rights. Today, there is a growing recognition of women's contributions to the workforce, but challenges such as gender discrimination, unequal pay, and limited access to leadership roles persist. It is essential to continue addressing these issues and striving for greater gender equality in the workforce.

Women in Southeast Asia face specific challenges, including limited access to education and employment opportunities, traditional gender roles, cultural norms that prioritize male authority, and challenges related to reproductive health and rights. However, significant progress has been

made in promoting gender equality and women's empowerment in the region through policies, programs, and organizations dedicated to advancing women's rights.

My vision for women in the workplace in modern society is a world where women are represented equally, have the same opportunities for advancement and leadership as men, and receive equal pay for equal work. I envision inclusive and diverse workplaces, valuing women's unique perspectives and contributions. This requires a cultural shift, the elimination of biases, and the creation of safe and supportive environments where women's voices are heard and respected. Promoting women in engineering and STEM fields is crucial for achieving a more inclusive and diverse workforce. By providing mentorship, scholarships, and a supportive environment, we can encourage more women to pursue careers in these fields and contribute to technological innovation and societal progress.

About the Author



Amalia Adininggar Widyasanti, affectionately known as 'Winny,' is a distinguished Indonesian economic planning and development figure. During her career at the Ministry of National Development Planning (Bappenas), she has showcased remarkable expertise and leadership in various roles. Starting her journey at Bappenas in 1999, Winny steadily ascended through the ranks, culminating in her position as Deputy Minister for Economic Affairs in December 2020. Before this, she served as

a Senior Advisor to the Minister, focusing on the economy, financing, and economic landscapes. Winny's contributions extend beyond her administrative roles. She played a pivotal role in Indonesia's pursuit of Sustainable Development Goals (SDGs), leading the SDGs National Secretariat and currently serving as the vice chair of the SDGs National Team. Her dedication to sustainable development underscores her

commitment to shaping Indonesia's future in a socially responsible manner. Educationally, Winny boasts an impressive background, holding a PhD in Economics from the University of Melbourne, Australia, complemented by master's degrees in both Engineering and Chemical Engineering. With her profound interests in macroeconomics, international economics, and economic modeling, Winny continues to be a driving force in steering Indonesia towards prosperity and sustainability on the global stage.

JOURNEY 7

Breaking Walls

Batool Abdulaal Al Fahad
Former Vice President
Water and Electricity Authority
Bahrain

I grew up in a bustling household with 24 siblings, raised solely by my mother after losing my father at the tender age of 2. Despite the challenges, my mother remained steadfast in her commitment to our education. She often tutored me on our breezy rooftop, insisting that success in school would unlock boundless opportunities. Nestled on the tiny Middle Eastern island of Bahrain, my world revolved around its vibrant energy, and I was determined to carve out my place within it.

My childhood memories are adorned with daily journeys to and from school, each walk transforming into a captivating odyssey of familiar sights and scents. At 11, accompanied by my younger sister Mona, we traversed the winding streets, passing through the historic souq as more girls seamlessly joined our procession like clockwork. We proudly wore our school uniform: a khaki vest, navy blue skirt adorned with the school emblem, and neatly tied ponytails. Our attire turned heads wherever we went.

One particular day etched itself into the fabric of my existence. I vividly recall Mona clutching her notebooks to her chest, her fingers stained with the remnants of a half-eaten Bambar fruit. This petite, sweet, and crunchy fruit served as a makeshift snack, staving off hunger until we returned home for lunch, leaving our fingers sticky with its lingering sweetness.

As we approached our doorstep, weary and famished, my brothers Hussain and Abbas were engaged in a heated argument.

“Why can’t we both pursue medicine?” Abbas hesitated as his older brother Hussain urged him on.

“We can’t all become doctors, Abbas! I’ll take up medicine, and you can pursue engineering!” Hussain exclaimed.

“But I want to study medicine too...” Abbas persisted.

I sensed the frustration mounting on Hussain’s face as Abbas tested his patience. “Enough, Abbas. I will be the doctor, and you the engineer! Consider this my final request,” Hussain declared, his hands poised to strike as his tolerance wore thin. “What is your decision?”

Abbas didn’t waver. Standing tall, he replied firmly, “I want to be a doctor.”

Before anyone could react, Hussain’s hand connected with Abbas’ cheek, fueled by pent-up anger and frustration. “You still want to be a doctor?!”

Rubbing his cheek, Abbas straightened himself, unwavering. “Yes, a doctor.”

“Fine, go ahead and become a doctor...”

Observing Hussain storm off, his frustration evident, I exchanged a knowing glance with Mona. We both silently acknowledged our potential career paths—perhaps as doctors or engineers.

In many ways, that moment marked the trajectory of our futures, as Abbas and Hussain’s choices influenced every decision we made in school thereafter.

A few months later, Hussain departed for Saudi Arabia to pursue Electrical Engineering, while Abbas headed to Iraq to fulfill his medical ambitions.

Years later, Mona followed Abbas into medicine, and I followed Hussain into Electrical Engineering.

Striking a Balance

Balance is a concept close to my heart, a lesson I share with those seeking to make a difference. It's about balancing family and career, continuous learning, and self-fulfillment. On life's journey, maintaining balance requires the courage to seek support from others.

My greatest test of balance came in 1983, shortly after graduating. Newly married with a one-year-old son, I received a rare opportunity to pursue an advanced degree in the UK. However, it meant nine months away from home and my family.

Travel was a significant commitment then, both financially and emotionally. Long-distance communication was limited and expensive. Would I be able to focus on my studies knowing my family was thousands of kilometers away?

Decisions like these are agonizing, but they are also a privilege. In making them, we can strive to maintain balance with the support of others. For me, that support came from my mother, who had sacrificed so much for us over the years.

“What’s troubling you, my dear? How can I help?” she asked when I confided in her. She had always been our rock, supporting our education, organizing our lives, and nourishing us. In many ways, she lived vicariously through our achievements, aspiring for us to reach heights she never could.

“Go pursue your degree! I’ll come with you and take care of Ali while you study,” she exclaimed. Little did I know, this marked the beginning of her years-long commitment to caring for my son as I pursued my career. I owe her the balance I sought and the success I achieved.

Breaking Barriers

I've always been hands-on and eager to apply my engineering knowledge in the workplace. Since joining the Electricity and Water Authority in 1979, I have aspired to obtain the High Voltage Substation Operator certificate.

It was an unconventional path for a woman at the time, but I craved the responsibility of managing electrical substations that powered countless homes. The prospect of becoming a high-voltage operator was a frequent topic of discussion at family gatherings.

When I approached my senior manager about applying for the role, I was met with skepticism. “Batoool, I don’t think being a high-voltage operator is suitable for a woman; it often requires late-night shifts,” he argued.

Why was this role deemed unsuitable for a woman? Racial stereotypes often lead us to internalize biases. As a woman, I feared judgment for my choices, wondering if people would blame me for any mistakes based on preconceived notions of my capabilities.

Was I prepared for the demands of the role? Absolutely. What undermined my confidence were societal expectations. Would I falter because of my gender or race? Or was it simply because I wasn’t ready?

I encountered many instances where people deemed toughness or leadership incompatible with femininity. Cultural biases were pervasive, presenting additional challenges in a male-dominated field.

But breaking these barriers also presented opportunities to redefine cultural norms. It required extra effort to prove myself, challenge stereotypes, and pave the way for others.

I am grateful to my husband, Jaffar, for empowering me to challenge expectations. He always supported my aspirations and dismissed doubts about my capabilities.

“What do you mean you’re not suited?” he would say. “There’s no one better suited for this job than you.”

Responsibility

The day finally arrived when I was put to the test—I received the first emergency call from a substation. I was one of the few certified substation operators on duty that night. The call came at 9 PM while I was having dinner with my family. Jaffar gave me a reassuring look and a nod, then began collecting the dishes.

With trembling hands, I donned my overalls. Excitement mixed with fear coursed through me at the thought of what lay ahead. This was it, the moment of reckoning. I reached the electrical site and walked towards the entrance of the substation, my overalls and operator tag gleaming in the moonlight. Placing my hand on the entry door, I paused. Doubt and fear overwhelmed me for a moment.

When faced with difficult tasks in life, self-doubt often creeps in. However, this time, something inside me said, ‘You can do this.’ It gave me the strength to carry forward despite overwhelming fear.

This newfound confidence reminded me of a lesson taught by my brother Hussain when I was five. He threw me into the deep end of a pool without warning.

“Hussain! What are you doing?” I panicked as I was being flung into the water.

Although unorthodox at first glance, his approach proved invaluable over time, instilling within me resilience and courage—two traits essential for success. I thank Hussain for showing me that doubt is a good thing; without it, there is no room for improvement. A little fear helps bring focus to your actions. He has always paved my way towards education and knowledge, removing many obstacles ahead of me.

I took a deep breath, lifted my head high, and pushed forward to fulfill the responsibility I had always fought for and craved.

Fulfillment

Seven years later, I received a call.

“I just wanted to let you know you’re getting a promotion. Congratulations, our new VP of production and transmission!”

The thrill and excitement of the announcement rushed through my body, carrying with it the weight of my entire journey to this point. I realized this job was to oversee the same substations I sought to operate ten years ago, managing thousands of male-dominated electricians and production teams. I discovered a new cultural norm was set and had a front-row seat to this change.

Did I accept my promotion? Of course! But for the next seven years, I realized my true fulfillment lay elsewhere. The hardships and challenges in life bring resilience and growth, but my true fulfillment came from sharing my experiences with those facing similar challenges.

There will be days when you pause, consumed by doubt and fear. I know now that we should cherish those days, as they are the needed fuel for the fire of success. I have taken it upon myself to pass this message to every young lady. Since 1995, I have joined countless charities and grassroots efforts to empower women on their journeys ahead. I directed and contributed to the Young Ladies Association and Engineering Association, where we encourage women starting their journey to have the courage to break walls and find balance in this competitive world. For my self-fulfillment, I thank the many women trailblazers who continue to pave their way to success despite doubts, fears, and cultural stigmas. Thank you for showing me that I am not alone. Thank you for encouraging me to share my story so that we may empower the next generation.

About the Author



Batool Abdulaal Al Fahad obtained her bachelor's degree in electrical engineering from Basra University in Iraq in 1979. She began her career at the Electricity and Water Authority of Bahrain the same year, obtaining a high-voltage operator Certificate from the UK (Manchester) and progressing through various roles within the organization. These roles included serving as a certified high-voltage substation operator, an engineer in the Strategic Planning Department, and eventually as Directorate Manager at the Electricity Transmission Department. In 1990, she achieved her master's in engineering with distinction, further solidifying her expertise in the field. Subsequently, she was appointed Assistant Undersecretary for Production and Transmission of Electricity and Water.

Throughout her career, Batool has committed to professional development and actively contributed to various initiatives. She is a dedicated member of the Bahrain Society of Engineers, where she focuses on advancing women's empowerment. Her efforts aim to inspire and support women in overcoming barriers and achieving success in a competitive environment. Following her retirement in 2014, Batool's dedication to women's development work has only grown. She channels her expertise and passion through mentorship and community involvement at the Bahrain Girl Renaissance Association.

JOURNEY 8

Iron Fist in a Velvet Glove: A Lifelong Learner

Diana Najib Bou Ghanem

Director of Telecom Sites and Equipment
Ministry of Telecom
Lebanon

Writing this article has been transformative. Typically, I delve into topics related to my professional endeavors—crafting papers, designing courses, or detailing work experiences. However, this piece marks a departure as I explore the depths of my own narrative. It has prompted me to ponder the fundamental question: “Who am I?” My favorite response echoes, “I am an engineer and a mother.”

My story begins in the picturesque village of “Ramlieh,” nestled in Mount Lebanon. I was fortunate to be nurtured by forward-thinking parents—a visionary mother and a progressive father. I grew up in a bustling household, fifth among five sisters and two brothers. An intriguing familial lineage reveals a pattern of male dominance in land ownership, tracing back through generations. Inheritably, males tilled the land, defended it, and perpetuated its lineage, while females were relegated to domestic roles and matrimony, devoid of land ownership rights.

From an early age, I refused to accept any notion of inferiority to boys. I eagerly challenged gender norms by excelling in physical activities like running, football, and climbing, finding solace in my aptitude for mathematics. Encouraged by my family’s recognition of my dual prowess in academics and athletics, I forged ahead confidently.

My father, a landowner and farmer, navigated through the changing

tides of agricultural economics. Despite governmental policies favoring urban development over rural sustenance, he persisted in stewarding his ancestral land, albeit with diminishing returns. Witnessing the decline of farming's profitability, he pivoted, leveraging his resources to establish a successful contracting enterprise. This strategic move not only secured our education but also underscored his unwavering commitment to preserving our familial legacy—the land symbolizing our dignity and pride.

My journey encapsulates defiance against societal norms, a celebration of individual capabilities, and a profound appreciation for heritage amidst evolving landscapes.

My mother, a dedicated schoolteacher, prioritized education for all seven of her children, regardless of gender. She contended with resistance from my father's family, who held traditional beliefs about girls' roles and marriage. Fortunately, I was born into a family where my mother firmly believed in empowering girls through education. She viewed education as essential, describing it as a weapon for girls, asserting that no girl should marry before completing her schooling and university education. For her, education was the cornerstone of a girl's strength and independence.

My mother's influence prevented me from succumbing to the early marriage expectations prevalent among girls in our village. Even relatives in Beirut prioritized marriage over education, but my mother remained steadfast. She never emphasized physical beauty, instead admiring intelligence and confidence. Our days were filled with studying during school, working on household tasks, and being in the fields during summer vacations, much like my brothers.

During summers, we cultivated vegetables for home consumption and assisted our father in harvesting fruits for the market. These experiences provided practical applications for the lessons learned in math, physics, and geometry.

I eagerly participated in traditionally male tasks like tilling the soil and preparing irrigation systems, finding joy in the geometry and physics involved. Despite societal norms, I embraced these opportunities to learn and apply scientific principles in real-life situations.

Growing up amid a civil war presented challenges, but I found solace in reading, particularly mysteries by Agatha Christie, which honed my critical thinking skills. Restrictions on television led to games like cards and Monopoly, fostering a love for Arabic literature and poetry and a passion for solving math problems.

Living my childhood in a village taught me to appreciate simple pleasures like running in the rain and watching snowfall. As my siblings pursued various careers, I found my calling in computer and communication engineering at the American University of Beirut (AUB) despite being among the few women in my field.

Navigating a male-dominated industry, I faced resistance but persevered with my husband's support. Despite societal criticism for balancing work and family, I pursued a successful career in the Ministry of Telecommunications, overcoming gender and socioreligious biases. I undertook challenging tasks and diversified experiences throughout my career, fueled by hard work and effective communication. Despite criticism for traveling for work, I remained committed to my job, recognizing the double standards imposed on women.

My determination to succeed enabled me to overcome obstacles and make a meaningful impact in my field. My children once expressed their desire for me to be home when they returned from school. My younger brother reassured them that they should be proud of their mother's dedication to her work, as it signifies intelligence and responsibility. While his comment positively impacted my children, I couldn't help but feel a twinge of guilt. Nonetheless, I believe my experiences have positively influenced my children, imparting valuable life skills that have aided them

in school. They've learned to approach problems with a solution-oriented mindset and have developed a strong work ethic, never backing down from challenges.

While balancing work, I pursued further education, earning my MBA and DBA. These studies kept me abreast of current knowledge and augmented my engineering expertise with essential business acumen, providing a comprehensive understanding of the telecom and ICT sectors. Subsequently, I was appointed as the gender focal point for the National Commission of Lebanese Women, where I delved into gender mainstreaming and project analysis. Working alongside non-engineering women presented challenges due to differing perspectives, but it heightened my awareness of women's issues and the imperative of gender equality and equity.

Additionally, I contributed to the Methodology for the Assessment of the National Procurement System (MAPS) at the Bassel Fleihan Institute of Finance. This involvement expanded my insight into international procurement practices, leading to my role as a trainer in sustainable procurement and contract management. This experience taught me the significance of reforming government contracts and combating corruption. Despite encountering skepticism about women's leadership in engineering, I persevered. A senior official who once doubted women's managerial capabilities eventually recommended me for a directorial promotion, illustrating the potential for change in perceptions.

Successful women in engineering possess a diverse range of competencies crucial for navigating the field's complexities. These include:

1. Technical competence
2. Critical thinking and problem-solving skills
3. Communication skills
4. Resilience and perseverance
5. Continuous learning
6. Collaborative mindset

7. Leadership skills
8. Adaptability
9. Creativity
10. Time management

These competencies collectively equip women in engineering with the tools necessary to excel in their roles, overcome challenges, and drive meaningful impact in their respective fields.

In summary, successful women in engineering exhibit a blend of technical proficiency, interpersonal finesse, and leadership acumen, coupled with a passion for their field and a commitment to ongoing growth. My journey, though challenging, has fortified me over time, akin to wielding an iron fist within a velvet glove—firm yet compassionate, employing diplomacy and kindness.

About the Author



Diana Bou Ghanem is a seasoned professional with expertise in telecommunications, ICT, procurement, and public-private partnerships (PPPs). After earning an engineering degree from AUB, she began her career in the private sector, specializing in IT and project management before transitioning to the telecommunications sector. She demonstrated leadership and strategic vision as Director of Network Operations for Lebanon's national network.

Diana's commitment to learning led her to pursue master's and doctorate degrees in business administration. During this time, she made significant contributions to AI, PPP, and procurement through her research and publications. Notably, she played a key role in formulating and adopting

Lebanon's new public procurement law, drawing upon international best practices. As Director of Telecom Sites, Diana oversees all technical procurement activities for the national telecom network. She also shares her expertise as a consultant and trainer on PPP, public procurement, and contract management at the National Institute of Finance. Additionally, she contributes as a jury member for the Digital Arabic Content Award under UN-ESCWA. Certified as a PPP professional and mediator, Diana remains dedicated to advancing her field and fostering excellence.

JOURNEY 9

Never Giving Up

Teresita Dangat-Balba

Adviser, Philippine Institute of Chemical Engineers
Philippines

I was born on May 5, 1957, in Calasiao, Pangasinan, Philippines, and raised in Basista, Pangasinan, by my parents. Growing up in a humble background, my parents, who had only completed elementary school, held strong aspirations for their children to attain higher education. As the eldest among seven siblings, I dedicated my childhood to assisting my parents and serving as an inspiration for my younger siblings. Throughout my upbringing, my parents instilled in me the values of humility, thoughtfulness, and kindness towards others.

Even at 10, I knew I wanted to become a chemical engineer. I possessed a natural affinity for mathematics and chemistry, which ignited my interest in the field. Despite financial constraints, my parents initially hesitated to support my aspirations. However, my father's sister graciously offered assistance, enabling me to pursue my college degree.

For over 20 years, I worked as a chemical engineer, primarily within the paper mill industry. I held positions in various companies, supervising and managing quality control departments, overseeing wastewater treatment plants, and serving as Pollution Control Officer. In 2004, while stationed in a remote location, I took a leave of absence to pursue a master's degree in environmental engineering at Mapua Institute of Technology. Later, I enrolled in a doctoral program at the University of the Philippines. Although I completed all required coursework, time constraints prevented me from finishing my dissertation.

During this period, I established my environmental consultancy business, which has thrived over the past 15 years. Starting as a solo venture, my consultancy now employs nine individuals and serves a diverse clientele with over one hundred projects.

During my college years, I encountered discouragement from older professors who believed women were incapable of excelling in engineering. Despite this, I persevered, obtaining a Bachelor of Science in Chemical Engineering and passing the government licensure examination. Gender discrimination persisted during job applications, yet I defied preconceptions, eventually becoming the sole female engineer in many of the paper manufacturing plants where I worked.

Upon marriage in 1985, my husband initially wished me to manage our home rather than pursue my career. Although I complied initially, I returned to work after my son turned two, driven by a desire to fulfill my professional aspirations. Striving to balance family and career, I found unwavering support from my family, who recognized the significance of my career choice.

Despite facing challenges, I succeeded in providing financial support to my siblings, ensuring their educational pursuits. While the field of Chemical Engineering initially exhibited an imbalanced gender ratio, I witnessed a positive shift, with more women enrolling in traditionally male-dominated engineering disciplines. During my professional career, I encountered disparity among colleagues who questioned my abilities solely based on gender. However, I persevered, eventually gaining recognition for my competence as an engineer. Despite gender discrimination in engineering fields, there's been progress, with management acknowledging the value of employing women engineers.

Overall, my journey as a woman engineer has been marked by challenges and triumphs. These experiences have significantly improved my social status and garnered admiration and respect from colleagues and peers.

In my initial role as a Research and Development Engineer, I found solace in the laboratory environment, where I dedicated most of my time to conducting research. It provided a secure space for me to work and flourish.

When I entered into marriage, it didn't notably alter my life. However, the dynamics shifted dramatically with the news of my pregnancy. Unfortunately, complications arose, leading to an early departure from work and a mandate for complete bed rest until my due date. Eventually, I gave birth to my son via cesarean section and underwent a hysterectomy due to the presence of myoma in my uterus. Following the birth, I postponed my return to work to prioritize caring for my son, whom his pediatrician affectionately referred to as a miracle baby. Despite the challenges, with the support of my family, I was able to resume work several months later.

Working in a manufacturing plant with a daytime schedule from 8 am to 5 pm allowed me to care for my son in the evenings while a helper assisted during the day. While being a working mother is widely accepted in the Philippines, it still necessitates a delicate balance between work and personal life. Managing times without a helper, I occasionally had to take my son to school myself, but the unwavering support of my family allowed me to continue working. Prioritizing being home with my son at night was essential during his formative years, and my previous job's lack of frequent travel facilitated this commitment.

Observing the differences between individuals with and without STEM backgrounds, I emphasized a scientific approach to problem-solving to my son, who subsequently chose to pursue an engineering course. Throughout my career, I never felt compelled to downplay my professional life, expressing my thoughts and opinions confidently despite the gender disparity in my department.

Transitioning into a leadership role as a female administrator or department head posed various challenges, including skepticism from

some female colleagues. However, I persisted, earning their trust through dedication and competence over time. Proving one's worth in a male-dominated environment is crucial, and I firmly believe that demonstrating capabilities naturally garners respect. Societal perceptions of working women are evolving, which is evident in the increasing number of women pursuing engineering careers in countries like the Philippines. However, challenges and discrimination persist in some Southeast Asian countries due to outdated beliefs about gender roles.

My ultimate aspiration is for equal opportunity in the workplace, where factors such as recognition and equality outweigh mere financial gain. I encourage aspiring women engineers to draw inspiration from successful female pioneers and advocate for equal opportunities. As part of the PTC-WEN organization, we empower women in engineering through orientation sessions for high school students and engage in CSR initiatives to demonstrate the diverse capabilities of women in engineering.

My son now co-manages my company, allowing me more time for international conferences and activities related to Women Engineers and Scientists. This enables me to pursue further knowledge in my field and spend cherished time with my grandsons, confirming the realization of my dreams.

Through perseverance and achievement, I now feel empowered as a woman engaging in fields once dominated by men. The changing landscape of engineering provides opportunities for every woman to boldly pursue her passions and goals, helping to transform STEM careers without gender limitations.

About the Author



Engineer Balba is highly regarded in Chemical Engineering and Environmental Consultancy, significantly contributing to both fields. Recognized by the Philippine Regulatory Board of Chemical Engineering in 2018, she held leadership roles in the Philippine Institute of Chemical Engineers (PIChE) and earned the title of ASEAN Engineer. Active in advocacy, Balba is a member of the PTC-Women Engineers

Network and is recognized as one of the first Inspiring Filipina Engineers. With a master's in environmental engineering from Mapua Institute of Technology, she's pursuing a PhD at the University of the Philippines, demonstrating a commitment to lifelong learning. She's also accredited as a DOST Cleaner Production Assessor. As the founding president, Balba guides the Philippine Institute of Chemical Engineers -- CAMANAVA Chapter, showing her dedication to advancing her field and supporting upcoming engineers. Her exemplary service, leadership, and commitment underscore her role as a prominent figure in Chemical Engineering and Environmental Consultancy.

JOURNEY 10

The Sky Is the Limit

Ghaida Aburumman

Dean, Zarqa Technical Intermediate College
Jordan

I was born and raised in Amman, the capital of Jordan. As the eldest of six siblings—two sisters and four brothers—I grew up in a loving, traditional family. My highly educated parents were deeply committed to ensuring quality education for all their children, regardless of gender. Our household was built on a foundation of love for literature and reverence for learning.

My parents enrolled my siblings and me in Amman's finest private school to receive the highest quality education available. During my elementary and middle school years, teachers recognized my talent in mathematics and problem-solving, as well as my distinctive leadership qualities. I actively participated in extracurricular activities such as art, music, and drama while enthusiastically engaging in science fairs and academic competitions. At the top of my class, I fostered a healthy sense of competitiveness while maintaining a friendly and cooperative demeanor with my peers.

From a young age, my father inspired me. He embodied success in his medical career and demonstrated kindness in his interactions with others. His brilliance and popularity as a physician motivated me to aspire to similar heights. I envisioned myself as “Dr. Ghaida,” driven to emulate his achievements and contribute positively to society. During high school, my affinity for subjects like mathematics and physics grew, and my teachers encouraged me, assuring me of my potential to excel in any field. In Jordan, university placement hinges on performance in the Tawjihi exam. I was fortunate to attain a high score, securing admission to the Biosystems Engineering Program at the Jordan University of Science and Technology. Despite the daily hour-long bus commute to the university, I found solace

in pondering geometry, arithmetic, and calculus problems, reveling in the joy of intellectual exploration.

My parents instilled in me and my sister the belief that education transcends gender roles and serves as our foremost defense against life's challenges. While I valued their principles, I also harbored aspirations for a family of my own. Fate intervened during my undergraduate studies when I met my husband, leading to marriage as I pursued my bachelor's, master's, and eventually Ph.D. degrees in Engineering. Balancing motherhood with academic pursuits became my reality, with my first two sons born during my undergraduate studies and my daughter arriving during my master's program.

Despite the logistical challenges of managing a household, pursuing higher education, and working as a researcher at the Royal Jordanian Geographic Centre, I remained undeterred in my quest for academic excellence. Completing my Ph.D. at the University of Jordan, despite giving birth to my third son during the final year, symbolized the culmination of years of dedication and perseverance. After graduation, I continued my professional journey at The Royal Jordanian Geographic Centre, finding fulfillment in the GIS department, where I applied my expertise in remote sensing. Subsequently, I transitioned to academia, securing a faculty position in the Civil Engineering department at Isra University and later joining Zarqa University. My journey, marked by relentless determination and unwavering support from family and colleagues, exemplifies the power of resilience in overcoming obstacles and realizing one's aspirations.

My professional journey has been extraordinary, marked by significant achievements and meaningful contributions. As the only female lecturer in the engineering college for seven years, I was fortunate to have my male colleagues' unwavering support and respect. Together, we cultivated a collaborative and inclusive environment within the civil engineering group, the largest department in the college. This camaraderie transcended gender barriers and played a pivotal role in fostering a culture of teamwork

and mutual respect.

Early in my tenure, I was entrusted with managing the Consultation, Continuous Education, and Community Service Centre—a role I enthusiastically embraced. For 16 years, I successfully led the Centre while concurrently serving as a faculty member and lecturer in Civil Engineering. This dual role gave me a unique perspective and invaluable experience in academia and community engagement.

As director of the Centre, I spearheaded initiatives to provide continuing education and training opportunities for university students and members of the local and regional communities. Through vocational training workshops and capacity-building programs, I sought to empower professionals and strengthen ties with the broader community. Additionally, I was deeply committed to advancing women's empowerment initiatives and youth development programs, recognizing the transformative impact of education and skill development.

In 2015, my career trajectory changed when I became Vice President for International Affairs. This role allowed me to broaden my horizons and cultivate international relations with institutions and stakeholders worldwide. Managing Erasmus-Plus-funded projects and participating in national and international conferences further enriched my professional journey, allowing me to contribute to global dialogues on critical issues such as climate change and environmental sustainability.

My steadfast commitment to excellence and integrity has guided me throughout my career. I have been selective in accepting administrative roles, ensuring my contributions align with my values and expertise. Quality has always been my guiding principle, driving me to continuously strive for improvement and innovation in all aspects of my work. Maintaining a healthy work-life balance has been paramount to my well-being and effectiveness as a professional. Regular exercise and family travel have provided me with much-needed rejuvenation and perspective amidst the

demands of my busy schedule.

In recognition of my contributions, in March 2019, esteemed organizations in Lebanon honored me as the Talented Arab Lady in water and environmental engineering in an international competition. In December 2019, the Ministry of Culture Egypt honored me for the second time for my community service activities.

I have underscored the impact of my work on a regional scale. Becoming the first female full professor and, subsequently, the first female Dean of the Faculty of Engineering at Isra University is a testament to my dedication and perseverance in the field. In 2020, I became a professor, and from that time until September 2023, I served as Vice President for International Affairs, Dean of the Faculty of Engineering, Director of Consultation Continuous Education and Community Service Center, and acting president many times at Isra University. In October 2023, I joined Zarqa University Engineering faculty, and in March 2024, I was nominated as Dean of Zarqa Technical Intermediate College.

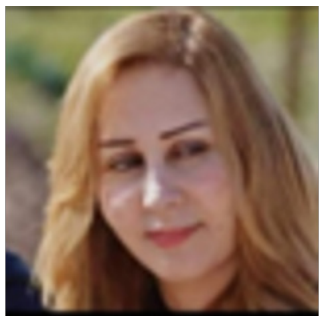
As a female leader in engineering, I am acutely aware of the importance of representation and advocacy. I strive to inspire and empower women to pursue careers in STEM fields, challenging stereotypes and championing inclusivity and diversity. While significant progress has been made in advancing gender equity in the workplace, I remain committed to advocating for greater opportunities for women in leadership roles. I want to see more women ascend to positions of influence and authority, driving positive change and innovation in academia and beyond.

Integrity, recognition, and equality are at the heart of my professional ethos. I am deeply grateful for my family's unwavering support, whose encouragement has been a source of strength and inspiration throughout my journey. Their belief in me fuels my determination to continue pushing boundaries and achieving new heights of success.

As I look to the future, I remain open to new challenges and opportunities, guided by the belief that dreams catalyze progress and transformation. With unwavering determination and a spirit of resilience, I am committed to making a meaningful and lasting impact in engineering and beyond.

My circumstances today culminate in numerous opportunities and challenges that have shaped my journey. I am currently in a realm with opportunities that aren't universally accessible to women. My pride stems from my independence, determination, and self-motivation, which have consistently propelled me toward my aspirations and enabled me to uplift fellow women.

About the Author



Ghaida Abu-Rumman is an esteemed Civil Engineering Professor and Dean of Zarqa Technical Intermediate College. She previously taught at Zarqa University and served as Dean at Isra University's Faculty of Engineering. With 17 years of expertise in civil engineering, water, and environment, she specializes in GIS and remote sensing research. Ghaida holds a

bachelor's degree in Biosystems (water engineering), a master's degree in civil engineering/water and environmental engineering, and a Ph.D. in civil engineering/water and environmental engineering.

Commencing her career at Isra University in 2008, Ghaida recently transitioned to Zarqa University, where she continues her academic pursuits. Her research focuses on water and environmental engineering, particularly in climate change studies using GIS and remote sensing. Ghaida's contributions extend beyond research as she develops and delivers training courses in these areas.

In 2021, Ghaida's accomplishments made history as she became Isra

University's first female Dean of the Faculty of Engineering and the first female full professor in its engineering faculty. Beyond academia, Ghaida is a passionate advocate for women in Jordan and globally. She is a dedicated mother to four successful children alongside her professional endeavors.

JOURNEY 11

Beyond Boundaries: Stories of Personal Triumph

Siti Hawa Hamzah

Professor in Civil and Structural Engineering
Malaysia

I was born on February 21, 1961, in Johor Bahru, Malaysia, the eldest child of Hamzah Kudus (father) and Mariam Abdul Karim (mother). My father, a British soldier, and my mother, a homemaker, resided in this southern city of Malaysia. Education was important in my household, with both genders afforded equal opportunities—a rarity for females in the late 1950s. As a result, many of my aunts and uncles pursued teaching careers, a trend that continued with my generation. I vividly recall attending preschool at age 4—an exceptional opportunity during the 1960s. My parents recognized my public speaking and sports potential, encouraging me to develop these talents. Alongside preschool, I received Quranic lessons at home, initially taught by my father and later continued under the guidance of an Ustadz (Islamic Teacher). By age 11, I had satisfactorily recited the holy verses, completing my Quranic studies.

At age 7, my father enrolled me in an English-medium primary school to enhance my language proficiency. Determined to excel, I completed my Lower Certificate Education (LCE) at 15 with an excellent score. I then pursued technical education for two years and concluded my secondary education with another outstanding performance in the Malaysia Certificate Education (MCE) in 1978. Recognizing my skills and achievements, the Government of Malaysia awarded me a scholarship to pursue a civil engineering degree in the USA, marking the beginning of my humble journey as an engineer in 1983.

On May 28th, 1983, I proudly graduated from the University of Miami in Florida, USA, earning my Bachelor of Science in Civil Engineering and a Certificate of Completion in Professional Education. I completed both programs in three years and nine months, accumulating 143 credits. Throughout my undergraduate journey, I attended two summer classes and eight semesters, commencing in September 1979. The Ministry of Education Malaysia generously funded my enrollment based on my exceptional performance in the MCE. Before returning to Malaysia, I eagerly applied for a lecturing position at Universiti Teknologi MARA (UiTM) (formerly Institut Teknologi MARA or ITM) in Shah Alam, Malaysia. On June 28th, 1983, I officially registered at ITM, beginning my first employment at age 22. I became one of only three women engineers employed in the Department of Civil Engineering. Subsequently, on October 29th, 1983, I registered with the Board of Engineers Malaysia (BEM) as a Graduate Engineer. On October 21st, 1985, I became a graduate member of The Institution of Engineers Malaysia (IEM).

Upon joining the department, my initial assignment involved teaching Hydraulics and overseeing the Strength of Materials laboratories. As my tenure progressed, my focus shifted to Structural Engineering during my third year at ITM. My teaching portfolio encompassed a wide range of courses, including Strength of Materials, Structural Analysis, Design of Reinforced Concrete, Steel and Timber Design, Structural Dynamics and Earthquake Engineering, Tall Building Design, Integrated Design Project, and Engineer in Society. In research, supervision, and publication, my primary areas of expertise revolved around load-bearing wall panels, beam-column connections, prestressed concrete sleepers, steel fiber-reinforced concrete, crushed concrete waste aggregate, and engineering education.

On January 1st, 1987, I began an exciting new phase of my academic journey by returning to the United States to pursue postgraduate studies at the prestigious University of Kentucky (UK) in Lexington, Kentucky. Accompanied by my small family, including my eldest son Afif, who was just 18 months old, this endeavor presented significant challenges as I

strove to balance my studies with caring for my loved ones. Nevertheless, my determination prevailed, and within 18 months, I completed my Master of Science in Civil Engineering in May 1988. My dissertation, “Computer Aided Design for Horizontally Curved R/C Floor Slabs,” marked a significant achievement.

The apex of my postgraduate studies culminated in a significant graduation ceremony. Walking across the stage hand in hand with Afif to receive my scroll from the esteemed 9th President of the UK, Prof. Dr. David Paul Roselle, was a heartwarming highlight. As a touching and memorable moment, my 3-year-old son was honored to shake hands with the President, eliciting enthusiastic applause from the entire audience. Undeniably, this extraordinary moment etched itself in my family’s memory.

In 1988, I returned home to find that UiTM had promoted me to a higher salary grade as a reward for my five years of service. This promotion resulted from my exceptional performance, further demonstrated through my extensive research, supervision, and publication activities. Subsequently, I received additional promotions: in 1994, UiTM promoted me to Senior Lecturer and appointed me as the Head of the Programme, a role I held from 1997 until 2001. In 2000, UiTM further promoted me to the esteemed position of Associate Professor. In January 2000, I obtained certification as a Corporate Member of IEM (MIEM, M08457). Later that same year, in June, I successfully qualified to register as a Professional Engineer (P.Eng 10412) with BEM, earning the distinguished title of Ir.

In June 2001, I embarked on pursuing my PhD qualification. At this juncture, I already had three children, aged 16, 12, and 4. While balancing the demanding workload of a PhD candidate, I also diligently monitored and facilitated my children’s education to ensure they received the best possible support and learning experience. It took me four years to complete my research work, culminating in writing a thesis entitled “Structural Behaviour of Profiled Steel Sheet Dry Board Wall Panel System with Opening.” Finally, in December 2005, the Senate of UKM awarded me

the distinguished Doctor of Philosophy (Civil and Structural Engineering) title. Subsequently, I became deeply involved with various institutions and organizations outside of UiTM. I provided numerous training sessions, conducted academic program reviews, and fostered academic-industry collaborations. Additionally, I contributed as a keynote speaker, invited speaker, and guest lecturer across various platforms and also served as an editor and reviewer of published papers and conference proceedings.

On August 11, 2008, I faced an interview for promotion to the esteemed position of full professor in Civil and Structural Engineering. Before this, I had served as the Head of the Structures Division (2008 until January 2009) and subsequently assumed the Deputy Dean (Academic) role from February 2009 until October 2010. The dream I had long envisioned finally came to fruition on April 1, 2009, when I proudly became Professor Ir. Dr. Siti Hawa Hamzah. I am deeply grateful to the Almighty for this well-deserved recognition. Undoubtedly, the wealth of experiences I acquired through my active commitment and participation with IEM and BEM greatly enhanced my visibility in the country, and UiTM acknowledged my valuable services and contributions to the nation and the world.

The pinnacle of my academic career came with the Professorial Lecture. On September 28, 2016, I felt honored to present my lecture “Structural Wall Panel,” which marked a significant milestone in my lifelong journey as an academician. Subsequently, on February 20, 2017, I decided to retire from the university and embark on a new chapter as a freelance trainer and advisor specializing in engineering education.

Throughout my 33 years and eight months of teaching and academic experience, I supervised and examined theses/dissertations for over 110 postgraduate students and final-year projects for more than 450 undergraduate students. I have interacted with approximately 6,500 students in my classes, many of whom have made significant contributions to the engineering profession. In addition, I have completed 21 research projects and authored 15 books on structures. Furthermore, I have

published over 175 technical papers. I have developed comprehensive expertise in undergraduate and postgraduate curriculum development and reviews throughout my career. I have also served as a moderator for examinations, mentored young lecturers, and participated in evaluation panels for the Engineering Accreditation Council (EAC) and Engineering Technology Accreditation Council (ETAC). Moreover, I advised and organized academic activities such as conferences and workshops and provided numerous professional and engineering education training programs. As an educational administrator, I successfully managed engineering programs for over 20 years.

My ideas and efforts have transcended boundaries and have been shared with numerous organizations, including the Ministry of Higher Education Malaysia (MoHE), Ministry of Education Malaysia, Ministry of Science, Technology and Innovation Malaysia (MOSTI), Public Works Department Malaysia, Keretapi Tanah Melayu Berhad (Malaysian Railway), PLUS Malaysia Berhad (North-South Expressway), IEM, BEM, Engineering Accreditation Department (EAD), Construction Industry Development Board (CIDB), Standard and Industrial Research Institute of Malaysia (SIRIM), Permanent Way Institute, Majlis Rekabentuk Malaysia, Academy of Sciences Malaysia, Persatuan Siswazah Wanita Malaysia, Society of Engineering Education Malaysia, and Akademi Profesor Malaysia. My extensive teaching, supervision, research, and publication involvement have significantly contributed to various facets of academia and industry.

First, I have conducted investigative research supported by grants such as FRGS, ERGS, and PRGS from the Ministry of Higher Education (MoHE) and e-science funds provided by the Ministry of Science, Technology, and Innovation (MOSTI). These research endeavors have expanded my field's knowledge and addressed pertinent issues relevant to national development. Furthermore, I have played a pivotal role in educational initiatives by collaborating with Dewan Bahasa dan Pustaka to publish textbooks and reference materials tailored for Sekolah Menengah Teknik Malaysia (Technical Secondary School). This effort aimed to enhance

the quality of technical education and support the academic pursuits of students and educators alike. In addition to my research and educational endeavors, I have actively shaped accreditation standards for the engineering profession. Specifically, I have been instrumental in developing and revising accreditation standards for the Board of Engineers Malaysia (BEM), ensuring the competency and quality of engineering education and practice in the country.

Moreover, my contributions extend to the realm of industry standards development. I have formulated Malaysian Standards of Specifications for Raised Access Floor Systems and the Civil Engineering Standard Method of Measurement (MsCESMM) for the Standards and Industrial Research Institute of Malaysia (SIRIM). By actively participating in standardization processes, I have facilitated the establishment of benchmarks that promote excellence and consistency in engineering practices.

Lastly, I have served as an Editorial Advisory Board member for journals and proceedings published by the Construction Industry Development Board (CIDB). This role has allowed me to contribute to disseminating scholarly research and insights within the construction industry, fostering knowledge exchange and advancement.

Collectively, these endeavors underscore my commitment to advancing education, research, and industry standards, with the ultimate goal of driving progress and innovation within the Malaysian academic and professional landscape.

At UiTM, I have received over 20 research accolades at international and national invention, innovation, and design competitions. Notably, I was a triple recipient of the UiTM Excellent Service Award in 1992, 1996, and 2013, and I have also been honored with Long Service Awards for 20, 25, and 30 years of service in 2004, 2009, and 2014, respectively.

IEM is a learned society, and during my first appointment, I had the

opportunity to assist the secretary in organizing the Regional Conference on Timber Engineering in 1986, which took place in Kuala Lumpur. This initial experience provided me with invaluable knowledge of conference organization, including seminars and workshops. Additionally, it allowed me to establish connections with distinguished professionals, speakers, and colleagues from around the world.

One significant network I greatly value is the Conference of ASEAN Federation of Engineering Organization (CAFEO), held annually and hosted by different ASEAN members. Another noteworthy achievement is the International Conference on Concrete Engineering and Technology (CONCET), inaugurated in 1989 and now held biannually, with hosting responsibilities rotating between IEM, Universiti Malaya (UM), and UiTM. These events have provided excellent opportunities to expose my postgraduate students and the junior lecturers I mentored to international networks. Numerous research collaborations have flourished through these engagements, resulting in mutual benefits such as publications and industry connections. As a result of my active participation, I was honored with the IEM Presidential Award of Excellence through the Civil and Structural Engineering Technical Division for the best technical work in 1992, 1993, and 1994.

As a Corporate Member of IEM (MIEM), I became more involved and was elected Council Member for three sessions, serving from 2001 to 2004. During this time, I actively participated in all Standing Committees and served as an Executive Committee Member from 2002 to 2004. I also contributed to BEM's Training and Examination committee, conducting Professional Engineer assessments and examining over 65 candidates. In addition, I provided training sessions and lectures on various topics related to the engineering profession, including Engineering Accreditation, Engineering Ethics, and the Path to Becoming a Professional Engineer.

On April 22, 2006, IEM elected me as a Fellow (FIEM, F08457) and honored me as the seventh woman engineer to receive this prestigious

recognition. Now, I am serving IEM again as a Council Member from 2021 to 2023. I actively participate in Standing Committees on Information and Publication, Corporate Affairs, Examination and Qualification, and more than seven sub-committees. Moreover, on April 15, 2023, IEM elected me as the vice president and tasked me with chairing the Admission and Practical Training committee from 2023 to 2025.

Thanks to my involvement with IEM, I was awarded the IEM Woman Engineer Award in 2007 and granted Honorary Membership to the ASEAN Federation of Engineering Organizations (AFEO) in 2008. Subsequently, with the revision of the Registration of Engineers Act (1967) in 2015, I obtained the status of a registered Professional Engineer with a Practicing Certificate (PEPC, C110412). The country has 8,879 registered PEPC engineers, of which 8% are women engineers.

As for the quality assurance for engineering education, on April 8, 2020, I made history by becoming the first woman Director of EAD, BEM. During my tenure from 2020 to 2030, I introduced the #acculturationofOBE initiative to ensure the consistent implementation of Outcome-Based Education (OBE) in all engineering and engineering technology programs offered in Malaysia, encompassing teaching, learning, and assessment. To further enhance our capabilities, BEM established ETAC in 2015. ETAC is the delegated body responsible for accrediting engineering technology bachelor degrees, engineering diplomas, and engineering technology diploma programs in Malaysia. EAD expanded its services and now serves as the secretariat for both EAC and ETAC. In 2018, BEM achieved full signatory status in the Sydney Accord (SA) and Dublin Accord (DA), making Malaysia the 11th member of SA and the 9th member of DA.

From 2020 to 2022, EAD made significant progress by improving administrative processes and financial standing. We shifted all accreditation activities to online platforms in 2020 and 2021 due to the COVID-19 pandemic. To ensure a smooth review process for each academic program, EAD developed guidelines and standard operating procedures. We also

took the lead in sharing the virtual accreditation visit (VAV) process with other IEA members, making BEM one of the few leading countries to do so. We conducted accreditation meetings, training sessions for new evaluation panels, and stakeholder workshops online. As of April 2023, EAC and ETAC have accredited 271 engineering degree programs and 314 (72 engineering technology degrees, 242 engineering/engineering technology diplomas) nationwide. Since 2000, EAC has accredited 356 engineering programs offered by 61 IHLs in Malaysia. Although the number of active engineering programs has decreased, there has been a significant increase in the engineering technology programs offered. The current evaluation panel comprises 863 members (EAC - 410 and ETAC -- 453), with 30% representing the industry. Since 2020, the evaluation panel pool has grown by almost 50% after the October 2022 training, with each workshop attracting between 65 and 80 qualified participants.

My involvement with EAD began in the late 1990s when I contributed to drafting the first Manual of Accreditation for EAC. This experience gave me a solid foundation to enhance my knowledge and competency in quality assurance for engineering education. In 2002, I attended a workshop to qualify as an EAC panel evaluator and received my first review task. In 2018, I also qualified as an ETAC panel member. As of March 2023, I have evaluated over 185 engineering programs in the country.

In 2014, BEM appointed me as the Associate Director (AD) of EAD for the Structural Engineering discipline, making me the first woman to hold that position. Later, my role expanded, and from 2016 to 2020, I served as the AD for Civil Engineering. In 2020, I took on the role of Director until April 2022. In the last quarter of 2022, I mentored the newly appointed director, who assumed office on September 12, 2022. I am serving EAD as an evaluation panel member for both EAC and ETAC. Recently, BEM appointed me as the Head of the Delegation to UTM for the WA Periodic Review, evaluating four programs, and as the Head of the Panel to UCSI for evaluating the civil engineering program. With a diverse and extensive portfolio in engineering education and quality assurance, I have

played pivotal roles across various institutions and organizations globally. As a reviewer for the Hong Kong Institution of Engineers (HKIE), I've contributed to maintaining standards aligned with the Washington Accord, IEA. As a mentor to the Board of Accreditation for Engineering and Technical Education (BAETE) in Bangladesh, I've guided initiatives to achieve full signatory status to the Washington Accord, IEA.

Moreover, my involvement as a trainer for the Ministry of Higher Education in Afghanistan on Outcome-Based Education underscores my commitment to capacity building in challenging contexts. Additionally, my training efforts for stakeholders on accreditation processes for engineering and technology programs have been instrumental in fostering quality assurance practices. Furthermore, my role as an academic program reviewer for esteemed institutions such as Qatar University and various Malaysian universities demonstrates my dedication to ensuring excellence in engineering education through rigorous evaluation processes. Lastly, serving as an evaluator for engineering programs seeking accreditation with the Board of Engineers Malaysia (BEM) further highlights my contribution to enhancing standards and fostering continuous improvement within the engineering education landscape.

Through my work with EAD and BEM, I have had the honor of being appointed as the first woman Associate Director, first woman Director, first woman mentor representing Malaysia to BAETE-IEB for IEA alongside The Institution of Engineers Singapore (IES), and first woman reviewer representing BEM to HKIE for the Washington Accord, IEA, together with Engineers Australia and IES. In recognition of my contributions, BEM included me in the Who's Who in Engineering, Malaysia Book published in 2022.

I have a passion for engineering education and outcome-based education (OBE). I have accumulated over 20 years of experience developing and managing academic programs, conducting accreditation and audits, and becoming an expert and reference.

In 2016 and 2017, I had the opportunity to provide OBE training in Kabul, Afghanistan, alongside trainers from Universiti Teknologi Malaysia (UTM). Despite the security issues we faced during our scheduled trips, we successfully trained approximately 400 lecturers nationwide. They gathered in Kabul for a week-long training session on each trip. Following our visits, we secured funding to bring potential students from Afghanistan to continue their post-graduate studies in Malaysia. UiTM and UTM served as their initial platforms, and the number of Afghanis graduating from Malaysian universities has significantly increased. The training continued in Malaysia in 2018 and 2019, expanding mobility opportunities for Afghan lecturers. Unfortunately, the current situation in Afghanistan has halted this collaboration.

Mentoring BAETE in Bangladesh to achieve full signatory status with WA and IEA posed a challenge that pushed my knowledge and competency to the next level. Starting in 2016, with experts from Singapore and Malaysia, I made eight trips to Dhaka. During these visits, I trained the BAETE team in developing their Outcome-Based Accreditation manual and process. I also assisted in developing the evaluation team, observed accreditation processes, visited several universities, and conducted on-site sharing sessions. Amidst the pandemic, we held more than 15 online discussions from the second half of 2020 until June 2021, focusing on developing their accreditation management system. These efforts were in preparation for the IEA verification review visit, which took place from October 2021 until February 2022. My collaboration continues today, and I recently presented a keynote paper in Dhaka on May 11, 2023.

Receiving an invitation to serve as an academic program reviewer at the post-graduate level with an overseas university has always intrigued me. In April 2019, Qatar University flew me to Doha to review the Master of Science in Civil Engineering program alongside Prof. Emeritus Dr. Essam Radwan from the University of Central Florida, USA. We both agreed that the program conducted at Qatar University is equivalent to established programs at renowned universities.

Over the years, I have conducted numerous OBE and Teaching, Learning, and Assessment (TLA) trainings, allowing me to share my expertise with the world. Through BAETE and collaboration with IEA, I have shared best practices based on Malaysia's experience in online TLA, BEM's virtual accreditation processes, online training, stakeholder engagement, and virtual meetings. I presented challenges and solutions to ensure quality assurance in engineering education programs, enabling other IEA signatories to relate and learn from our experiences.

Since 2005, I have provided numerous OBE and TLA training as an Adviser/Expert/OBE Trainer at Universiti Selangor, Universiti Malaya, and Al Madinah International University. I have also been an External Examiner for Bachelor of Civil Engineering programs at seven universities in Malaysia. After completing the mentoring assignment at EAD, I have continued to provide training on OBE and accreditation requirements, with a recent focus on tackling complex engineering problems and activities and achieving the targets of sustainable development goals.

As a result of my contributions through this training, the Society of Engineering Education Malaysia (SEEM) honored me as the first woman engineer to receive the Honorary Distinguished Fellow for 2021 award. At the end of 2021, the Akademi Profesor Negara (APM) inducted me as a Life Member.

The fulfilling joy of being a career woman lies in the ability to love and devote time to caring for one's family. I am blessed with three wonderful children: Afif, Athari, and Atiqah. My better half has retired from his managerial position with an international establishment. He now acts as a personal assistant, attending to my transportation needs. Above all, he remains my loyal companion during our adventures around the globe.

The journey has been remarkable. I embraced all challenges and obstacles as opportunities to excel and succeed, for which I am grateful for the blessings of a higher power and its divine grace that have shaped

me into the person I am today. I have always regarded time as limitless, continuously advancing in my pursuits. I strive to gather even a small drop of knowledge in the vast ocean of knowledge. Although my limitations in thinking may hinder the discovery of innovative solutions, I continuously strive to improve and practice. I have profoundly impacted civil engineering education, exemplified by my extensive work encompassing 15 signature publications authored over two decades. From my earliest contributions, like the “English Glossary Series,” to the latest endeavors, such as the “Series of Civil Engineering Studies on Structure,” I am dedicated to disseminating knowledge and fostering deeper understanding within the field. These publications cover diverse topics, including solid mechanics, structural analysis, and engineering design methodologies.

Furthermore, my influence extends beyond my authored works to publications such as “MS 1552 Part 1:2002” and educational materials like “Pengajian Kejuruteraan Awam Tingkatan 5.” I have enriched these resources, infusing them with valuable insights and perspectives. Through my writings and works, I have shaped the discourse surrounding civil engineering education, leaving an enduring legacy in the field. In addition to my significant contributions to civil engineering education, I have advanced the field through practical tools such as the “Structural Design Log,” providing engineers with a structured framework for documenting the design process. Moreover, my series of publications on various structural topics, from beams to foundations, serve as indispensable resources for both students and practitioners alike, contributing to a deeper understanding of the complexities inherent in structural engineering.

Throughout my journey, I have written numerous training modules and publications, which serve as testimonies of my life’s work. The thousands of graduates I have nurtured are valuable human capital assets for Malaysia. Countless hours spent on voluntary and philanthropic endeavors embody the promise of a better future, and the satisfaction I have gained from these experiences is deeply cherished and has truly made a difference.

My late father, HAMZAH (December 3, 1932 – February 21, 1979), has been my lifelong source of inspiration, making my journey purposeful and captivating. Meanwhile, my late mother, MARIAM (December 30, 1942 – September 23, 2020), instilled discipline in me and taught me the importance of being systematic. May they both be blessed with Jannah. The presence and unconditional love of my children, AFIF (May 13, 1985), ATHARI (October 12, 1989), and ATIQA (August 21, 1997), continue to ignite my motivation. Throughout all the challenges, including agony, frustration, risks, and times of sickness and health, I find comfort and support in my better half, my best friend, and my partner, AZMAN (July 10, 1961). Moving forward, I am committed to sharing my experiences and knowledge.

About the Author



Dr. Siti Hawa Hamzah is a distinguished figure in Civil and Structural Engineering, boasting a career spanning over four decades. With a PhD from UKM and various qualifications from the USA, she has served as a beacon of expertise and leadership. Dr. Hamzah's contributions to academia include her tenure as a Professor at UiTM Shah Alam, where she shaped the minds of future engineers for 33 years. Her managerial prowess extends over 20 years, which is marked by her involvement in more than 185 engineering programs' accreditations. She has assessed over 70 engineers for professional certification and completed 21 research projects, yielding 15 books and over 175 technical papers. Dr. Hamzah's impact transcends national borders; she has mentored international institutions and served as an accreditation trainer for BEM and ETAC. Her accolades, including the IEM Women Engineer Award and UiTM Excellence Service awards,

underscore her significant contributions to the engineering community. Dr. Siti Hawa Hamzah's legacy is defined by her unwavering dedication to advancing engineering education and practice globally.

JOURNEY 12

Challenge and Perseverance

Rachida Ajhoun

Ensias, Université Mohammed V, Rabat

Morocco

I was born into a large family in the quaint town of Ksar El Kebir, located in northern Morocco, approximately 150 km from the capital, Rabat. As the fourth among ten siblings, my journey was unique.

In our generation, few girls pursued education beyond primary school, let alone completed high school. My situation posed a dual challenge: I was the only member of my family expected to pursue high school education, and my inclination towards the “mathematical sciences” branch necessitated continuing my studies in Rabat, far from our familial roots. Despite criticism from relatives, neighbors, and friends, my parents exhibited remarkable support and fortitude in accepting this endeavor.

My journey began at a girls’ high school with boarding facilities in the heart of Rabat. Those years were marked by adversity and pivotal decisions. I had to acclimate to the rigorous demands of mathematical studies and redefine my lifestyle, thought processes, and problem-solving strategies in an environment lacking parental oversight. My guiding principle was anchored in the belief that “courage, perseverance, and hard work can propel anyone towards their aspirations,” a mantra that guided my choices. Consequently, I surrounded myself with serious and persevering individuals, a practice that profoundly influenced my life trajectory.

After graduating high school, I had several opportunities to pursue further studies abroad, particularly in France. However, my mother’s influence led me to respectfully accept her decision to remain in Morocco.

Consequently, I enrolled in the only major engineering school in Rabat at the time, the Mohammadia School of Engineers, also known as “EMI.” Interestingly, during my third year of studies, the institution transformed into an academic and military school.

Throughout my five years at EMI, diverse social interactions among students of varying ages and educational backgrounds significantly influenced my perspective on life. This period profoundly shaped and refined my personality, spirit, and perception of the inner and outer worlds. Beyond the rigorous scientific education provided by the school, I acquired invaluable emotional and social skills that continue to shape my character.

One pivotal decision I faced was selecting a specialty during the third year. Despite electrical engineering being the most demanding option, typically favored by male students, I chose it without hesitation. This decision was both a personal challenge and a statement against gender stereotypes. By opting for electrical engineering alongside a few other female students, I aimed to demonstrate that high cognitive abilities are not exclusive to any gender.

The emerging field of computer engineering, established in the 1980s, intrigued me with its emphasis on logical thinking and programming skills. Consequently, I pursued this track for my engineering studies, earning my “state engineer diploma” in computer science in 1984.

Through various academic projects, I realized that education should focus on acquiring knowledge rather than merely obtaining a diploma. My senior capstone project on automatic processing of the Arabic language facilitated my involvement with the Institute of Studies and Research for Arabization (IERA) in Rabat. This decision proved fulfilling as it enabled me to contribute to developing my mother tongue.

Under the guidance of Professor Ahmed Al Aghdar Ghazal, renowned internationally for his work on the Arabic language, I undertook a project to

integrate Arabic into SGBDLN, a natural language database management system. Initially developed at ESRIN, a European Space Agency (ESA) department in Italy, this project required extensive time and effort to implement and operate the new system.

Regarding the balance between professional and married life, it's essential to recognize that harmony depends on shared visions and life objectives between partners. In my case, marriage coincided with the conclusion of my studies, as my husband also graduated from the same engineering school. Our mutual affinity for “the engineering spirit” and shared perspectives on life strongly fortified our enduring union.

The mutual coherence and homogeneity of thought within my academic journey played a pivotal role in my progression toward doctoral studies and pursuing my state Ph.D. degree. Stepping into the realm of doctoral studies marked a significant transition, where the conventional learning model showed signs of limitation. I became deeply intrigued by the prospect of personalized and collaborative learning tailored to individual learners' needs. This concept formed the crux of my Ph.D. research inquiry.

Embarking on my dissertation, I became a pioneer in Morocco by addressing e-learning nationally. As early as 2000, using digital technology to enhance learning quality gained traction within academic circles. An opportunity emerged, leading me to join the esteemed National School of Computer Science and Systems Analysis (ENSIAS).

I established a research team and nurtured new doctoral candidates in this evolving field. Additionally, I spearheaded an association dedicated to pioneering advancements in new-generation networks and e-learning. This association's international outreach facilitated the establishment of branches across several African countries and the MENA region.

Within Mohammed V University, I was entrusted with directing a center exclusively dedicated to e-learning. The center's mandate was to formulate and implement strategies for leveraging technology in education and

training. Additionally, it aimed to enhance educators' digital literacy to elevate teaching quality and facilitate effective learning. We implemented a support system to aid educators in developing and integrating online courses into a dedicated platform. This pioneering experience was subsequently disseminated across various Moroccan universities and adapted for both continuing and secondary education, heralding the advent of distance learning in Morocco.

As I traversed different phases of my career, from engineering to doctoral research and instructional roles, I encountered an amalgamation of opportunities and challenges. Throughout, perseverance remained my guiding principle. The rapid evolution of digital technology always captivated me, serving as a scaffold to surmount challenges. I adeptly transformed adversities into opportunities, leveraging a measured approach.

Women engineers encounter various challenges stemming from societal norms, professional dynamics, and familial responsibilities. In any ecosystem, opportunities and threats are amplified by inherent strengths and weaknesses. Hence, it becomes imperative to conduct SWOT analyses, not only within corporate frameworks but also in life's journey. Informed decision-making, coupled with perseverance, becomes paramount.

The primary challenge lies in addressing gender inequality, fueled by the misconception that engineering is a male-dominated domain. While society has made strides towards gender equality, pockets of resistance persist, particularly in realms characterized by male dominance, such as corporate leadership and political arenas. Mobilizing women's advocacy groups, with the backing of international women's rights bodies, can help attenuate this unjustified male hegemony.

Another challenge women face, particularly those bound by marriage, revolves around balancing familial obligations with professional pursuits. The burden of household and childcare responsibilities often falls

disproportionately on women, necessitating equitable sharing of duties between genders.

Navigating the micro work environment entails negotiating interpersonal dynamics with colleagues and collaborators. Maintaining a balanced professional relationship amidst personal interactions and conflicts poses a significant challenge. Fortunately, in the Moroccan context, gender does not hinder employment opportunities. However, challenges may arise in balancing work and family commitments, especially for women.

In personal life, women engineers often grapple with reconciling familial responsibilities and professional aspirations. Family support, particularly from spouses, is paramount in achieving this equilibrium. Traditionally, women bear more household responsibilities, underscoring the need for mutual understanding and cooperation within familial dynamics.

The professional accomplishments of women engineers garner respect within Moroccan society, inspiring admiration from peers and serving as a beacon of empowerment for future generations. Achieving work-life balance necessitates meticulous prioritization and adept multitasking. Telecommuting has emerged as a viable solution, albeit requiring regulation to safeguard privacy and delineate boundaries between work and personal life.

Reflecting on the role of women engineers in societal advancement underscores the pivotal role of education in fostering a robust family structure and driving societal progress. As an advocate for STEM education, particularly in engineering, my primary duty is encouraging women to pursue higher education and embark on careers in STEM fields. Women educators, in particular, serve as invaluable role models, shaping the aspirations of future generations. Embracing and celebrating this special role is essential for fostering inclusive and empowered societies.

About the Author



Rachida Ajhoun, a prominent professor and head of the LeRMA research team at ENSIAS, Mohammed V-Rabat University, Morocco, obtained her Ph.D. in computer science and e-learning from Mohammadia School of Engineers in 2001. She served as a technical advisor in education and technology at the Ministry of Higher Education, Scientific Research, and Executive Training from 2013 to 2014. Ajhoun's significant contributions include founding and chairing the e Next Generation Network in 2008 and directing the e-Learning Center at Mohammed-V-Rabat University from 2011 to 2015.

She co-founded the GUIDE association in 2005 and represented Africa from 2008 to 2012. Ajhoun's leadership extends to national and international e-learning research projects, notably spearheading the creation of the first Moroccan MOOC supported by IFIC in 2013. She has authored and co-authored numerous indexed articles, communications, a book, and three book chapters on e-learning, solidifying her expertise in the field.

Dr. Ajhoun's dedication to educational technology earned her recognition as a Senior Member of IEEE and the Moroccan Royal Medal of Honour "Al Istihkak Al Watani - Exceptional" in 2021. Her relentless pursuit of excellence inspires the academic community, shaping the future of e-learning nationally and internationally.

JOURNEY 13

From the Blessed Spot, the Confluence of the Niles

Tahani Abdalla Attia

Associate Professor, University of Khartoum
Sudan

I first drew breath and embarked on this life journey in a tranquil village nestled amid Sudan's beauty. This village, Al-Makniya, cradled within its surroundings to the west of the Nile in the Al-Matamma region of the Nile River state, embodies the noble legacy of my ancestors. My extended family resided in Al-Zaydab, located in Al-Damer, in the same state where my father was born.

In both Al-Makniya and Al-Zaydab, I thrived within a social milieu defined by tolerance, harmony, and unity, where the rich tapestry of Sudanese values flourished. These places nurtured me with their love, boundless compassion, and invaluable cultural heritage. At seven, I relocated to Port Sudan, Sudan's smiling gateway, with my older sister and her family. My educational journey, which began before I turned five, continued there. I attended Transeet Primary School and then Port Sudan Ameeriya Intermediate School. My teachers' kindness and dedication profoundly influenced my passion for learning, complemented by the supportive home environment fostered by my older sister and her husband. Their guidance instilled noble values in me, nurturing my academic aspirations. I excelled in the Red Sea State's primary and middle school exams.

Port Sudan captivated me with its tranquility and offered cherished childhood pastimes like jumping rope, "hajla" (a playground game similar to hopscotch), ludo, and snakes and ladders. Time felt different then. Digital games were uncommon, and I enjoyed engaging in riddles and puzzles and reading magazines, stories, and novels.

After completing a year at Ashi Girls' Secondary School, I transferred to Al-Khartoum Old Secondary School to finish my secondary education. Following this, I enrolled in the Faculty of Engineering's Department of Electrical and Electronic Engineering at the prestigious University of Khartoum. My parents, who hadn't attended formal schools but learned to read and write through Koranic study sessions, supported my educational journey and personal growth. They maintained a supportive environment devoid of biases or preferences for specific professions.

I chose engineering as my major due to my inclination, reinforced by a high school teacher's advice who recognized my aptitude for mathematics and physics. Despite marrying during my third year of college at 20, I maintained academic excellence, meticulously balancing studies and household responsibilities. With Allah's guidance and my husband's unwavering support, I graduated with honors and secured a teaching assistant position at the University of Khartoum.

My academic achievements during university stood out. Despite initial opposition from my extended family regarding marriage during my studies, their eventual support buoyed my determination. The university years transformed me, fostering academic growth, social connections, exposure to diverse cultures, and engagement in educational, scientific, and social pursuits, which enriched my university experience.

I began my professional journey in the Department of Electrical and Electronic Engineering at the University of Khartoum, a pioneering force in Sudanese life. Appointed as a teaching assistant among colleagues of both genders, I experienced no gender discrimination in the workplace; we all received equal monthly salaries and benefits. The University of Khartoum fostered a nurturing environment with an excellent work atmosphere. As a married woman with children, I received suitable private accommodation for my family. However, I had to fulfill my responsibilities without differentiation in workload. Despite facing challenges and stress, I

diligently pursued success, relying on Allah and receiving support from my husband. This period marked both challenges and adventures.

Studying engineering instilled in me a keen sense of time management. I prioritized organization and meticulous planning in my daily schedule at work and home, taking charge of household arrangements and periodically refreshing our living space to bring about change and renewal.

My academic career progressed naturally. After earning my Master's in Telecommunications and Information Engineering in 1999, I advanced to the lecturer position. Subsequently, obtaining my PhD in Electrical and Electronic Engineering in 2006 promoted me to Assistant Professor. My PhD thesis focused on multiuser detection of WCDMA signals over fading media, which held scientific value at the time. This led to the publication of further related scientific papers. Eventually, I attained the rank of Associate Professor at the University of Khartoum.

Throughout my academic journey, I have held various administrative and academic roles within the university, garnering colleague appreciation. I served as the principal researcher for Sudan's esteemed, pioneering educational CubeSat (Cube Satellite) project. This project significantly contributed to efforts to form the nucleus of a Sudanese space agency. As part of the university's scientific research projects, it aimed to support Sudanese researchers in satellite science research and was fully Sudanese in all its stages. I have also published extensively in esteemed journals, supervised theses, and engaged in professional associations. In public service, I have held positions on committees and in youth organizations, including chairing the Advisory Council for the Youth Institution for Information Technology and serving on other Sudanese public bodies.

My involvement has extended internationally, representing Sudan in numerous gatherings and ministerial meetings worldwide. In 2012, despite my apolitical stance, my dedication to my country motivated me to accept the constitutional position of Federal Minister for Telecommunication

and Information Technology. The Presidency of the Republic of Sudan appointed me, and I served as a federal minister until 2018.

During my ministerial tenure, I spearheaded advancements in scientific research and ICT regulation, fostering digital transformation and bridging the digital divide. Noteworthy achievements include establishing the Institute of Space Research and Aerospace and implementing significant legal reforms in the ICT sector. I actively promoted social cohesion within the telecommunications and postal industry, organizing gatherings and engaging with employees via social media. Moreover, I chaired several boards and contributed to various initiatives supporting Sudan's science and communications sector. My efforts have been recognized through personal accolades and honors, including being listed among the top female figures in the ICT sector in Africa and the Middle East.

Throughout my career, I have prioritized women's empowerment, providing opportunities for their advancement and serving as a role model. I remain committed to achieving further accomplishments with the grace of Allah.

About the Author



Tahani Attia is a prominent academic, educator, and technology strategist, notable for her roles as a university professor and Federal Minister of ICT in Sudan. She has spearheaded legal and regulatory reforms and promoted scientific research in IT, telecoms, cybersecurity, and information protection. Dr. Attia has initiated projects like Sudan's e-government to bridge the digital gap.

As an associate professor at the University of Khartoum, she has led the Department of Electrical and Electronic Engineering, publishing extensively and presenting research globally. Her academic journey, from

earning a BSc, MSc, and PhD at the University of Khartoum to managing the CubeSat project, showcases her commitment to innovation.

Certified as a consultant engineer by the Sudan Engineering Council, Dr. Attia actively engages in professional societies. Her multifaceted expertise and dedication have profoundly influenced academia and the ICT sector, leaving a lasting impact locally and internationally.

JOURNEY 14

The Power of Inner Strength

Reem Bahgat

President, Egypt University of Informatics
Egypt

I grew up as an only child in a household where my father, an engineer, and my mother, who held a bachelor's degree in psychology and sociology, played influential roles. My father set high standards and rarely tolerated mistakes, while my mother applied her psychological insights to nurture and guide me. Their love and support never wavered, yet they consistently urged me to strive for excellence.

During my early education in Egypt, I attended girls' schools administered by Christian nuns despite being Muslim. This experience exposed me to diverse beliefs and instilled a deep respect for differing perspectives while reinforcing my faith. These schools, known for fostering discipline, aligned with my family's values and traditions.

In 1974, my family relocated to Kuwait, where I completed my secondary education. As I approached higher education, I faced the decision of attending Kuwait University or returning to Egypt for my studies. Although I could pursue a university education in Egypt, my parents preferred that I remain in Kuwait for my undergraduate studies, staying close to them.

My father aspired for me to pursue a medical career despite his engineering background. I vividly recall him saying, "If a female and a male candidate were to apply for a position with me, and the female graduated with an overall grade of 'excellent' while the male with an overall 'good' grade, I would opt for the male for an engineering role because he might better handle the demanding engineering work environment." Despite excelling

academically and having the opportunity to choose any field of study, my heart resonated with math and physics. My consistently high scores in these subjects fueled my passion. After extensive discussions with my father, I enrolled at Kuwait University to pursue Computer Science, guided by the belief that it involved substantial mathematics and held promising career prospects.

Kuwait University prides itself on hiring academicians with PhDs from esteemed universities. I fondly remember the professors who imparted their knowledge to me. One professor, renowned for crafting challenging open-book exams, emphasized effective teaching. Another presented a final exam question that stumped my classmates and me. Despite my best efforts, I couldn't solve it. Seeking enlightenment, I visited him afterward, only to learn that it was an open research query without a solution. He included it as a bonus question to tap into our intellect. These experiences broadened my educational horizons, for which I remain deeply grateful.

While my father envisioned my pursuit of postgraduate studies at a top-tier university, I desired to prove my mettle in the workforce. However, out of respect for his wishes, I pursued a master's in computing. Despite receiving acceptance from several institutions, I chose Imperial College London due to its global reputation in engineering and computing. My father's acquaintances suggested allocating the funds elsewhere, but he staunchly believed in fostering my independence, declaring, "I am nurturing a capable individual who will chart her path, be it in her career or personal life."

At Imperial College, where females constituted only 13% of the student body, I encountered various challenges but remained undeterred. Departing from my protective familial cocoon to navigate life in a foreign land presented its hurdles. Gradually, I embraced cultural diversity and assimilated into a liberal environment. Academic challenges included deciphering diverse accents and adapting to the British education system. Despite initial struggles and the temptation to abandon my studies,

I persevered. Eventually, I earned a distinction at the end of my first academic year.

Encouraged by my professors, I pursued a PhD, securing a full scholarship to alleviate my father's financial burden. The doctoral research journey demanded unwavering dedication, involving extensive reading, analysis, and experimentation. Though plagued by moments of doubt, I persisted, ultimately garnering recognition with a thesis nomination for the British Computer Society Award. Through this arduous process, I learned the virtues of commitment, perseverance, and self-compassion, acknowledging mistakes as opportunities for growth.

Transitioning to a teaching role at City University London and, subsequently, Cairo University unveiled my passion for education. As an educator, I embraced the responsibility of nurturing scientific understanding and ethical values among my students. Returning to Egypt, I delved into documenting the country's cultural heritage, contributing to its preservation and digitization while fostering interdisciplinary collaborations.

As I ascended the ranks within academia, from department head to vice dean and eventually dean, I discovered my aptitude for management. Gender proved no barrier to my ascent, underscoring the importance of inner strength, analytical acumen, and adaptability in leadership. Amidst societal upheavals during the 2011 revolution, I navigated the turbulent academic landscape, ensuring educational continuity amidst chaos. This period underscored the stabilizing influence of internal fortitude in crisis management.

In 2019, I spearheaded the establishment of the Egypt University of Informatics (EUI), seizing the opportunity to leverage international partnerships to ensure academic excellence and market relevance. Despite myriad challenges, dedication and perseverance propelled us toward success, culminating in the realization of our shared vision.

Reflecting on my journey, I owe a debt of gratitude to my parents for instilling in me the values of resilience and determination. Alongside formal education, life's lessons have taught me the importance of embracing mistakes, learning from them, and forging ahead with inner strength. I am also indebted to my colleagues who recognized my capabilities regardless of gender, affirming that engineering sharpens analytical thinking while womanhood fosters empathy—a potent combination for effective leadership. As I continue to tread this path, I am committed to fostering an inclusive and supportive environment where everyone can thrive and contribute their best.

About the Author



Reem Bahgat is the President of Egypt University of Informatics, a private non-profit institution focusing on informatics, established through collaboration between the Ministry of Communications and Information Technology and the Ministry of Higher Education and Scientific Research. Previously, she served as the Director of the Egyptian Bureau of Cultural and Educational Affairs at the Egyptian Embassy in the UK from 2016 to 2020.

With a strong academic background, Prof. Bahgat has been part of Cairo University since 1993. She held positions such as Dean of the Faculty of Computers and Information from 2009 to 2014, Vice Dean for Postgraduate Studies and Research from 2006 to 2009, and Head of the Computer Science Department from 2003 to 2006. Additionally, she served as Deputy Director of the Center for Documentation of Cultural and Natural Heritage (CULTNAT) from 2000 to 2009.

Bahgat earned her BSc in Computing and Statistics from Kuwait University in 1985, an MSc in Computer Science with distinction from

Imperial College – London University in 1987, and a PhD in Parallel Logic Programming in 1991. Her research interests include parallel logic programming, constraint logic programming, agent technologies, and semantic textual analysis.

JOURNEY 15

I Challenged Life-Pinnacle Moments: Reflecting on Achievement

Maria Natalia Roxas Dimaano

Professor, University of Santo Tomas
Philippines

As a professional engineer, I often contemplate how to manage both my career strategies and personal responsibilities effectively. Throughout my journey as a chemical engineer, I've faced numerous challenges while balancing my roles as a mother of six, a daughter to aging parents, a supportive wife to a husband committed to his family in the province, and a mentor and caregiver to my students. Navigating these diverse roles has taught me the importance of careful life management, allowing me to find equilibrium and continue advancing my career while being present for my loved ones.

My name is Maria Natalia Joaquin Roxas, though my colleagues and friends know me as “Marita.” I hold the esteemed position of full Professor in the Department of Chemical Engineering at the Faculty of Engineering. Additionally, I serve as a faculty researcher at the Research Center for the Natural and Applied Sciences. I am honored to lead as the Program Lead/Chair of the Engineering Programs Cluster at the Graduate School of the University of Santo Tomas. I hail from Obando, Bulacan, Philippines, but spent a significant part of my childhood in Baguio, where I lived for 11 formative years. Later, I returned to Obando to pursue and complete my foundational professional education.

My father worked as an underwriter and life insurance area manager, while my mother was a homemaker. Their strict parenting style limited my outings, leading me to immerse myself in activities such as reading, sewing,

crocheting, and knitting. When given the chance to play with my cousins and neighborhood peers, I delighted in traditional games like jackstone, hopscotch, peek-a-boo, “tinda-tindahan” (pretend market), and “eskuwe-eskuwelahan” (pretend school).

Growing up alongside three elder brothers—18, 15, and 9 years my senior—I received abundant love and attention from my family. As the only girl and the youngest in the household, my family cherished and cared for me, fostering a nurturing environment. Early on, I interacted with individuals of various ages and socioeconomic backgrounds, thanks to my parents’ generosity and compassion, which instilled a sense of empathy and understanding.

While my father assumed tasks typically associated with masculinity at home, he welcomed me to observe and learn from him, sharing valuable wisdom during those moments. Conversely, my mother imparted lessons on volunteerism, patience, obedience, and diligence through household chores. My parents instilled crucial values like honesty, integrity, impartiality, and respect for others and the law.

During my adolescence, my family, particularly my parents, enforced strict rules to ensure my safety. However, they also encouraged me to exercise freedom in decision-making, emphasizing the importance of rational judgment. Apart from my immediate family, I maintained close ties with relatives who cherished my company.

I pursued a degree in Chemical Engineering from the University of Santo Tomas with a consistent track record of excellence in mathematics and science during my primary and secondary education and with wholehearted support from my family. The university has embraced co-education for several decades, providing a safe and inclusive environment devoid of gender discrimination and adequate security measures for the welfare of female students, faculty, and staff.

Following my success in the Chemical Engineering Licensure Examination, I secured a position as an Assayer in the male-dominated mining industry. I began as a probationary Chemist in the Chemical Laboratory of the Assay Department at the Baguio Gold Operation of Benguet Corporation (BC) in Balatoc, Itogon, Benguet, analyzing mine samples for gold, silver, and copper concentrations. At the time, I was the sole female Chemical Engineer among approximately 90-100 male employees, alongside three other women in the department.

As a professional Chemical Engineer, I later assumed a leadership role in the Fire Assay Department, which predominantly comprised male staff. During my tenure, I encountered demanding work schedules, requiring my presence in the laboratory during unconventional hours due to high sample volumes from various projects. As the only female engineer, I navigated diverse attitudes among my male counterparts with strength, sharpness, and critical decision-making, fostering qualities like intellect, moral character, and responsibility.

Throughout my tenure at Benguet Corporation, I proposed and executed multiple projects to enhance elemental determination processes, automating laborious laboratory tasks. These initiatives significantly improved the efficiency and manageability of our analyses. Furthermore, I actively participated in company events and stock-taking activities. I provided troubleshooting support, even in adverse weather conditions such as typhoons and landslides, demonstrating my dedication to the organization's success.

At Benguet Corporation, I received an invitation to teach at a university in Baguio City, which I carefully considered with guidance from my superiors. I opted to teach 3-6 units (Thermodynamics and Physics) at what was then the Baguio Colleges Foundation (BCF), now known as the University of the Cordilleras. Balancing this part-time teaching role with my full-time position at Benguet Corporation honed my skills in multitasking, time management, and aligning with the company's "Management by

Objective” approach. It also provided a platform to update and enrich my technical expertise.

My journey at Benguet Corporation spanned six years. Through a series of well-deserved promotions, I progressed from an assistant chemist to the esteemed position of top-rate essayist. This professional growth afforded me invaluable experiences and knowledge that I deeply appreciate.

I encountered various technical, environmental, and social challenges throughout my tenure. I tackled these challenges by leveraging insights from my academic background and participation in management seminars, cultivating an analytical and systematic problem-solving approach that greatly contributed to my team’s success.

In 1986, I married a fellow Metallurgical Engineer from Benguet Corporation, and in February 1987, I embarked on a new journey of motherhood. This journey prompted me to resign from my industrial role and teaching commitments to focus on raising my child. Relocating to Batangas, where my husband joined his family business, I dedicated myself to nurturing our child until she reached one year of age.

However, good fortune intervened when a visit to the University of Santo Tomas (UST) led to a lucky encounter with Engr. Eduardo Ignacio and Dean Alberto Laurito, ultimately leading to a teaching position in the Chemical Engineering Department at UST, commencing in November 1988. Concurrently, I ventured into entrepreneurship, establishing a home-based garment business, which I successfully managed alongside my teaching responsibilities until the demands of motherhood and teaching necessitated letting go of the company.

Engr. Eduardo Ignacio encouraged me to pursue an MS degree to bolster my academic credentials despite being pregnant with my fourth child. I strived to balance my studies with familial responsibilities, which proved challenging. Ultimately, I benefited from the Engineering and Science

Education Program (ESEP) Scholarship offered by the Department of Science and Technology, facilitating my academic pursuits while providing ample time for my children. My thesis research focused on phase change materials for energy storage systems, a project that presented additional hurdles when I found myself pregnant with my fifth child.

Undeterred, I secured a Professorial Chair grant, enabling me to conduct research at UST's Research Center for the Natural Sciences. Despite logistical challenges, I successfully defended my thesis shortly after giving birth, earning my Master of Science degree in Chemical Engineering in March 1995.

Following this achievement, I presented my thesis paper at an international conference in Bangkok, Thailand, engaging with esteemed professors and researchers, including Professor Atsushi Kanazawa from the Tokyo Institute of Technology. Despite being pregnant with my sixth child, I seized the opportunity to participate in a short-term research grant at the Tokyo Institute of Technology, facilitated by the Department of Science and Technology, further enriching my academic journey.

This journey has been truly transformative, opening up many new professional opportunities for me. I immersed myself in the academic excellence of a leading technological institution in Japan, recognized as one of the top research universities in the country. Subsequently, in March 1997, I received another opportunity under the JSPS Exchange Scientist Program, facilitated by the JSPS Core University Coordinator, Dr. Manolo G. Mena, from UP. Embracing this invitation, I embarked on the JSPS RONPAKU (PhD Dissertation) Program in 1998, a five-year scholarship grant at the Tokyo Institute of Technology, under the mentorship of Prof. Takayuki Watanabe.

Undoubtedly, this phase marked my most significant challenge, necessitating the coordination of research efforts between the Nuclear Reactors Research Laboratory of TokyoTech, where I conducted my research work

for a maximum of 90 days, and my continued research activities in the Philippines throughout the year. Over five years, I conducted experiments, developed FORTRAN programs, performed numerical analyses, published in esteemed international journals, and presented findings at various international conferences. Additionally, I received invitations to speak and engage in DOST-initiated activities, further enriching my academic experience.

Navigating this research track amidst the challenges of pregnancy and childbirth demanded unwavering dedication, determination, and the invaluable support of mentors and grant opportunities. These experiences, both national and international, have significantly contributed to my professional growth and expertise in Chemical Engineering.

I continued to teach throughout this period at the Faculty of Engineering of UST, albeit with a reduced load. My responsibilities encompassed teaching laboratory courses while allocating the remaining half of my teaching units as research units to fulfill my obligations as a tenured faculty member. With adept time management, I balanced my roles as a mother, wife, daughter, student researcher, and faculty member, effectively dividing my commitments between work and personal life. Regular communication with my family facilitated through email and prepaid phone cards during my time in Japan, ensured that I remained connected despite physical distance.

In tandem with my academic pursuits, I actively contributed to various professional and governmental organizations, spearheading extension and community outreach activities. Notable leadership roles include presidencies, vice presidencies, and chair positions within esteemed organizations, highlighting my commitment to fostering academic and professional development within the community. Recognition for my contributions has been bestowed through prestigious awards and distinctions, underscoring the impact of my endeavors in the field, including the Dangal ng UST awards, the National Research Council of

the Philippines (NRCP) Achievement award, and accolades from esteemed engineering associations.

As an engineer, my endeavors are rooted in a commitment to enhancing quality of life and prioritizing public safety. I have endeavored to foster inclusivity and balance, acknowledging the multifaceted roles of women in society. Pursuing advanced degrees has enriched my perspective and provided opportunities for growth and impact.

Women, renowned for their emotional intelligence and ability to effect positive change, possess innate qualities that resonate with the ethos of engineering. By balancing professional pursuits with familial responsibilities, women engineers can navigate complexities with finesse, contributing meaningfully to the field.

Effective work-life balance facilitates better decision-making and enhanced productivity, empowering women to realize their full potential. Embracing opportunities with a growth mindset and unwavering faith in divine providence paves the path to success.

About the Author



Dr. Maria Natalia R. Dimaano, D.Eng., is a distinguished faculty member in the Chemical Engineering Department at the University of Santo Tomas (UST). She also serves as a resident researcher at the Research Center for the Natural and Applied Sciences and as the Program Lead of the Engineering Programs Cluster at the Graduate School. Dr. Dimaano obtained her bachelor's degree in chemical engineering from UST in 1980, a Master's degree from the University of the Philippines in Diliman in 1995, and a Doctorate in Chemical

Engineering from the Tokyo Institute of Technology in 2003. She began her career as an essayist at Benguet Corporation before joining UST as an Instructor in 1988, eventually becoming a Full Professor after 34.5 years of dedicated service.

Dr. Dimaano has significantly contributed to scholarly publications, including articles in international and national peer-reviewed journals and a chapter in “Solar Energy: New Research.” Her research interests include thermal energy storage, phase change materials, biofuels and biochar conversion, and composites. She actively engages in community outreach and collaborates with government agencies and professional organizations. She has received numerous national and institutional awards. Additionally, she holds fellowships in various international and national engineering organizations.

JOURNEY 16

Challenges Make Us Stronger

Ibtisam Kamal

Faculty of Engineering, Soran University
Basrah University College of Science and Technology
Iraq

I grew up in a family that highly valued education, which instilled in me a deep desire to pursue higher learning and contribute to society. My journey began at Al-Huda School in Basrah, southern Iraq. There, I found a nurturing environment with dedicated teachers who fostered healthy competition among young students.

My earliest leadership experiences emerged as I consistently attained the top student position, which rotated among the brightest students. Holding this title multiple times during my primary education filled me with pride, motivated by my parents' unwavering support and encouragement. Their pride in my achievements further fueled my determination to excel academically and positively impact my community.

During my secondary education at Al-Batool Secondary School for Girls and later at the preparatory level at Al-Maaqal Preparatory School for Girls within the same building, I experienced a rich academic environment. The school boasted excellent scientific and sports facilities alongside dedicated teachers, establishing itself as one of the premier educational institutions for females in Basrah. From the outset, I was particularly drawn to the sciences and English language courses. The competitive atmosphere within the school enabled students to recognize their capabilities and build confidence. Various activities such as exhibitions, scientific competitions, and quiz programs, often held on Thursdays in the schoolyard, provided ample opportunities for students to showcase their skills. I eagerly

participated in these events.

In 1971, I gained admission to the University of Basrah to pursue studies in chemistry. Initially unsure about the field, I soon developed a deep passion for it. Reaction kinetics, thermodynamics, quantum mechanics, and industrial chemistry captivated me. Despite the challenges, the university provided a warm and welcoming atmosphere, attracting students from diverse backgrounds. My journey with Basrah University began early in my career when the chemistry department appointed me as a laboratory assistant, being one of the top ten graduates. Under the mentorship of Dr. Ameer Attoo, my former professor, I gained invaluable insights into the workings of the department's laboratories, laying the foundation for my future endeavors. As my responsibilities expanded to assist in teaching and guiding students, I became increasingly drawn to pursuing further studies. With my family's unwavering support and encouragement from my superiors, I embarked on my master's degree journey in 1980. Despite the challenges posed by the onset of the Gulf War, I persevered and completed my project within the stipulated timeframe, laying the groundwork for a successful academic career.

After completing my master's degree, I joined Basrah University's College of Engineering, Chemical Engineering Department, where I dedicated myself to teaching and research. Over the years, I played a pivotal role in the department's growth and development, assuming various responsibilities, including serving as an assistant to the department head. By establishing strong collaborations with industry partners and organizing academic events, I enhanced the department's visibility and fostered a culture of dedication among faculty members.

In 1987, I seized the opportunity to further my academic pursuits by pursuing a Ph.D. Unfortunately, due to governmental restrictions, I had to study in Iraq. Despite the challenges of being the sole Ph.D. student and the turbulent political climate, I remained steadfast in my determination, ultimately completing my doctoral studies with distinction. This

accomplishment opened doors for me to assume leadership roles within the university, culminating in my appointment as Head of the Chemical Engineering Department, a position I held with pride and dedication.

Throughout my career, I have received recognition for my academic contributions, including national awards and the prestigious Medal of Science. My journey testifies to the power of perseverance and the unwavering support of family and mentors in overcoming obstacles and achieving success in the face of adversity. I take great pride in the accomplishments of my alums, many of whom have gone on to serve in prominent governmental roles, including as ministers, deans, vice deans of engineering faculties, and industry directors.

On March 21, 2003, I experienced a profound and life-altering event. While residing on the campus of Basrah University, I witnessed an attack by United States-led coalition aircraft that resulted in extensive destruction of homes, including my own. I sustained severe injuries, losing my right kidney, bladder, and half of my liver. Despite enduring more than 15 bomb shrapnel wounds to the right side of my body, many of which remain lodged to this day, I persevered. After four months of bed rest and recovery, during which my family and I found ourselves homeless, I transferred my professional endeavors to Baghdad University, where I temporarily stayed with my parents. There, I assumed a position as a full professor in the Biochemical Engineering Department at Al-Khwarizmi College of Engineering. Despite the challenges, I emerged from a major surgery with renewed determination, resuming my academic pursuits with vigor.

Two years later, I seized the opportunity to attend a conference in France. This marked the beginning of a new chapter as I embarked on a post-doctoral leave at La Rochelle University, followed by a subsequent contract in 2004. During my tenure there, I served as a professor, dedicating myself to teaching, supervising postgraduate students, conducting research, and participating in European projects. Encouraged by my post-doctoral supervisor, Professor Dr. Karim Allaf, I pursued and obtained an HDR in

Process Engineering in 2012, focusing my research on green engineering and the Impact of the Instant Controlled Pressure Drop Process on the Extraction of Bioactive Molecules from Natural Resources.

After returning to Iraq in 2013, I joined Soran University as the Head of the School of Engineering, where I played a pivotal role in establishing a comprehensive engineering faculty. Over eight years, I served as Head of the Chemical Engineering Department and Vice Dean of the Faculty of Engineering, contributing significantly to the university's rise in regional rankings. In October 2023, Basrah University College of Science and Technology appointed me as a scientific consultant and tasked me with shaping the curricula and requirements for newly established engineering departments. Subsequently, in November 2023, I assumed the role of Head of the Petroleum Engineering Department.

I firmly believe that success in engineering leadership knows no gender boundaries, provided one possesses the requisite qualifications, charisma, work ethic, positive attitude, and vision for shaping the future. Throughout my journey, I am deeply grateful for the guidance and kindness of God (Allah) and the values my parents instilled in me, reinforced by my educational experiences. I am thankful for my husband's unwavering support and proud of my two sons' accomplishments, who have pursued their academic and professional paths with me as a guiding influence.

Reflecting on my journey thus far, I am filled with purpose and determination to continue making meaningful contributions. My story is far from over, and I eagerly embrace the challenges and opportunities that lie ahead.

About the Author



Ibtisam Kamal is a distinguished professor of Process Engineering with over 14 years of administrative experience, including Head of Chemical Engineering Departments and Dean's Deputy for Scientific Affairs at Basrah and Soran University. Currently a full professor at Soran University's Faculty of Engineering, she also serves as a scientific consultant at Basrah University College of Science and Technology.

Kamal earned her BSc, MSc, and Ph.D. in Polymer Technology from Basrah University.

With a career spanning Basrah, Baghdad, and La Rochelle University, Kamal has supervised over thirty postgraduate students. Her research contributions include over 160 peer-reviewed papers and two patents, one European. She is a sought-after keynote speaker and delegate at national and international conferences. She also provides consultancy services to the petroleum and petrochemical industries. Kamal's editorial roles extend to international journals. Her research focuses on the simulation, optimization, and modeling of production processes, particularly in biofuels, eco-friendly drilling fluids, smart building materials, and green nanoparticles. Kamal's dedication to academia and research underscores her commitment to advancing Process Engineering and fostering innovation in sustainable materials.

JOURNEY 17

Lead and Persist

Rana Maya

Professor and Head of Quality Audit
Tishreen University

Syria

I have always believed that my role as a woman in building and advancing society extends far beyond nurturing a family. Despite numerous obstacles and challenges, my unwavering goal is to make meaningful contributions wherever I find myself. This determination fuels a hidden reservoir of strength within me, granting me the patience, perseverance, and resolve necessary to navigate through adversity. Syria's thirteen-year-long conflict has tested my resilience, yet it has only intensified my passion and commitment to engineering management.

Born in the coastal city of Latakia, Syria, in 1973, a place steeped in the rich history of Ugarit, I spent my formative years there until age ten. At Al-Karmel school, overseen by dedicated nuns, I immersed myself in an environment characterized by love, compassion, and discipline, which left an indelible mark on my character. My household was deeply rooted in science; my father, an engineering officer in the Navy with a PhD in marine engineering, and my mother, a dedicated homemaker, instilled in me the values of diligence and precision akin to my father's professional ethos.

In 1983, at age 10, my family relocated to Russia, where my father embarked on a three-year mission to pursue a master's degree. During our stay in Leningrad, I attended the Russian School while concurrently studying Arabic. Juggling two distinct curricula in different languages presented challenges, yet my enthusiasm for science enhanced the experience. My mother's invaluable support through home-based Arabic

lessons significantly contributed to our academic success.

Residing in Russia for three years profoundly shaped my character. Experiencing a new way of life in a modern city, enriched with diverse cultural facets, particularly in science and culture, broadened my worldview. The emphasis on organization, cleanliness, societal engagement, and innovation ingrained during my time there kindled a sincere desire within me to contribute to societal progress.

Upon returning to Syria, I completed my high school education, intending to pursue medicine, driven by a passion for alleviating human suffering. However, circumstances led me to pursue civil engineering, a field I initially perceived as rigid and arithmetic, contrary to my inclination towards innovation and invention. Encouraged by my father to explore engineering for its potential compatibility with family life and my aptitude, I began my studies at Tishreen University in 1990.

My fascination with construction engineering and management reignited my childhood aspirations of societal development. Despite the university's lack of practical training opportunities and societal norms discouraging individual initiatives, I persevered. Subsequently, during my postgraduate studies, I delved into research topics with field aspects, facilitating hands-on experience crucial for my professional growth.

Following graduation, I embraced a teaching career at the university, allowing me to balance academic pursuits with familial responsibilities. Pursuing postgraduate studies alongside teaching, I obtained a postgraduate diploma in 2000. During this period, I encountered my mentor, who had recently returned from Germany, whose expertise in quality management systems profoundly influenced my career trajectory.

Enrolling in a master's program in quality management in construction, I immersed myself in research, training, and practical applications. Despite the scarcity of relevant resources in Syria, I persisted, attaining a master's

degree with honors in 2003.

Pursuing a PhD posed a formidable challenge due to the unavailability of construction engineering and management programs in Syria. However, with perseverance and the support of my supervisor, Professor Jamal Omran, I overcame hurdles and commenced a PhD program, marking a pivotal juncture in my professional journey. I enrolled in a Ph.D. scholarship program focused on enhancing the performance of engineering projects, jointly supervised by Professor Volkhard France from the University of Kassel, Germany, and Professor Bassam Hassan, currently president of Tishreen University in Syria. Throughout this program, I evaluated over 300 projects in Syria and Germany, marking a crucial phase in my academic journey. I am profoundly grateful for the unwavering support and resources provided by my esteemed supervisors.

In 2009, I attained my Ph.D., specializing in quality management within construction projects, a pioneering endeavor in Syria. This achievement holds particular significance as it advanced the field and championed the cause of women in engineering. Breaking barriers, I became the first female doctoral graduate in construction engineering and management in Syria, setting a precedent for future generations. Over the past 18 years, the department has proudly seen five female colleagues earn their doctorate degrees, with some now serving as esteemed colleagues. Currently, five ongoing Ph.D. projects are led by female students, reflecting our commitment to fostering inclusivity and diversity in academia.

Concurrently with my doctoral pursuits, I recognized the imperative of supplementing theoretical knowledge with practical experience. Despite the scarcity of opportunities in engineering project management within Syria, I seized a role at a leading developmental institution, the Syria Trust for Development, where I served as Deputy Manager and later Regional Manager for five years. This experience honed my project planning, design, and evaluation skills and fostered creativity and innovation—a facet previously underexplored in my academic trajectory.

Balancing the demands of my doctoral research, full-time employment, and familial responsibilities proved a formidable challenge. Yet, through meticulous organization and unwavering determination, I successfully navigated this juggling act, garnering accolades such as the Ideal Mother Award from the organization I served.

In 2010, I returned to academia, assuming teaching responsibilities at Tishreen University. Despite encountering obstacles due to the scarcity of contemporary references, I persevered, earning high praise and recognition from my students for my dedication and commitment to excellence.

As the head of the internal audit and follow-up department at the newly established Center for Quality Assurance at Tishreen University, I spearheaded initiatives to instill a quality culture within the institution. Despite initial resistance, our concerted efforts yielded tangible results, culminating in the establishment of the National Authority for Quality and Accreditation in Syria—a testament to our enduring impact.

In tandem with my teaching endeavors, I pursued a sincere passion for scientific research, actively participating in major projects and supervising numerous master's and doctoral students. Additionally, I was pivotal in establishing and facilitating a master's program in Building Information Modeling and Management at the Syrian Virtual University, garnering recognition for my exceptional contributions.

My research endeavors shed light on the subpar performance of construction projects globally, underscoring the pressing need for enhanced project management tools and methodologies. Motivated by this revelation, I joined a global research team specializing in organizational excellence, contributing to collaborative projects to address these challenges.

Recognizing the need for practical interventions, I transitioned into consultancy, leveraging my expertise to improve various organizations'

project management and quality systems. Over the years, I've trained over 1,500 professionals and spearheaded initiatives to bolster quality and performance management in the face of adversity induced by the conflict in Syria. In recent years, I've assumed leadership roles at Al-Sham Private University and within the Engineers Syndicate, focusing on enhancing quality assurance practices and fostering innovation in engineering projects. Through these platforms, I am dedicated to effecting meaningful change and elevating the engineering practice standards in Syria.

Balancing the demands of teaching, research, and societal engagement has been arduous yet immensely rewarding. As a steadfast advocate for gender equality and empowerment, I am committed to nurturing the next generation of female leaders in engineering, inspiring them to challenge conventions and catalyze positive change.

In reflection, my journey has been characterized by resilience, perseverance, and a steadfast commitment to excellence. As I continue to chart new frontiers in academia and beyond, I am driven by the belief that every achievement, no matter how small, contributes to the collective advancement of society

About the Author



Dr. Rana Maya earned her PhD in Construction Engineering and Management in 2009, focusing on Quality Management and Performance Improvement. Since 2010, she has served as a faculty member at Tishreen University, Syria, and currently directs quality and accreditation at Al-Sham University. She is also a Syrian Virtual University professor specializing in Building Information Modeling (BIM). Dr. Maya has conducted extensive training, research, and consulting projects in

quality management systems and project management nationally and internationally, overseeing over 350 projects in Syria and Germany.

Certified as a Lead Auditor for Quality Management Systems and an Engineering Management Consultant, Dr. Maya now chairs the Construction Engineering and Management department. She supervises master's and PhD students while contributing to global research and development. Professionally, she is part of the Canada Organizational Excellence Specialists Team and leads the Projects and Quality Management Committee at the Engineering Union in Syria, focusing on training and establishing quality procedures for engineering projects.

JOURNEY 18

From Struggle to Success: A Tale of Triumph

Leong Wai Yie

Senior Professor

INTI International University's Faculty of Engineering and Quantity

Surveying (FEQS) Malaysia

My father, Leong Weng Sum, proudly owned a serene and idyllic Poultry Farm in Rawang, Selangor. Growing up, I experienced a joyful and stress-free childhood, shielded from academic pressures. We lived in a quaint double-story house within the expansive grounds of the Poultry farm, teeming with thousands of chickens. My mother devoted her time to nurturing her five children—two girls and three boys—with me being the second eldest. We prioritized building strong familial bonds and cherishing special moments integral to our daily lives.

We relished the simple joys of life, engaging in play, games, and various activities. The farm chickens provided us with endless amusement and excitement, particularly when collecting their eggs. Our surroundings boasted breathtaking landscapes, including expansive durian forests, papaya plantations, and flourishing vegetable farms, enhancing the beauty of our rural setting. During the Hari Raya festival, when all Muslims celebrated and were on leave, I actively assisted in our family business, fostering a joyous atmosphere and strengthening our familial bonds even further.

Reflecting on my childhood on the Poultry farm fills me with cherished memories of love, laughter, and the wonders of nature. My upbringing instilled in me the value of family, an appreciation for life's simple pleasures,

and the importance of hard work and unity.

Initially, I held no aspirations towards engineering. My exposure to this field during my secondary school years remained limited, tainted by preconceptions of toiling under the scorching sun amidst mud and bricks in an unpleasant work environment. As a science enthusiast, my opportunities for immersion in the subject were stifled by inadequate laboratory equipment and uninspiring pedagogical methods. I firmly believe that science education should commence early in a child's life, fostering a deep understanding and passion for scientific inquiry.

Upon completing my SPM (Sijil Pelajaran Malaysia), gaining entry into local government universities proved daunting. Two years of arduous attempts and disheartening rejections marked this period. The limited options regarding universities and academic programs only compounded my uncertainty about the future.

While at INTI College, I shared a dorm room with three roommates majoring in engineering and computer science. On campus, encounters with civil engineering students conducting fascinating measurement experiments left a lasting impression, inspiring me to enroll in a 2-year Diploma of Computer Engineering program.

Despite initial doubts from my family and personal apprehensions, I embarked on this academic journey to pursue a PhD in Electrical Engineering. The challenges were numerous, compounded by language barriers and cultural differences upon my arrival in Australia. However, with perseverance and peer support, I navigated through these obstacles.

In 2004, while pursuing my PhD, I participated in the Australian Research Trailblazer Innovation Award, emerging victorious despite initial skepticism. Financial hardships compelled me to work at a restaurant in Brisbane's Chinatown, reinforcing the values of perseverance and hard work. Throughout my time at the University of Queensland, I excelled

academically and assumed leadership roles, establishing the Sanskrit Society and representing the university at various events. As a minority in engineering, my presence as a female student was noteworthy, highlighting the need for greater diversity and representation.

If you have a passion for engineering, don't hold back, regardless of gender. Like any profession, engineering is about skills and abilities. Feeling concerned about stereotypes is natural, but they shouldn't deter you from pursuing your interests. Recently, society has recognized that women can excel in engineering. Eligibility criteria for engineering studies now emphasize academic performance rather than gender, making all branches of engineering accessible to everyone.

Several engineering fields have become popular among women:

1. **Computer Science and Information Technology:** This field has seen a rise in female participation due to the demand for skilled professionals in software development, artificial intelligence, and cybersecurity.
2. **Electronics and Communication Engineering:** This field involves designing electronic devices and communication systems, offering diverse career opportunities in telecommunications, consumer electronics, and automation industries.
3. **Biotechnology or Bioengineering:** This field creates innovative solutions by combining biology, engineering, and technology in healthcare, pharmaceuticals, and agriculture, attracting more women.
4. **Electrical Engineering:** This discipline focuses on electricity, electromagnetism, and electronics and plays a vital role in industries like power generation, renewable energy, and electronics manufacturing.
5. **Chemical Engineering:** This field involves designing processes and equipment for chemical production, and it has applications in

pharmaceuticals, energy, and environmental engineering.

It's important to note that these fields are not exclusive to women and can be pursued by anyone based on individual interests and career goals. Don't let preconceived notions hold you back; embrace your passion for engineering confidently.

As a C-Suite executive, I provide leadership and oversee all Centre of Institutional Analysis and Development operations. My responsibility is implementing a comprehensive plan to enhance the University's reputation. With a background in engineering and extensive knowledge in the field, I leverage my analytical skills and strategic thinking to comprehend and evaluate various plans, enabling me to make well-informed decisions for the industry. These analytical skills allow me to consider problems from multiple perspectives and facilitate effective solutions for complex issues.

In addition to my leadership role, I specialize in medical signal processing and telecommunications engineering. Through my expertise, I have successfully commercialized a groundbreaking bioinformatics technique I licensed to healthcare companies. This technique enables the extraction of crucial features from biomedical signals, leading to cultural enrichment, improved quality of life, and advancements in health and well-being. Furthermore, my work has strengthened the biomedical research capacity and knowledge of businesses and organizations, attracting substantial investments from the industry.

In recognition of my accomplishments, I have received numerous awards, including:

- 2023 INWES Distinguished Woman in Engineering Award
- 2021 WFEO Women in Engineering Award
- 2018 IEM Women Engineer of the Year
- 2016 IEM Presidential of Excellence Award
- 2016 Academic Excellence Award

- 2017 Ten Outstanding Young Malaysian
- 2017 Top Research Scientists Malaysia
- 2017 ASEAN Meritorious Service Award
- 2015 IEM Best Paper Award
- 2005 Australia Trailblazer Innovation Award
- 2005 Australia Queensland Smart-State Smart-Women Award

Working alongside my colleagues in an environment characterized by camaraderie and enjoyment brings me great satisfaction. It's a workplace that genuinely sparks my enthusiasm, and I eagerly anticipate each morning's arrival. A standout feature of this workplace is the exceptional leadership team, whose guidance enriches the positive work atmosphere.

What excites me most is the prospect of collaborating with my team to achieve significant objectives. Each day presents an opportunity to contribute to the company's growth, imbuing my work with a purpose that brightens my day. This opportunity allows me to make a meaningful impact in an exciting, forward-thinking industry. Together with my team, we can leverage our skills to drive positive change and progress.

Every company should aspire to sustainable growth and prosperity, regardless of the industry. Effective management of personnel within the organization is pivotal in fostering a positive work environment through initiatives like employee benefits and essential training. These efforts strengthen our brand, setting us apart in the competitive job market and attracting and retaining top talent. As a capable manager, I prioritize understanding the individual needs of employees and adapting my approach accordingly. Striking a delicate balance between honoring individuality and maintaining consistency is essential. Moreover, consistently fostering a positive attitude and behavior among the team is imperative to cultivating a healthy work environment.

The underrepresentation of women in the science and engineering workforce is a well-recognized issue. To address this challenge, our

collaboration with esteemed organizations such as the World Federation of Engineering Organizations (WFEO), The Institution of Engineering and Technology (IET), and the International Network of Women Engineers and Scientists (INWES) has led to the successful establishment of a Women-in-Engineering Mentorship program, benefiting over 1000 female participants. The positive outcomes of this program have shown that pairing female engineering students with female mentors fosters a greater sense of belonging, motivation, and confidence in their field, resulting in improved retention in engineering majors and stronger aspirations for successful engineering careers. Female mentors play a significant role in nurturing aspirations to pursue engineering careers by safeguarding women's sense of belonging and confidence.

The Women in Engineering Committee has outlined four overarching themes to address ongoing issues:

1. Engineering Workforce Capacity Building: Aim to bolster diversity and inclusivity within the future skills pipeline.
2. Retention and Leadership of Female Engineers: Strive to promote women's continued presence and advancement in leadership roles within the engineering field.
3. Collection of Engineering Strategic Indicators: Emphasize the need to gather pertinent data to measure and monitor progress effectively.
4. Partnership for Sustainable Development Goals: Focus on Goal 5, Gender Equality, while aligning efforts with SDG13 and SDG17.

Through these four themes, the committee aims to comprehensively address women's challenges and disparities in engineering, fostering an environment conducive to their success and advancement.

As an advocate for women in STEM, I am deeply passionate about promoting Equity, Diversity, and Inclusion (EDI) in engineering. As the lead of the IET EDI Taskforce, I am well-positioned to represent women in engineering and communicate the message of EDI through various

channels such as publications, conferences, and the media.

Furthermore, I have delivered over 500 talks, seminars, and conferences to mentor and support women in engineering, catering to the needs and interests of ASEAN and global women engineers, engineering members, and the general public. I have also actively contributed to enhancing the social standing and image of the ASEAN and global engineering profession through workshops, seminars, publications, media, and conferences. Additionally, my position as an engineering think-tanker in the Academy of Sciences Malaysia (ASM) enables me to contribute to nation-building efforts and raise awareness of science and technology in ASEAN, Asia Pacific, and globally.

Regarding my leadership style, I prefer a directive approach that involves motivating, guiding, and managing groups of individuals. I aim to inspire others to perform, create, and innovate.

In terms of my professional roles, I hold various positions, including:

- Vice President of The Institution of Engineers, Malaysia (IEM) for the term 2020/2022
- Chairman of The Institution of Engineering and Technology (IET) Malaysia for the term 2018/2021
- Vice President, External Relations of the International Network of Women Engineers and Scientists (INWES)
- Member of the World Federation of Engineering Organizations (WFEO) Women in Engineering Committee
- UK Council Member for IET
- Asia Pacific Gender Equality Committee Chairman

These involvements at the ASEAN, Asia-Pacific, and global levels aim to promote professional engineering practices to support the socio-economic development objectives of ASEAN locally and internationally.

As the Vice President of External Relations of INWES, I actively represent the organization to promote its initiatives in various global platforms, including the Union of International Associations (UIA) in Korea, the UNESCO-ICT Congress in Thailand, and UNESCO Meetings in Korea. I have also delivered speeches on women-in-STEM topics at WFEO-hosted events. I consistently represent INWES to share insights on Women-in-STEM at The Association of Korean Woman Scientists and Engineers (KWSE), The Asia Pacific Nation Network (APNN), The Society of Taiwan Women in Science and Technology (TWiST), and many other member countries.

In summary, my commitment to promoting Equity, Diversity, and Inclusion in engineering has led to meaningful mentorship programs and numerous engagements to support women in STEM. My leadership style revolves around inspiring and guiding others, and I hold various key positions within prestigious organizations to champion the cause of women engineers globally. Through these efforts, I aim to contribute to the development of the engineering profession and advance the socio-economic objectives of ASEAN and the world.

About the Author



Dr. Leong Wai Yie, a seasoned senior professor in Electrical Engineering, holds a Ph.D. and bachelor's degree from The University of Queensland, Australia. She is acclaimed for her extensive contributions to biomedical electronics and biomedical engineering and has authored ten book series. Currently holding prestigious positions, including Immediate Past Chairperson of IET Malaysia, Vice President of IEM, and VP of INWES, she specializes in medical signal processing

and telecommunications. Her pioneering research encompasses IR4.0, wireless sensor networks, and Brain Signal Processing. Commercialization of her bioinformatics technique has significantly impacted healthcare. Dr. Wai Yie's endeavors have enriched culture, enhanced quality of life, and boosted biomedical research capacity, attracting substantial R&D investments. Her accolades include the IET Achievement Award 2023 and Women in Tech® APAC Award 2023. With over a decade of experience in Australia, Singapore, the UK, and Malaysia, she focuses on biomedical signal processing, smart control, and wireless sensor networks. Recognized as a Young Scientist by the Academy of Sciences Malaysia, she advocates for women engineers globally and contributes to UN discussions. Additionally, she actively participates in academic accreditation and mentoring initiatives, further solidifying her influence in academia and industry.

JOURNEY 19

Always Farther and Beyond

Yasmina Kerboua Ziari

Research Professor

University Of Science & Technology, Bab Ezzouar
Algeria

I have always wanted to chronicle my journey, but starting has been challenging. I come from Skikda, in northeastern Algeria, where my parents' backgrounds shaped my upbringing: my mother, a dedicated homemaker, and my father, a diligent land laborer with a passion for numbers. Despite my grandmother's lack of formal education, she offered unwavering support for my learning journey. She and my mother instilled in me a profound belief in the importance of education for women, stressing that it should precede marriage considerations. Their mantra, "Career is sacred; marriage and family follow graduation," resonated deeply within me and shaped my worldview.

When I was five, Algeria celebrated its independence, prompting my family to enroll me in a new school. However, my early educational experience was marred by a harrowing incident that left an indelible mark. Under the tutelage of a prejudiced French instructor, I endured relentless bullying and humiliation, culminating in a public shaming where I wore a dunce cap while my peers jeered. The trauma of that day lingered, fostering within me a staunch resolve against injustice and a commitment to defending others' rights.

After this ordeal, I found refuge in the compassion of a new teacher who embraced and nurtured my potential. My academic prowess quickly flourished, earning me accolades as the top student across all subjects.

I perceive and approach life differently from my sisters, always seeking challenges, even from a young age. My childhood memories consist more of books than play, often immersing myself as a schoolmistress during leisure time. In elementary school, my passion for mathematics ignited, setting me on a trajectory toward a career in STEM. Growing up, I constantly disproved the notion that girls are inferior to boys, a challenge exacerbated by societal pressures reinforcing gender stereotypes such as “You are a girl. You should excel” or “You are a girl. You should not engage in certain activities or professions.”

Before graduating from elementary school, I was significantly disappointed when I received an overall failing grade despite achieving a perfect score in the math section of exams. This setback, however, fueled my determination. When allowed to retake a higher-grade exam, I excelled. Despite initial rejection due to age restrictions, I embraced the challenge of revisiting familiar material and achieved exceptional results, earning an A+.

Subsequently, my academic journey saw me outpace my peers, culminating in being the city’s top student by the end of middle school. High school marked a memorable chapter characterized by supportive mentors, particularly a math professor who influenced my career trajectory toward electronics. Despite familial support, my father initially resisted my choice to pursue a degree in Electronics, which he viewed as an unconventional field for women. However, his eventual acceptance and support bolstered my determination.

Venturing over 600 kilometers from home, I pursued my passion for electronics at the National Polytechnic School of Algiers, facing isolation from peers but garnering respect from professors. Despite challenges, including transportation difficulties and the loss of my grandmother, I persevered, supported by family and friends.

Internship experiences at the Nuclear Center of Algiers and the industrial vehicle complex of Rouiba provided valuable hands-on learning, solidifying my decision to pursue a career in academia rather than corporate roles. Despite doubts from acquaintances, I remained steadfast, fueled by my passion for teaching and research.

Graduate studies in Industrial Engineering presented new challenges, requiring extra effort to catch up with peers, yet culminating in recognition as class valedictorian. Throughout, supportive mentors like Professor Kerbache played pivotal roles, imparting invaluable knowledge.

I pursued personal milestones, including marriage and motherhood, while maintaining dedication to my career, reflecting my family's ethos of prioritizing education and personal growth. Scholarships and opportunities, such as studying in Scotland and Belgium, further enriched my academic journey, underscoring the importance of seizing opportunities despite obstacles.

The unwavering support of loved ones and mentors fueled my determination in all endeavors. They guided me toward a fulfilling career in academia and administration, where I continue to strive for excellence.

I defended my thesis four years after its inception while I was eight months pregnant. Before my child's birth, safeguarding my well-being was paramount. The premature birth of my first child, a significant event in the past, necessitated a prolonged pause in my academic pursuits as I focused on nurturing my son through his early challenges in the incubator. Thankfully, he thrived, allowing me to successfully defend my master's thesis and transition into Professor Kerbache's doctoral program in industrial engineering, focusing on medical informatics. My supervisor, a prominent management and planning institute figure, recognized this field as pivotal for reforming the

Algerian healthcare landscape.

I never allowed family responsibilities to impede my academic aspirations throughout my journey. The 1990s, a period marred by Algeria's tumultuous Black Decade, saw women academics facing grave threats. Despite the difficult circumstances where daily routines were shadowed by uncertainty, I persevered, even amidst the loss of colleagues to senseless violence. The societal upheaval, characterized by the rise of terrorism, cast a somber pall over Algeria, leaving an indelible mark on my consciousness. Against this backdrop, I balanced the demands of academia with the omnipresent danger, refusing to succumb to the oppressive ideology that sought to confine women to domestic roles. Each day testified to resilience as I entrusted my son to a caregiver, uncertain of our reunion each evening.

My daughter's birth in 1994 unfolded against the backdrop of a stringent curfew, yet I navigated these challenges with determination. As motherhood took precedence, I momentarily set aside my research, entrusting household responsibilities to my husband while embracing modern appliances like microwaves to ease familial obligations. Despite the tumult, I remained committed to my academic pursuits, diligently resuming my research endeavors and adopting a hands-on approach to my children's education, even paralleling their educational journey by assisting with homework and exam preparation.

Navigating the academic landscape presented obstacles compounded by resource deficiencies and bureaucratic hurdles. Despite such challenges, I persisted, driven by a relentless determination to advance my thesis. The eventual breakthrough came through support from the medical oncology department at the Pierre and Marie Curie Center in Algiers, where I honed the central theme of my dissertation.

The tide began to turn with the gradual improvement in Algeria's circumstances. International recognition followed, exemplified by

my accolades at prestigious conferences such as the 2004 GISEH Conference in Geneva, where my paper secured the top honor. Despite bureaucratic impediments delaying my thesis defense, I persevered, ultimately triumphing in 2007 after a protracted struggle against institutional barriers.

Transitioning into academia, I found fulfillment in shaping the next generation of scholars, particularly in advocating for female empowerment in the male-dominated engineering field. My commitment to effecting societal change extended beyond academia, as I championed gender equality through advocacy initiatives and mentorship programs. Despite societal prejudices, I remained steadfast in my belief in the transformative potential of women in the workforce, advocating for their equitable representation in leadership roles.

My professional journey has been defined by resilience, a steadfast commitment to my family, and unwavering dedication to effecting positive societal change. Reflecting on my experiences, I am reminded of the enduring importance of perseverance and the transformative power of education in shaping a brighter future for generations to come.

About the Author



Yasmina Ziari, a doctorate holder in industrial engineering with degrees from various European, Canadian, and national institutions, transcends the boundaries of academia. Instead of confining herself to teaching, she delves into research and mentorship, particularly focused on empowering students and young women through coaching in areas such as NLP, career development, and

entrepreneurship. Active in program boards for youth, Yasmina channels fresh ideas and enthusiasm toward effective project implementation, resilience, and sustained commitment. Beyond academia, she explores medicine, obtaining a Medical IT and Hospital Management certificate from the Catholic University of Louvain, Belgium, and collaborating with the Pierre and Marie Curie Centre in Algiers. This experience enriches her understanding of healthcare systems.

JOURNEY 20

Determined To Rise

Basema Taher Almahroos

Director of Investments, Apicorp
Bahrain

The transition to university life marked a significant shift for me, requiring considerable adjustment to the new academic system. Fortunately, the foundational year provided a stepping stone. Initially, our program comprised around 30 students, dwindling to fifteen after the first year, with seven women. Determined to excel, I immersed myself in my studies and joined a diligent study group. Gradually, I emerged as one of the top students in our cohort, earning placements on the Dean's List multiple times.

However, reminders of gender disparities in engineering surfaced during an industrial summer training program. While male counterparts secured placements in major companies, female students, including myself, were relegated to medium-sized factories. Similar experiences persisted during our graduation year when a visiting representative from a prominent Bahraini company implied that the engineering field wasn't conducive to female participation.

At 19, I married while my husband pursued his engineering degree in the UK. This unconventional decision allowed me to continue my studies in Bahrain despite familial reservations. Despite my mother's limited education, her unwavering support and advocacy for academic pursuits reinforced the importance of education in shaping our future.

Upon completing my degree in January 1987, with my husband still studying abroad, I decided to pursue employment or join him in the UK for a master's degree. Opting for the latter, I was admitted to a chemical

engineering program scheduled to commence in September 1987. However, my husband's early completion of his studies prompted our return home by July 1987.

Job hunting in Bahrain proved challenging, particularly with the limited opportunities available for female engineers. Undeterred, I persevered, securing a position at the Bahrain National Oil Company (BANOCO). Starting as a trainee planning engineer within the International Marketing Business Unit, I played a vital role in refining operations and international petroleum product sales.

Throughout my tenure at BANOCO, Eng. Adel Almoayedh, the Business Unit Head, provided unwavering support and facilitated career development initiatives. Transitioning between roles, I spent five formative years as a process engineer in the Technical Services Department, actively participating in technical activities, including plant shutdowns traditionally handled by men.

Despite challenges, I maintained an unwavering commitment to equality in the workplace, never seeking special treatment due to my gender. Balancing career aspirations with familial responsibilities, my husband and I welcomed four sons, who became a source of strength and motivation. Embracing a culture of continuous self-improvement, I leveraged mentorship and diligently honed my skills, assuming progressively more significant leadership roles within BANOCO/BAPCO.

In 2006, my perseverance bore fruit when I shattered the glass ceiling and became BAPCO's first female manager in its 75-year history. Her Royal Highness Princess Sabeeka bint Ibrahim AlKahlifa, the Head of the Supreme Council for Women in Bahrain, played a pivotal role in advancing the cause of Bahraini women by providing opportunities for active participation in Bahrain's development. Furthermore, Eng. Adel Almoayedh, Dr. Mustafa Al Sayed (Bapco CEO), and His Excellency Dr. Abdul Hussain Mirza (The Minister of the National Oil and Gas Authority)

supported my promotion.

This groundbreaking promotion thrust me into the spotlight, presenting a significant challenge. I aimed to prove my capabilities while showcasing that women can handle such responsibilities. At the time, I was the sole woman among the 60 managers in the company. If any of the other 59 managers faltered, no one would have questioned them. However, if I stumbled, it would be attributed to my gender. Therefore, I was determined to set a sterling example for women both within and outside the company.

Managing a department comprising roughly ten engineers, I spearheaded its reorganization and devised a development program with support from the organization's training department. Empowering and leading my team, we achieved remarkable strides together. It fills me with pride to hear from senior officials, even years after my departure, that I left behind a commendable legacy.

Recognizing that comfort impedes growth, I refused to settle and sought further career advancement. I embarked on a part-time master's program in Finance from DePaul University (USA) in collaboration with the Bahrain Institute of Banking and Finance (BIBF), graduating with distinction in 2009. This period proved to be one of the most challenging times in my life as I juggled studies, work, and family responsibilities.

Sacrificing social engagements and delegating most family duties to my husband, I often questioned if sacrificing my family life was worthwhile. However, the conviction to forge ahead and the belief that my children would one day be proud of my achievements kept me going. Our judgments were vindicated as I witnessed my sons emulating my dedication and commitment to their pursuits, viewing me as a role model.

Combining my engineering background with a nuanced understanding of the energy sector from business and investment perspectives, alongside a master's degree in finance, paved the way for me to join an investment

bank focused on the energy sector in the Kingdom of Saudi Arabia in 2010. Joining the Arab Petroleum Investments Corporation (APICORP) as a senior team member in the investments department, I contributed significantly to numerous success stories, leading successful investments and pivotal decision-making processes.

Reflecting on approximately 35 years of work experience, I ask myself whether I would have been happier or more successful had I chosen a different path. The resounding answer is no. While there are decisions and circumstances I might have handled differently, I take immense pride in who I am today and all that I have achieved, as does my family.

In conclusion, I offer the following words of wisdom to aspiring female engineers: the path to success isn't always smooth, but believe in yourself, pursue your passion, forge your own path, work diligently, continually develop your technical and leadership skills, and use any negative comments or challenges as stepping stones toward your goals.

About the Author



Basema AlMahroos, a distinguished energy executive with over 35 years of experience, has significantly contributed to the Arab Petroleum Investments Corporation (APICORP). While at APICORP, she led various investment initiatives and established the Portfolio Management unit, which oversaw a diverse portfolio exceeding USD 5.5 billion. Before her time at APICORP, Basema held leadership positions at Bahrain Petroleum Company (Bapco), where she made history as the company's first female manager in 2006.

Originating from Manama, the bustling capital of Bahrain, Basema's upbringing was deeply influenced by the city's vibrant trade networks and multicultural environment. As the tenth child among twelve siblings in a

large extended family, she was surrounded by highly educated relatives who instilled a profound appreciation for education and ambition in her. Despite a family tradition that leaned towards medicine, Basema charted her own path by pursuing a degree in Chemical Engineering at the University of Bahrain. This decision reflected her natural affinity for science and mathematics, setting the stage for her remarkable career in the energy sector.

Basema's leadership, strategic acumen, and dedication to mentorship have earned her industry recognition. She is a trailblazer in her field and a staunch advocate for diversity and inclusion, paving the way for future generations of aspiring professionals.

JOURNEY 21

If You Own Your Story, You've Got To Write the End

Asma Almani

Mena Region General Manager, TDE Group
UAE/Algeria

When life veers off course, I find solace in imagining myself delivering an inspiring address to a vast audience a decade from now. In this hypothetical future, I candidly share profound lessons from my odyssey, replete with trials and tribulations. I introspectively ask: how might I articulate that today's adversities were, in truth, blessings in disguise? Once I unearth the answer, a sense of liberation washes over me, dispelling worry and shame and enabling me to channel my energies into optimizing my present circumstances.

I have forged my essence by embracing failures, acknowledging missteps, and confronting adversity head-on. Rather than viewing them as impediments, I perceive these setbacks as invaluable opportunities for growth and self-realization. One might misconstrue my stance as reluctance to acknowledge defeat or error. Yet, it is precisely the opposite: I wholeheartedly embrace my fallibilities, leveraging them as catalysts for progress and enlightenment.

Born in 1977 in a small Algerian town, I hail from a humble, grounded family. My father denied the opportunity for schooling and shouldered the responsibility of providing for his mother and siblings after my grandfather fell during the Algerian liberation war in the late 1950s. He began years of labor at just seven years old to ensure his younger brothers could attend school. From him, I imbibed dedication and perseverance. In contrast, my mother, advancing to the 9th grade, enjoyed a somewhat better childhood.

“I desired an educated wife, someone who could enrich me, who surpassed my knowledge,” my father once confided.

I vividly recall my father’s reaction upon learning that I ranked second in my class. As we strolled home, laden with groceries, he paused to embrace me, dropping the bags to the ground. Overflowing with pride, he expressed hopes for my strength and success, envisioning my eventual pilgrimage to Mecca—a promise I fulfilled upon securing my first job. He always championed our education, attending every school ceremony with a beaming smile, proclaiming us as “the apple of his eye.”

Though our family was conservative, my father harbored aspirations beyond convention. While our extended family tolerated education for girls only up to a certain age, my father envisioned broader horizons for us. He encouraged us to pursue our dreams, surpass our limitations, and embrace new experiences. Despite familial opposition, he remained resolute.

My journey to an engineering degree diverged from my father’s aspirations for me to become a doctor, a profession he deemed most suitable for a woman. Yet, my aversion to the sight of blood steered me toward engineering. Opting for the top engineering specialty led me to the National Institute of Electricity and Electronics (INELEC). Among a yearly intake limited to 100 students, I was one of just four girls admitted that year. By the end of the third year, only 36 students remained, and I found my niche in the control (automation) specialization.

Months before graduating, I began job hunting, confronted with openings in remote locales where most of my salary would dissipate into housing and transportation. Though resigned to my deviation from the medical path, my father clung to the hope of being hailed as “the doctor’s father.” He encouraged me to pursue a master’s in engineering and even registered me for entrance exams.

Enrolling in a master’s program, I was among three graduate students—the

sole woman among men. Despite initial challenges, I became a competent field engineer in an oil and gas service company. Confronted with biases and stereotypes, I persevered, earning the respect of my peers through diligence and professionalism.

Navigating male-dominated spaces, I encountered numerous obstacles, from ill-fitting safety gear to biased clients. However, I remained steadfast, advocating for inclusivity and diversity within my company. I sought to empower female engineers and challenge institutional norms by engaging in mentoring and diversity initiatives.

Transitioning to a company focused on clean energy solutions, I reflected on my journey, recognizing my divergence from the conventional career trajectory. While departing from my previous company was a difficult decision, it was necessary to pursue my aspirations fully. Embracing uncertainty, I embarked on a new chapter, confident that every choice, however unconventional, shapes my narrative of growth and resilience.

About the Author



Asma Almani boasts 22 years of cross-functional expertise in the oil and gas sector across MENA and Europe. Currently serving as MENA General Manager at TDE Group in the UAE, she spearheads innovative energy solutions. Before this, she undertook diverse roles with Wintershall Dea, managing projects between Germany and the UAE. Notably, she held leadership positions as a Sales Manager in Libya, Product Line Manager in Qatar, and Regional Asset Manager with Baker Hughes.

Her journey began as the pioneering female field engineer in Algeria, and she evolved to become Libya's first female sales manager in a male-dominated industry. As a trailblazer, she navigated challenges, fueling her

commitment to fostering a supportive environment for women in oil and gas. She actively mentors, coaches, and advocates for female professionals, striving to enhance inclusivity within the sector.

Recognized for her contributions, Asma received the inaugural Women's Network Award of Appreciation from Wintershall Dea in 2021. She holds an EMBA from Mannheim Business School, a project management certification from Ecole des ESSEC Paris, and an electrical engineering degree from Algeria.

JOURNEY 22

Rising to the Challenge: Chronicles of Achievement

Sui Kau Alice Lim
Principal, Alvo Consultant
Brunei

I was born in Seria, a small oil town in Negara Brunei Darussalam (commonly known as Brunei), on the island of Borneo, in the early 1960s. The youngest of six siblings, I grew up while my father worked as a junior electrician for Brunei Shell Company and my mother as a cleaner in the British Army camp. Brunei remained under British Protectorate until its independence in 1984. According to Macrotrends.net, Brunei's population in the 1960s was approximately 90,000, with Seria, the second-largest town, likely housing 20,000 to 25,000 residents.

As the youngest child, I enjoyed my father's special affection and benefited from my older siblings' guidance, accelerating my progress. My eldest brother particularly encouraged me to excel in English and mathematics so that I could pursue higher education overseas. Initially, I attended a local Chinese school with my sister, who is six years older, while my other siblings went to convent schools. However, I chose to remain in my school due to my love for it and my family's support.

Under my siblings' guidance, I excelled in English, math, and biology. When I was ten, my eldest brother's graduation from a Scottish university with a degree in Electrical Engineering left a lasting impression on me. His company even provided him with a large four-wheel-drive car for work, which I found incredibly cool. My father often emphasized, "If you become an engineer, you'll drive a big car and visit different sites."

After retiring from Brunei Shell Company, my father purchased a large car and a station wagon. During school holidays, he took me to construction and oil rig sites in Seria. This wasn't for leisure; instead, I assisted him in running his mobile canteen at these sites. This experience provided my first exposure to site work and profoundly impacted me.

Throughout my life, I remained actively engaged in sports and school activities, enjoying racket games, ball games, track and field, singing on stage, and competing in word games like Scrabble. Additionally, I developed a passion for sewing and creating clothes for my mom, myself, and my sisters. These activities kept me constantly occupied, but my mother instilled a sense of balance between extracurriculars, academic responsibilities, and household chores. Her strict expectations taught me valuable qualities such as self-determination, resilience, hard work, discipline, and time management skills.

During my secondary school years, my family lived above a car workshop, which initially fascinated me. I observed mechanics dismantling engines, repairing car bodies, and restoring them to their original condition. However, the smell and noise associated with mechanical work deterred me from considering a career as a mechanical engineer. Nevertheless, my desire to work outside the classroom persisted. I yearned for a job that allowed me to witness the entire process of creating something, from inception to completion, much like the transformation of a car after a "face-lift."

While my sisters pursued careers in information communication and early childhood teaching, I contemplated my path. Although engineering hadn't crossed my mind initially, my older brother, an electrical engineer, encouraged me to consider STEM fields. However, I hesitated to pursue electrical engineering due to the high expectations I felt would be placed on me. I wanted to carve my own path and was also concerned about the gender imbalance I observed in the science department, with fewer female students and teaching staff.

As I was about to begin my GCE 'A' level course in London, some secondary school teachers cautioned me about the male-dominated nature of science and engineering fields. Despite this, my family had unwavering faith in me and supported my decision to pursue an engineering degree. They understood my passion and dreams, providing the financial support necessary for me to enroll in a Bachelor of Science program in civil engineering and later complete a master's in business administration (MBA) in the UK.

Reflecting on my teenage decision to pursue civil engineering, I can see how it profoundly influenced my life. This path allowed me to indulge in my love for hands-on work and fulfilled my desire for tangible outcomes and the joy of being outdoors. I learned to navigate hectic schedules throughout those formative years, fostering invaluable qualities like resilience, determination, and effective time management. Now, I stand as living proof of the life-altering potential that lies within making daring choices and following one's genuine passion.

During my university years, the gender imbalance in engineering courses became starkly apparent. Out of approximately 100 students in the civil engineering undergraduate program, there were only two female students, including myself, in the full-time course and one female student in the sandwich course, making up a mere 3% of the class. This situation made me realize that I was part of a minority, not only as a female student but also as an Asian student. I imagined a similar gender imbalance might have existed in engineering workplaces worldwide during the early 80s.

Throughout my first and final year (third year), I lived in a residential unit on campus with eight other female students from the UK and other parts of the world who were pursuing degrees in fields other than engineering. A couple of students were studying computer science as well. When I pursued my MBA, the percentage of female students was higher than in engineering, though it still wasn't as balanced as it could have been. The university had plenty of female undergraduates and postgraduate students

in courses like applied science, business and finance, computer science, economics, and politics. The university was women-friendly, offering proper security and a conducive environment for study, allowing women to move around the campuses freely at any time.

To ease some of the financial burden on my parents, I took up a part-time job during my course. Juggling a full-time course with an 18-hour part-time job was challenging, but the years of resilience training instilled in me by my mother and the thought of supporting my aging parents in the future kept me through the tough times. Some male students I was close to and shared projects or assignment groups with were very supportive and caring. They would lend me their tutorial notes and reading materials, for which I am still grateful. Fortunately, I did not encounter any male chauvinists in the course.

During the first two years of the course, we had to embark on fieldwork in different parts of the city and countryside multiple times. Female students were never discouraged or objected to certain tasks during the fieldwork. We carried the survey equipment and tools whenever necessary. These numerous field trips assured me that we, as female students, were trusted and believed to be suited for the career we had chosen. Nevertheless, the university faculty was considerate enough to make proper accommodation arrangements for female students in the countryside.

While at university, I often pondered whether female and male brains work differently and if the female brain is wired to have different subject interests. I couldn't help but wonder why so few female students were in engineering courses.

After serving as the director of water services, leading the department for five years, I was promoted to head the Public Works Department (PWD) as the Director General, a position equivalent to the CEO. PWD oversees eight departments under its umbrella, reporting directly to the Ministry of Development, and is tasked with developing and maintaining buildings

and infrastructure throughout Brunei. As a critical entity in fulfilling the national objectives outlined in the Blueprint of Brunei Vision 2035, PWD employed over 3,500 individuals by 2020. With robust engineering and technical capabilities, PWD played a pivotal role in the nation's sustainable socio-economic advancement, offering project management services alongside infrastructure development and maintenance.

Reflecting on my career, I deeply appreciate the trust bestowed upon me by the senior management of the Ministry, who continuously challenged me and provided avenues for personal and professional growth. Collaborating on diverse projects with teams of varying expertise was profoundly rewarding. I am privileged to have worked within a department and ministry that values women in engineering and prioritizes talent cultivation, perpetually striving for enhanced outcomes. In today's milieu, fostering a gender-balanced, diverse, and inclusive workplace is imperative to ensure that we harness the full spectrum of talent and innovation.

Juggling a career's demands alongside motherhood presents challenges exacerbated by societal expectations. Nevertheless, with unwavering determination and support from family, as well as assistance from caregivers, maintaining a healthy work-life balance is achievable. Cultivating an optimistic and problem-solving mindset is paramount, enabling one to navigate adversity with resilience. As a career-driven woman with familial responsibilities, I recognized early on the importance of prioritizing work-life equilibrium. Refusing to compromise on a fulfilling career or a nurturing family life, I made sacrifices in other domains, such as leisure time. While I couldn't be present for every moment, I ensured my availability during pivotal junctures in my children's lives.

I am grateful for the Brunei Government's commitment to gender equality and familial well-being. Policies such as 108 days of maternity leave for female employees and flexible arrangements for mothers attending medical appointments underscore this commitment.

Amidst the demands of career advancement and familial obligations, I heeded my late father's counsel to give back to society. Serving in local engineering institutions and on the Board of Directors of Chung Hwa Middle School has been a moral obligation and a source of personal fulfillment. No magic formula exists for balancing these demanding roles; it requires relentless dedication and a commitment to working smarter, not just harder. My life's philosophy revolves around perpetual learning and progress. Upon retiring from PWD in 2020, I established my engineering consultancy firm, focusing on civil, structural, and environmental engineering services for both public and private sectors. This endeavor keeps me intellectually engaged and ensures a more balanced lifestyle.

Throughout my journey, achieving milestones such as Fellowships with esteemed engineering institutions has paved the way for professional recognition. Initiating a consultancy firm has been challenging yet gratifying, offering meaningful work and personal time. My dedication to upholding industry standards remains unwavering.

In conclusion, by defying stereotypes, embracing creativity, seeking growth and guidance, and remaining adaptable, we can excel in the dynamic realm of engineering unbounded by societal constraints.

About the Author



Ir. Alice Lim is a highly esteemed figure in civil engineering, holding a Bachelor of Science (Honors) in Civil Engineering from the University of Aston, Birmingham, UK, and an MBA from the same institution. With over 35 years of experience in engineering and project management in Brunei Darussalam's construction industry, Lim's career is illustrious. Her tenure in the Public Works Department of the Ministry of Development led

to her appointment as Director General. Lim is a Chartered Engineer, a Fellow Member of the Institution of Civil Engineers (UK), and a Fellow Member of the ASEAN Federation of Engineering Organizations and Pertubuhan Ukur, Jurutera dan Arkitek (PUJA). She's also the first and only female Fellow Member of the Institution of Civil Engineers in Brunei. Lim is registered as a qualified civil and structural engineer with the Board of Architects, Professional Engineers, and Quantity Surveyors (BAPEQS) of the Ministry of Development, Brunei. In November 2020, Lim founded her Civil & Structural Engineering Consultancy, showcasing her leadership, expertise, and dedication to advancing civil engineering in Brunei and beyond.

JOURNEY 23

Start With Your Heart, and Then Just Start!

Thea Kurniawan

Chief Technology Officer, Tunas Resin
Indonesia

At the tender age of four, Kevlar first captivated my young mind. Stephanie Kwolek, the brilliant chemist behind this remarkable material, inspired me with her pioneering journey in a male-dominated field. Her unwavering determination fueled her fearless experiments with a cloudy polymer solution, defying skeptics to create the first of a family of synthetic fibers renowned for their exceptional strength and stiffness. Kwolek's self-belief ignited in me a conviction for the boundless potential of women and girls. However, as I matured, I recognized that realizing these aspirations would require overcoming significant obstacles.

My early years unfolded in Jakarta, Indonesia, amid societal and economic turbulence. The tumult peaked during the May 1998 riots, marked by widespread violence and civil unrest, particularly targeting Chinese Indonesians like my family. Though too young to recall many details, I realized that being different could carry dangerous consequences. Over time, I understood that this experience transcended racial or cultural disparities to encompass various forms of diversity, including gender. Recognizing these challenges, my parents bravely relocated our family to Perth, Western Australia, seeking a more nurturing environment for my sisters and me.

Perth, with its expansive landscapes and laid-back atmosphere, provided an idyllic backdrop for my formative years. There, amid beachside adventures and audacious kitchen experiments with my sisters, my fascination with the world's intricacies took root. Engrossed in the dance of elements shaping our world, I unknowingly paved a path toward my future passion

for STEM.

Like many children, I reveled in toys, from Duplo and Lego to Barbie and Bratz dolls. Our imaginative play extended to crafting props from recycled materials, unknowingly embracing the ethos of upcycling. Discovering vintage toys at my grandparents' house in Jakarta further fueled my curiosity, though disassembling them drew disapproval.

Our nomadic lifestyle between Jakarta and Perth instilled resilience and cultural intelligence, reinforcing my commitment to effecting positive change. Guided by my parents' ethos of pursuing dreams with elegance and grace, I embarked on a journey of self-discovery and purpose.

As adolescence beckoned, I pondered my career path and impact on the world. Despite excelling academically and dabbling in diverse interests, the possibilities left me grappling for direction. Though initially drawn to culinary arts, I realized during high school that chemical engineering resonated with my love for experimentation and understanding complex systems, aligning seamlessly with my passion for chemistry.

Sharing my career choice with my parents evoked mixed emotions—support tinged with uncertainty. Despite their unfamiliarity with STEM fields, they encouraged me while navigating uncharted territory. Their candid discussions about potential obstacles and personal decisions underscored the importance of remaining true to myself in a male-dominated industry.

Undeterred, I pursued my aspirations, guided by the pillars of community, culture, and chemistry, laying the foundation for a journey to engineer a better world.

During my university years, I dedicated myself wholly to my academic pursuits, striving to obtain my degree and accomplish my goals. Initially, the gender balance in my cohort was relatively equal, but a noticeable shift occurred as time passed. Eventually, only ten women remained among

approximately 125 students. This significant gender disparity fueled my determination to complete my education, challenge societal norms, and serve as a beacon of inspiration, particularly for my female peers.

I realized the importance of maximizing my university experience beyond academic achievement. I became passionate about advocating for greater support for female engineering students. I aimed to promote more inclusive curricula and foster an environment that would attract and retain female students, ultimately reducing dropout rates and empowering them to complete their degrees. Central to this mission was addressing the issue of belonging within the academic community, ensuring that all students felt valued and supported.

Throughout my journey, exceptional mentors influenced me, passionately advocating for engineering as a career open to all. Their guidance not only broadened my understanding of the diverse opportunities within the field but also inspired my commitment to mentorship and paying it forward to future generations of students. Engaging with organizations like Engineers Without Borders and Robogals allowed me to actively participate in outreach events to inspire and empower young women to explore STEM fields. I relished sharing my journey with students from various backgrounds, shedding light on the challenges and rewards of pursuing STEM, particularly as a woman.

Upon graduation, I ventured into a career in management consulting, drawn to its dynamic, project-based nature. Despite deviating from the traditional engineering path, I sought projects aligned with my technical background and interests. This decision eventually led me to explore opportunities in an engineering design firm, where a humanitarian perspective further fueled my passion for engineering.

In 2022, I boldly decided to return to Jakarta, embarking on a new chapter in my professional journey focused on product research, development, and manufacturing. This move provided me with an opportunity to

reconnect with my extended family and opened doors to new challenges and experiences in my field.

At the core of my motto, “start with your heart and then just start,” lies a commitment to values that guide my life. Family is paramount among these values, and I prioritize spending quality time with my loved ones while maintaining a delicate work-life balance. Inspired by my parents’ sacrifices and guided by their example, I strive to cultivate a supportive work environment that respects individual circumstances and fosters authenticity. I firmly believe in the power of women supporting women and am committed to empowering others, particularly in the workplace.

While both triumphs and challenges have marked my career journey, I remain steadfast in my commitment to advocating for equality and inclusivity in the workplace. Drawing inspiration from remarkable women, I seek to embody grit and vulnerability in my daily life, serving as a role model for future generations of female STEM professionals.

I am deeply convinced that by working collaboratively and uplifting one another, we can effect positive change and foster an environment of equality and progress in STEM fields.

From an individual level:

- Engage in open and honest conversations with young people, especially your children, about your journey as a woman in STEM and the incredible opportunities a STEM career can offer you and the world.
- Encourage and enroll your children in STEM programs from an early age, igniting their curiosity through play. This early exposure develops a wide range of essential cognitive and critical thinking skills that will benefit them in future studies and careers.
- Be confident in sharing your experiences as a woman in STEM with as many people as possible. Your voice is significant, so make it count!

On a community level:

- Get involved in STEM programs or consider launching grassroots initiatives to foster interest and participation in STEM fields.
- Volunteer to share your career experiences at childcare centers, schools, universities, and other educational institutions.
- Support and stand up for your peers. Speak out against situations that are uncomfortable, unsafe, or promote exclusion.
- Cultivate a welcoming and inclusive culture of belonging.

At a workplace level:

- Advocate for your company to sponsor female leadership programs to empower and support women in leadership roles.
- Promote increased visibility of STEM-related resources in the workplace and educational institutions, ensuring that all have access to these valuable tools.
- In addition to having a formal corporate diversity or women's committee, establish informal networks within your workplace to provide a safe space for female colleagues to connect and support each other.
- Organize regular gatherings or mentorship opportunities.
- Create pathways to help passionate, driven, and ambitious women in your STEM workplaces, nurturing their career growth.

The challenges that women in STEM continue to face and overcome cannot be resolved as easily as fixing a broken toy by taking it apart and putting it back together. While significant progress has been made since the biases and obstacles faced by women like Stephanie Kwolek, there is still much work to be done to achieve true gender equality in the industry. Being in the minority can be intimidating, but it's an everyday reality for women. Nevertheless, we persist. Women have made significant contributions to making the world a better place, and we will continue to forge ahead with our heads held high and smiles on our faces.

About the Author



Thea, a versatile chemical engineer with experience in Indonesia, the USA, and Australia, is known for driving innovation and sustainability. She thrives in collaborative environments, leveraging her expertise across diverse sectors, including mining, start-ups, health, consumer goods, and chemicals. Outside of her professional endeavors, Thea actively engages in volunteer work and advocacy, notably with organizations such as Engineers Without Borders and TEDxUWA, where she champions

STEAM education and environmental conservation. Her leadership at TEDxUWA has made a significant impact, reaching over 500 live audiences and amassing 1.3 million online views, providing a platform for youth voices globally. Thea's contributions have been recognized in prestigious forums such as Forbes Under 30 and the Western Australian Women's Hall of Fame, showcasing her profound impact on the community.

Raised in Asia and Australia, she advocates for fostering connections between people, cultures, and nations while mentoring the next generation of leaders to instigate positive change.

JOURNEY 24

Don't Follow the Crowd, Let the Crowd Follow You

Imen Makhoul

Transport and Energy Infrastructure Expert

Tunisia

My journey began with a revelation from my mother about my father's initial preference for a son, igniting a determination within me to challenge assumptions and forge my own path. Raised in a large yet humble family in a quaint Tunisian village, my mother stood as a beacon of strength and resilience. She dedicated her days to nurturing our household despite her limited formal education. In contrast, my father, a passionate primary school educator, held education in the highest esteem. He tirelessly invested in his children's academic pursuits, ensuring we had access to every resource essential for excelling in our studies.

Throughout my childhood, I exuded vibrancy and imagination, finding joy in crafting my own toys and exploring my creativity's limitless expanses. Drawing became my solace, and I reveled in sketching portraits of women—a passion that persists. On my first day of school, my father accompanied me, and I recall the mix of excitement and emotion as I crossed the threshold of the primary school. While I cherished subjects like drawing, music, history, and geography, the scientific disciplines captivated me the most. Mathematics, science, and physics held a special fascination, and with each passing day, my interest in these subjects intensified. Achieving high grades and garnering praise from my teachers was gratifying, but my father's pride and contentment truly fueled my drive.

Growing up in a village with limited recreational options, I sought

solace in the local libraries during winter and summer breaks. There, I immersed myself in a world of novels, books, and any tidbit of knowledge that crossed my path. My academic journey flourished during secondary school, where I maintained my commitment to excellence. Each year's end brought academic accomplishments and recognition through awards and accolades, underscoring my dedication and perseverance.

Opting to pursue the mathematics track for my high school baccalaureate marked the onset of a challenging journey. Despite being the lone female student in my high school to pass the math baccalaureate, I remained resolute, propelled by my enthusiasm for the subject. My determination and academic prowess propelled me to the zenith of my class, securing the esteemed rank of first place.

Studying engineering as a girl was unconventional. Choosing civil engineering, traditionally dominated by boys, fueled my desire to challenge stereotypes and break barriers. I vividly recall informing my father of my choice. He reacted angrily, asserting, "This is not a job for you; it's a field made for men, not women." Despite the hurt his words caused, I persevered. I loved what I was studying, and I excelled at it. So, despite his objections, I continued to shine in my studies.

In those days, it was not uncommon for girls to be in the minority in engineering schools. However, what amazed me was the excellence displayed by my female peers in every subject. They worked diligently and managed their time efficiently. Their discipline and passion for civil engineering were reflected in their grades—they all performed exceptionally well in their studies.

Graduation day remains etched in my memory. Surrounded by my entire family, I walked across the stage, feeling nervous and excited. As the ceremony concluded, an unexpected moment unfolded—my father, who had once doubted my path, could not contain his tears. He pulled me close and expressed his pride in my choices and the person I had

become. His words deeply touched me, leaving an indelible mark on my heart that continues to guide me to this day. They are a constant source of encouragement, steering me through personal and professional challenges and reminding me of the strength and determination that propelled me to where I am.

I was thrilled to receive an invitation for a job interview after graduating from the National School of Engineers of Tunis (ENIT). However, the conversation took an unexpected turn during the interview with the general manager of a prominent design firm in Tunis. Instead of discussing my skills, he asked delicate questions: “What will you do when you get married and have to tend to your children? How will you manage your family responsibilities if work necessitates travel to challenging living conditions?” The interrogation left me feeling crushed, upset, and furious. It seemed he didn’t see me for my abilities, only my gender. Yet, I refused to let this setback deter me from pursuing my dreams.

Unsurprisingly, I didn’t secure the job. The discrimination I encountered left me feeling disheartened and furious. Nonetheless, I persisted in my search until I found a small engineering firm that recognized my potential. They offered me a position as a road infrastructure engineer, and I seized the opportunity with determination and gratitude. Over the years, I evolved and ascended the ranks in my professional career. I worked in two highly reputable design offices in Tunisia. Despite getting married and becoming a mother to two daughters, I continued to fulfill my professional commitments and travel extensively for work in Tunisia and abroad. Balancing work and family life posed challenges, particularly during pregnancy. I constantly had to assert myself and earn respect from my superiors and colleagues.

Serving as a project engineer in a respected design office was fulfilling. I oversaw various infrastructure projects with dedication, conducted field visits, and led a team of engineers and technicians. However, balancing work and family responsibilities became increasingly arduous as my family

grew. With two young daughters and no nearby family for support, my evenings often became stressful as I juggled work commitments with childcare duties. Seeking a solution, I approached my boss to request a flexible schedule, only to be met with a stubborn refusal, citing company policies. This incident marked a turning point, prompting me to reassess my priorities and pursue a better work-life balance.

A month later, I tendered my resignation and embarked on a career as an independent consultant. It meant relinquishing the security of a permanent position, a stable income, and the comfort of familiarity. Yet, the allure of freedom and autonomy proved irresistible. Driven by a profound belief in my ability to achieve more, both professionally and personally, by charting my own course, I embraced the challenge. Departing from my comfort zone was a risk, but one I was willing to take for the opportunity to create a life where I could thrive, both as a professional and a parent.

Shortly after, I received an offer from an Oil and Gas company with construction activities in a remote area in southern Tunisia amidst the desert. Stepping into this unfamiliar territory, predominantly occupied by male professionals, my presence elicited mixed reactions. While not universally welcomed, I found invaluable support from a few individuals who extended trust and confidence, shaping my journey in this challenging industry.

My empathy and diverse professional experience enabled me to acquire numerous technical skills and develop soft skills such as listening, compassion, and adaptability. Most importantly, I carved out a place as a woman in a male-dominated field while remaining true to my authentic self.

As my daughters grew older, I had more time to dedicate to various associations and professional networks. Driven by the belief that my journey could inspire and empower other girls and women, I became involved in associations advocating for gender diversity in engineering and technical

fields. From local organizations like the Tunisian Association of Roads to international networks such as the International Network of Women Engineers and Scientists (INWES) and the World Road Association (PIARC), I found platforms to share my experiences and advocate for greater gender inclusion. Through these affiliations, I interacted with brilliant women who shared my passion for breaking barriers and fostering an environment where everyone, regardless of gender, could thrive in technical professions. Together, we worked to amplify our collective voices and drive meaningful change in our respective communities and beyond.

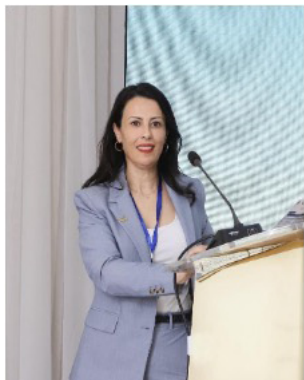
Notable highlights of my journey include my participation in the German-Arab Mentoring Program (Ouissal) in 2018, attendance at the IEEE Women in Engineering Leadership Summit in 2021, and contributions to discussions at COP27 in Sharm El Sheikh, Egypt, in November 2022. These experiences allowed me to shape the discourse on gender diversity and inclusion in technical spheres internationally.

A profound realization has emerged throughout my professional and personal engagements: we are all agents of change. Each of us—men and women—has a role to play in creating a world that is more inclusive and better for us and future generations.

“Diversity is having a seat at the table, inclusion is having a voice, and belonging is having that voice heard.” - Liz Fosslien.

About the Author

Imen Makhoulf, a senior civil engineer specializing in transport and energy infrastructure, earned her Civil Engineering degree from the National Engineering School of Tunis (ENIT) in 2001. Initially, she worked as a road engineer in various Tunisian firms, contributing significantly to major road projects across Tunisia and several African countries. In



2012, she entered the oil and gas sector, serving as an infrastructure consultant and overseeing projects in southern Tunisia. Since 2016, she has operated as an independent consultant, focusing on transport, road safety, and energy projects within and beyond Tunisia.

Imen actively engages in international organizations such as the International Network of Women Engineers and Scientists (INWES) and the World Road Association (PIARC), where she chairs the technical committee on roads for equity, accessibility, and mobility in rural and interurban areas. She is also a member of the Tunisian Road Association ATR board of directors. Imen has participated as a speaker at numerous international events and conferences in Egypt, Algeria, South Africa, Paraguay, Italy, and Germany. Additionally, she has been part of the German-Arab Mentoring Program Ouissal since 2017 and the Global Women's Network in Energy Transition (GWNET).

JOURNEY 25

Destined To Be an Engineer

Wan Siew-Ping

Founder, Design Engineering 82 Pte Ltd

Singapore

I, Wan Siew-Ping, grew up in a working-class family of five children in Queenstown, Singapore's first HDB housing estate. My father worked as a maintenance mechanic, while my mother was a typesetter in a small Chinese printing press. With both parents working long hours, my siblings and I often found ourselves under our grandparents' care.

During my primary school years, I spent much time with my paternal grandparents at home after school. This arrangement allowed me the freedom to explore Queenstown with other children, discover various plants and shrubs, and even catch guppy fish in drains to bring home as pets. My grandfather, a retired master machinist and mold maker, often wished for me to be a boy. He was driven by the traditional belief that a male descendant would inherit his craft and skills. Although I had three younger sisters and one younger brother, the seven-year age gap between my brother and me meant I didn't feel any significant difference in treatment.

In an era when passing down technical skills to daughters was taboo, my parents, like many others, believed girls didn't need higher education. They thought it would be wasted once the daughters married and joined another family. Due to our limited budget, toys were rare, but my father shared interesting machine hardware parts with us, fostering an early interest in engineering concepts. Despite my interest, my grandfather's insistence that girls were not allowed in machine shops prevented me from considering skilled jobs related to engineering in factories. Though working women

were uncommon in the 1960s, my mother believed the best path for girls was marriage or traditionally acceptable roles like teaching or nursing.

After secondary school, I struggled to find job opportunities due to financial constraints. My parents suggested acquiring technical skills by enrolling in Singapore Polytechnic or finding work as a seamstress. Unfortunately, we couldn't afford polytechnic education, so I applied to a junior college for pre-university education. I intended to become a primary school teacher after completing A-levels. Despite societal expectations, I pursued technical subjects in Pre-U, believing they would increase my job prospects. However, after graduating, I faced rejection from teacher training college and relief teaching positions.

Peer pressure made me consider becoming an Air Force ground crew technician, but my parents objected to the long commitment, prioritizing marriage over career.

Realizing A-levels might not suffice, I entertained the idea of a university education. Although my parents initially wished for me to work and contribute to the family expenses, they were elated when I secured a government bursary to study optometry in Australia. However, financial constraints forced me to decline the offer. My parents then allowed me to pursue a university education on the condition that I pay my school fees. I applied to Singapore University's engineering school, embracing the challenge of earning funds for the four-year course through part-time work and providing tuition.

During my university years, I juggled academics with work, facing setbacks and financial constraints. Despite these challenges, I persevered, graduating with a degree in mechanical engineering. My final year project, "Retrieval of Chinese Characters," sparked my interest in software design, laying the foundation for my career transition into automated machinery design.

The job hunt post-graduation proved challenging, with rejections from

mechanical engineering roles leading me to explore opportunities in the computer sector. Eventually, I secured a role as a process engineer at Fairchild Semiconductor Pte Ltd, marking the beginning of my engineering career.

When I shared the positive news with my parents, their immediate concern revolved around the location and nature of the factory. With the semiconductor industry still in its relative infancy, they worried about the presence of heavy-duty machinery, hazardous chemicals, and a predominantly male workforce. Lacking a specific Chinese term to describe the industry, I addressed my parents' query by referring to it as an electronics factory in Toa Payoh HDB. My parents advised me to consider resigning if the work environment proved hazardous.

After working for two days, I felt compelled to report to my parents about the working environment, ensuring their peace of mind and securing their approval for me to continue at the company. To their utter disbelief, I described an exceptionally clean factory, surpassing even the cleanliness of our own house. I emphasized that clean uniforms, gloves, and masks, akin to those worn by doctors, were mandatory when entering the production floor.

Furthermore, I eased their concerns about the male workforce, assuring them I had only a few male colleagues and bosses. Most factory employees comprised over a thousand female operators and supervisors. With this reassurance, my parents allowed me to pursue my career at Fairchild Semiconductor Singapore, where I diligently worked as a Process Engineer, striving each day to enhance the yield of semiconductor backend processes.

After less than two months as a process engineer and while still learning about the production line's different processes, I found myself amid a retrenchment exercise at the factory. One morning, upon reporting to work at 8 am, my immediate boss instructed me to remain at my desk in the office and refrain from going to the production floor as usual. Perplexed,

I inquired about the reason and learned that my colleague, who had been guiding me through the factory processes in the previous weeks, had been retrenched along with several operators and technicians earlier that day. HR was providing them with a briefing on the exit procedures on the production floor.

Later, I approached my boss to understand better how retrenchment occurs. He explained that in American companies when the headquarters conducts quarterly reviews, and revenue falls below expectations, managers must reduce their workforce. This understanding of the retrenchment exercise and that I had been retained despite still being on probation further fueled my motivation to work harder in my position.

After approximately 1.5 years in the process department, the company approached me with an opportunity to transfer to the newly established factory automation department. In hindsight, this decision marked the starting point of my career in equipment design for the semiconductor backend. Despite not fully comprehending what the job entailed, I am grateful that I displayed the courage to embrace this transfer into the automation department. This role gave me the chance to utilize my mechanical engineering education to enhance the production line's yield and productivity.

As I adapted to this new role, a significant challenge emerged six months into my tenure in the automation department. My department manager requested a meeting with me and two other engineers on that particular day. During the meeting, he informed us that he and the senior director had decided to establish a new company focused on providing automation solutions for the semiconductor industry. To my surprise, they invited us to join them as shareholders in this new venture.

As a relatively new engineer in the semiconductor industry with just two years of experience, being offered the opportunity to become a shareholder in a new company was more of a daunting challenge than a cause for

celebration. This time, it entailed overcoming another obstacle: a family mandate. My grandfather had set a rule that family members, especially girls, should not involve themselves in business dealings due to unpleasant experiences he had witnessed within the extended family.

To navigate this situation, I proposed to my parents that since I had been employed for approximately two years and contributed to the family's income, I wished to invest my one-month salary to join my bosses in the new company. Although my parents were reluctant, they eventually agreed upon realizing that I was using my own money and not borrowing from them. However, they cautioned me that I might not recoup my investment and emphasized that I must not sign any company cheques. Taking their advice to heart, I resigned from the multinational corporation and commenced my career as a design engineer with the new automation company I.C. Equipment Pte Ltd in August 1984.

Since 1984, I have been engaged in equipment designs for various processes in semiconductor backend operations. The inception of the new company began with our first customer in the familiar Toa Payoh area, where I embarked on the journey of learning about different types of semiconductor products and their associated processes. At this customer's factory, I successfully delivered my first machine design and gained valuable experience in managing machine commissioning according to customer procedures.

As a female engineer carrying out the commissioning of a machine design within the factory, I attracted curious glances from every corner. However, the customer engineer who supported the installation and commissioning tests proved helpful, which solidified my belief that a female engineer can confidently excel in engineering. Following this initial triumph, my boss and I began to build connections with more individuals in the production line, resulting in additional design requests coming our way. Before we knew it, this first customer brought us opportunities to supply automation solutions to their factories in Malaysia and Europe for the subsequent ten

years.

As my company's business expanded, I recognized the need to stay abreast of the latest technologies impacting automated machinery design to remain competitive on a global scale. Consequently, I returned to university to deepen my knowledge and enrolled in a part-time Master of Science program in Mechanical Engineering.

Despite my parents' cautionary advice, suggesting that I prioritize marriage over pursuing another degree, I disregarded their concerns as I lacked the desire or aspiration to get married. I completed the part-time degree, ignoring their well-intentioned advice, and acquired valuable skills and knowledge.

As I progressed in my career and gained expertise in the design and manufacturing of automated machinery, I took on more responsibilities and began traveling to customer sites to provide service. This allowed me to gain in-depth knowledge about the specific needs of the semiconductor industry and the challenges faced by various factories. Working in the field of automated equipment, which is predominantly male-dominated, presented some challenges as a female engineer. However, I successfully collaborated with customers' engineers to overcome installation and commissioning issues at the site. Surprisingly, Western customers had more concerns about a female engineer being assigned to their projects than Asian customers. In Singapore, where I worked, I did not experience any differential treatment as a female engineer.

Since I did not find my way to marriage even after almost 15 years of working, I decided to focus on my interests and ambitions at work instead of building a family. The semiconductor industry's growth from the 1980s to the 1990s kept my company busy and pushed my design work into higher-end precision controls and other cutting-edge technologies. Motivated by this, I again decided to pursue further personal development through university courses. This time, I enrolled in a part-time master's

program in Precision Engineering, as I needed to deliver equipment with increasingly higher precision specifications each year. Some friends suggested that I pursue a doctoral degree and prepare to teach in higher education institutions. However, I believed that the design skills required for engineering systems were not deeply rooted in academic principles and found no suitable PhD topics.

By the new millennium, after completing my second master's degree, the semiconductor industry had evolved amidst global economic challenges. When my private company changed ownership to someone uninterested in semiconductor machinery design and manufacturing, I decided to leave after 22 years.

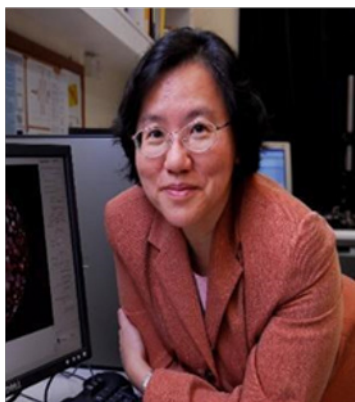
In 2005, I joined a friend's company in chemical coating processes for semiconductors but transitioned to the Agency for Science, Technology, and Research (A*STAR) in 2007. I never anticipated working with researchers, but I was intrigued by the suggestion to apply for an engineering role at A*STAR.

During the application process, HR double-checked that I had left the field for a doctorate blank. Half of the panel in the interview questioned why I pursued two master's degrees without a doctorate. I explained honestly that I had not found a local professor specializing in equipment design and manufacturing. To my surprise, they offered me the Program Head for Equipment Innovation and Development (EID) position. I held this position for about six years, designing and building various equipment to support research projects. I then spent the next seven years promoting recent technologies to local industries, such as automation and design simulation techniques, in different sectors to solve equipment issues and recommend productivity solutions. I retired at sixty-two in November 2021 after a fulfilling career.

Reflecting on my journey, I never expected to become an engineer, as I was advised in school to become a teacher. However, with determination

and a strong desire for education, I overcame hurdles and completed my university education. I thoroughly enjoyed my work as an engineer and considered myself fortunate to have had supportive bosses, colleagues, and customers who helped me deliver better products and services. Recently, former design engineers and technicians have introduced me as their teacher to industry peers, affirming that I fulfilled my teaching duties, even though I did not become a formal school teacher. I have learned that the definitions of a teacher, engineer, and school have evolved and will continue to change for future generations. Young people can aspire to be whoever they want, but it is essential to recognize our limitations and make the most of life's opportunities.

About the Author



Ms. Siew-Ping Wan, a 1982 graduate from the National University of Singapore, began her career in the semiconductor industry at Fairchild Semiconductor Pte Ltd as a process engineer, specializing in backend manufacturing processes for both ceramic and plastic packaged IC chips. With two years of invaluable experience in manufacturing IC chips, Ms. Wan co-founded IC Equipment Pte Ltd in 1984, a startup focused on designing and manufacturing automated machinery. Over the years, she dedicated herself to designing and producing semiconductor backend equipment, overseeing projects ranging from automated assembly and process equipment to test handlers, vision inspection systems, laser marking systems, and tape and reel systems. Designing these machines provided her with immense fulfillment as an engineer.

Recognized for her expertise in automated equipment system design, Ms. Wan joined the Singapore Institute of Manufacturing Technology

(SIMTech) in 2007. She provided in-house equipment design and development services for researchers while offering consultancy services to various industry sectors on equipment manufacturing and automation challenges. Ms. Wan retired as Senior Consultant (Equipment Design, Automation, and Supplier Development) at the Precision Engineering Centre of Innovation at SIMTech in November 2021, after which she embarked on a career as a freelance technical consultant.

JOURNEY 26

Do Your Best To Deliver the Best

Diah S. Darmawaty

Senior Aircraft Structural Engineer

The Boeing Company

Indonesia

My life journey commenced in Pangkal Pinang, on Bangka Island, situated southeast of Sumatra Island, Indonesia, where my remarkable parents nurtured me. At 6, my parents opted to relocate to Palembang, the capital city of South Sumatra Province in Indonesia, where my formative years unfolded, shaping my aspirations. Both my parents were highly educated compared to the norm at that time. My mother graduated from college with a law degree, while my father graduated with multiple majors. They both held esteemed professions; my mother was a politician, and my father was a government officer. Their dynamic roles shaped my upbringing, instilling a sense of curiosity and resilience. Supported wholeheartedly by my parents, I had the privilege to pursue my education in engineering, a choice that significantly influenced my trajectory.

During my childhood, indoor games held a special allure, and among them, the world of baby dolls captivated my imagination, embodying dreams of nurturing and growth within its delicate threads. Amidst these innocent pursuits, the resounding refrain of equality echoed through our household. My parents, exemplars of fairness, eliminated distinctions between their children based on gender, ensuring that opportunities flowed unreservedly to each of us.

Guided by my parents' wisdom, a trinity of life advice was etched into my being. First, the compass of righteousness was unfurled, directing me to uphold what is right while avoiding transgressions of the law. Second,

the tapestry of respect was woven, urging me to transcend appearances and social status, treating every soul with equal regard. Lastly, the foundation of humility was laid, instructing me to remain grounded in every circumstance. These principles became my lodestars, illuminating the path to success.

Even as a young girl, the allure of STEM fields, particularly engineering, captured my imagination, especially after witnessing my older sisters pursue education in engineering. It seemed as though my aspirations mirrored those of my family. Eventually, my youngest brother also chose to follow the same path, studying engineering. United by the thread of engineering, my siblings and I formed a formidable alliance; each set sails toward the horizon of innovation with ardent support from our parents. The echoing refrain was not just one of familial unity but a testament to the limitless potential within me.

While my journey has been one of exploration rather than entrepreneurship, the mantra of “do your best in everything” became my compass. I encountered this doctrine daily—a reminder to embrace excellence in every endeavor and nurture a legacy of achievement far beyond the present. Completing the sentence, “You are a girl. You should do,” becomes an ode to diligence and integrity, encapsulated in the mandate to perpetuate what is right with meticulous care. In contrast, the negation—“You are a girl. You should not do”—serves as a warning against straying into impropriety, a testament to the protective guidance that bolsters one’s moral compass.

In summary, my journey from the humble origins of Pangkal Pinang to the sprawling landscapes of Palembang has been underpinned by the pillars of support, equality, and moral uprightness. Nurtured by the wisdom of parents who cultivated the seeds of success, my trajectory embraced the STEM fields with an ardor matched by familial unity. The lessons learned in childhood continue to shape my existence, fostering an unwavering commitment to excellence and integrity.

Character and personal development are significantly influenced by the experiences one encounters during college. Within the diverse tapestry of college life, interactions with peers and educators play a pivotal role in shaping one's perceptions and creating lasting memories. In my college, the gender ratio was heavily skewed, with approximately one boy for every ten girls, highlighting the unique gender dynamics that influenced our interactions and overall experiences.

Fortunately, the environment at my college was nurturing and respectful, with my classmates and faculty members treating me with the utmost courtesy and consideration. This positive atmosphere fostered a strong sense of belonging and encouraged intellectual growth. Inclusivity was a prevailing theme that extended beyond academic interactions, permeating various aspects of campus life. The campus was known for being women-friendly, emphasizing diversity, and promoting mutual understanding.

The campus's women-friendly nature also translated into practical facilities that greatly contributed to a comfortable college experience. Amenities like ladies' rooms were strategically located around the campus, ensuring convenience for female students. These facilities were thoughtfully positioned to cater to the student body's needs, and their operating hours were designed to accommodate the routines.

Life is an intricate journey marked by critical junctures that demand decisive choices. After completing my high school education, I stood at a crossroads, contemplating the path to shape my future. During this pivotal moment, I felt a strong inclination toward the realm of engineering. Supported by an exceptionally open-minded and encouraging family, my transition into the world of STEM felt like a natural progression. This journey wasn't just about personal aspirations and embracing the importance of family obligations with professionalism. As I matured, my mother's wisdom resonated deeply within me. She conveyed a profound lesson transcending gender roles—the significance of marriage and family. These lessons reminded us that we must remember our roles as partners

and parents regardless of our career paths.

When the time came to reveal my decision to pursue engineering, I was fortunate to be surrounded by an environment that exuded openness and positivity. An abundance of enthusiasm and encouragement characterized my family's response to my choice. The absence of traditional gender biases within my family affirmed that my aspirations were valid and worthy of pursuit. Their steadfast support further solidified my belief in my chosen path. While dedication to my engineering journey was unswerving, I was acutely aware of the need to balance my professional endeavors and responsibilities as a partner and parent. Consulting my husband, parents, and daughter became integral to my decision-making process. This collaborative approach not only harmonized my personal and professional aspirations but also ensured that my choices were conducive to the well-being of my family.

My venture into engineering was not a coincidence but rather a deliberate and spontaneous inclination. The allure of innovating solutions and contributing to technological advancements aligned seamlessly with my passions. This convergence of my aspirations and chosen career path infused each step I took with purpose and unwavering determination.

In engineering and STEM, my journey has been defined by unwavering determination, strong support, and a remarkable absence of gender-based obstacles. As a woman navigating the world of technical academia, I often face questions about the challenges I may have encountered due to my gender. However, my voyage has been marked by a notable lack of traditional adversities, serving as a testament to the evolving inclusivity within the field.

The cornerstone of my academic journey has been experiential learning, a valuable facet that has enriched my education. Immersive internships and field experiences have played a pivotal role in this process. Practical exposure enhanced my theoretical knowledge and deepened my appreciation for engineering's real-world applications. This hands-on engagement added a

unique dimension to my education, bridging the gap between theory and reality.

The absence of gender bias has been a distinctive feature of my journey. In an era where conversations about gender equality are gaining momentum, I'm fortunate to declare that my chosen path hasn't been marred by discouragement based on my identity as a woman. Meritocracy has triumphed over prejudice, offering hope and opportunities to aspiring female engineers.

An exceptional aspect of my narrative is the absence of a constant struggle for validation. Unlike conventional stories, where individuals often grapple with the burden of proving themselves, I've been fortunate to thrive in an environment that nurtures talent and fosters collective growth. The camaraderie among my peers and mentors has eliminated the need for constant self-assertion, reflecting the progressive mindset characterizing the contemporary educational landscape.

Remarkably, my journey has been free from the insidious specter of objectification that some women encounter during their academic journeys. The idea of inappropriate exposure, often used to hinder the advancement of women, finds no place in my narrative. My path is illuminated by a commitment to equality, where every mind is valued for its intellectual prowess, not its gender.

While singular, extraordinary experiences haven't marked my journey, it remains a cohesive tapestry woven from the threads of consistent growth and unwavering encouragement. My support system, consisting of my parents and siblings, has provided the foundation for my aspirations. Their unwavering faith in my abilities and their absence of gender bias in their beliefs have strengthened my resolve and amplified my pursuit of excellence.

Personal choices play a significant role in shaping one's professional path in pursuing a career in engineering and STEM. For some, like myself,

the transition from academia to the industry was immediate, driven by the desire to apply newfound knowledge and skills in the workforce immediately after completing our engineering degrees. Others might have chosen a different route, aiming for an academic career.

Navigating the predominantly male-dominated fields of engineering, my experience as a woman was marked by resilience and determination. As one of the few women in the industry, I faced challenges that demanded a strong resolve to prove my capabilities. However, this journey had its bright spots. Being a woman in engineering allowed me to bring a unique perspective, promoting diversity of thought and innovative problem-solving.

The challenges faced by women engineers in male-dominated, engineering-oriented industries are multifaceted. While diminishing, gender biases can still affect career growth, as women are sometimes unfairly perceived as lacking technical prowess. The struggle for recognition and equal opportunities continues to be an ongoing battle, a testament to the indomitable spirit of women who refuse to be limited by stereotypes.

Reflecting on my post-academic journey, the prospect of industry engagement ignited a sense of purpose. The transition from academia to the corporate sphere was empowering, as I witnessed my theoretical knowledge transforming into real-world solutions. During this transition, familial and societal reactions played a pivotal role. While I received applause for becoming an engineer, there was also subtle skepticism about a woman's role in such a demanding profession.

A common narrative often perpetuates the idea that marriage should supersede a woman's career aspirations. However, the determination instilled in me by years of education empowered me to defy these expectations. Pursuing my career did not preclude the possibility of marriage; instead, it epitomized the harmony that can be achieved between personal and professional milestones.

Entering the corporate world elicited different responses from those

around me. Some admired my enthusiasm and curiosity, while others subtly doubted a woman's ability to succeed in such an environment. Nevertheless, my determination to challenge stereotypes and excel outweighed any negative comments, motivating me to forge my own path regardless of conventional perceptions.

Interestingly, finding a life partner was a seamless journey, fortified by mutual respect and shared values. Marrying a supportive and intellectually stimulating partner illustrates the evolving landscape of relationships in contemporary society. The absence of any perceived disparity in dowry due to professional qualifications underscores the changing tide against traditional gender norms.

Regarding my social status, I proudly embraced the title of a female engineer. However, my primary focus remained refining my skills, making valuable contributions to my field, and breaking through barriers rather than being overly concerned with societal labels. As for men's attitudes upon learning of my engineering background, any discernible difference in treatment remained elusive. The evolving dynamics of gender equality have ushered in an era where competence is increasingly recognized over gender stereotypes. This acknowledgment serves as evidence of the progress made in dismantling outdated preconceptions.

In a world marked by rapid technological advancements, the presence of women in engineering has evolved from a rarity to a significant aspect of the field. Reflecting on the journey of a woman engineer, it becomes evident that while progress has been made, challenges and triumphs continue to weave through the narrative. The path to securing a position in the chosen field has been largely unencumbered, as my personal experience has shown that finding job opportunities as a woman engineer is not difficult.

Undoubtedly, the engineering domain is one where competence should transcend gender biases. However, whether one's commitment and capabilities can be undermined based on gender remains pertinent. My dedication and proficiency have never been questioned due to my identity as a woman. This underscores a shift in perceptions, illustrating a step

toward gender equality in the professional landscape.

The specter of discrimination can cast a shadow on career trajectories within employment. Despite the strides made, instances of bias can persist. Notably, my journey has been characterized by the absence of discrimination during my tenure as an engineer, whether in corporate or technical leadership roles. This is a testament to the inclusive work environments that have fostered respect and equal treatment.

Interactions with male counterparts are an essential aspect of one's professional engagement. Encouragingly, these interactions have been seamless, marked by mutual respect and cooperation. This unobtrusive dynamic belies the historical gender divides that have occasionally marred professional relationships. The progressive attitude demonstrated by male and female colleagues contributes to an atmosphere of collaboration rather than contention.

Perceptions often influence decision-making, but whether one's gender impacts these judgments is worth probing. In my experience, addressing departmental issues has not been significantly influenced by my gender. The approach has been guided by objective analysis and consideration of the task rather than a gender-specific perspective.

Beyond the confines of technical excellence, the corporate world's treatment of women serves as a barometer for societal progress. From my perspective, the companies I have been associated with have unwaveringly supported diversity. This inclusive ethos reflects evolving corporate cultures that embrace the contributions of women in leadership roles and recognize the value of diverse perspectives.

However, the intersectionality of identities can often present nuanced challenges. Discrimination, whether based on race, ethnicity, language, or religion, remains an unfortunate reality for many. Having personally faced such instances, I understand the complexities of navigating multiple facets of identity in the workplace and the necessity of continued advocacy for

equity and inclusion.

Safety in the workplace is an indispensable consideration. In my early days, I was fortunate to feel secure and respected, a testament to environments prioritizing professionalism and mutual respect. Feeling safe in one's workplace is a precursor to productivity and an environment conducive to growth.

In the intricate dance of modern life, where professional aspirations and familial responsibilities intertwine, I have found myself navigating the delicate balance between work and family. This journey has presented challenges, required seeking support, and involved forging a path that embodies my values. The relentless tug-of-war between my demanding job and the cherished moments with my family has often left me yearning for more daily hours. It's a universal sentiment that transcends gender boundaries, and I'm no exception to this feeling.

Throughout this journey, the unwavering support of my family has been the bedrock of my success. Whether I was taking on work commitments, pursuing higher studies, or embarking on personal projects, their understanding and encouragement propelled me forward. Their recognition of my insatiable curiosity for learning and their willingness to adapt and accommodate during demanding periods have been invaluable. This robust support system smoothed my path and emphasized the importance of mutual respect and cooperation within our family unit.

In pursuing professional excellence, I've occasionally encountered the subtle echoes of traditional expectations that I must adhere to certain domestic duties as a woman. However, these echoes have been few and far between, gradually fading against a society progressively embracing equality and diversity.

The art of balancing work and personal life is a tightrope act that I've honed over time. Admittedly, a workaholic, I find solace in completing targets and projects. Nevertheless, my family remains my north star,

guiding my priorities. Urgent family matters always take precedence over work commitments. In these decisions, I find the true essence of balancing responsibilities and constantly reassessing my dedication to both spheres of life.

Amidst my professional journey, there have been instances when I've relinquished travel assignments due to family commitments. These moments symbolize my conscious choices to ensure my familial obligations are met. In these decisions, I strive to embody values that transcend my role as a working woman in engineering. As a mother, I am acutely aware of the impact of my actions on my daughter. I endeavor to exemplify the significance of quality work, trust, respect, and humility. Through these values, I aspire to mold a future engineer and a conscientious and compassionate human being.

My longing for the engineering world eventually resurfaced. My eldest sister, Dr. Ir. Diah Kusuma Pratiwi, M.Sc., encouraged me to leap into faith. Despite my background in soil structure and unfamiliarity with aircraft structure, I applied for a position in the Indonesian Aircraft Industry (PT. IPTN). My sister's poignant question, "Did you know anything about foreign exchange trading before?" catalyzed my pursuit of this new opportunity. I confronted a rigorous selection process to secure a role as an Engineer in the Indonesian Aircraft Industry, enduring a taxing full-day written test while battling illness. Nevertheless, I persevered and surpassed the threshold with a score just above the borderline.

On July 15th, 1993, I embarked on my journey in the Aircraft industry, fully aware of my limited knowledge of aircraft structure. I dedicated myself to rigorous study and sought mentorship within the organization, immersing myself in the intricacies of metallic technology employed in fuselage, wing, and empennage structures. By my third year in the industry, I discovered a profound passion for my work, relishing the opportunity to learn something new every day. After 11.5 years in the Indonesian Aircraft Industry, I seized an opportunity to join The Boeing Company in Everett, USA.

Commencing on October 6th, 2004, I assumed the role of an Aircraft Structural Engineer, initially stepping in for one of my mentors from PT. IPTN had received an offer from Boeing but had yet to accept it due to prior commitments. Despite my confidence stemming from my extensive experience at PT. IPTN, I was assigned to Aircraft Interior Structures, an entirely alien area incorporating composite technology. The pressure was daunting, and I questioned my competency. However, my husband, Effendy Kamri, provided unwavering support, urging me not to give up and reminding me that this role wasn't my initial target. His encouragement fortified my determination, leading me to commit to intensive study sessions from 8 PM to 4 AM every night for three months to bridge the knowledge gap.

My perseverance bore fruit when, amidst the job cuts of 2008-2009, my dedication led the leadership team to offer me a transition from a contract engineer to a direct employee, securing my position within Boeing. By May 2009, I officially became a direct employee of the company. From 2008 to 2020, I played pivotal roles in various Boeing Commercial Aircraft Product Development Projects, ascending to Senior Technical Lead Engineer and Senior Aircraft Structural Engineer positions. My specialization in Aircraft Interior Structures, encompassing overhead stowage bins, ceilings, sidewalls, linings, crew rest areas, and furnishings, solidified me as a subject matter expert.

Amid the challenging backdrop of the COVID-19 pandemic in May 2020, I faced a crucial decision as I considered leaving Boeing to tend to my ailing father. Ultimately, I opted for a Voluntary Layoff (VLO), bidding farewell to Boeing on December 5th, 2020. However, in a turn of events, I received an enticing invitation to return to Boeing in mid-August 2022, an offer I promptly accepted. Commencing October 26th, 2022, I embarked on my second stint in the aircraft industry. Reassigned to my former Business Unit, where I had amassed sixteen years of expertise, I resumed my previous role and responsibilities.

Nine months into my return, I deliberately expanded my skill set by transitioning to the Seat Structure (Stress) team to diversify my experience within interior structures. For me, rejoining the workforce evoked a sense of returning to the classroom, eager to absorb new knowledge and challenges.

Navigating professional spaces, I have adopted a philosophy of compartmentalization. I firmly believe that my engineering persona need not permeate every facet of life. Be it amidst men or women, I choose to withhold discussions of my professional achievements in social settings. Instead, I channel my professional attributes exclusively into pertinent contexts. This approach, though it may appear controversial, allows me to savor precious moments with my loved ones without diluting them with work-related discussions.

Remarkably, I've been fortunate to evade the judgmental gaze of both women and relatives. This absence of judgment has allowed me to focus on my aspirations and responsibilities without the burden of external scrutiny. Yet, opposition has arisen from my unyielding commitment to work. Some have questioned my allocation of time and energy, challenging the extent of my dedication. Such skepticism, while a testament to my enthusiasm, reinforces the inherent societal norms that continue to scrutinize women who unabashedly pursue their ambitions.

In a world characterized by ceaseless activity and competing priorities, my journey as a working woman has been a tapestry woven with resilience, support, and a sincere determination to strike an equilibrium. With each stride toward my goals, I remain mindful of the delicate thread that connects my professional feats and cherished family moments, crafting a life that reflects the values I hold dear and the ideals I aspire to pass on to the next generation.

In administrative leadership, women have made significant strides, breaking through glass ceilings and assuming pivotal roles previously dominated

by men. However, despite these advancements, the journey for a woman administrator is not without its unique challenges, even in interactions with fellow women colleagues. When considering the dynamics between a woman administrator and her female coworkers, several dimensions reflect both encouraging support and potential complexities.

A harmonious and cooperative environment thrives when colleagues, regardless of gender, support one another. In this context, women colleagues have proven to be exceptionally supportive allies. They embrace camaraderie, acknowledge competence, and willingly contribute to the team's collective success. Appreciation for achievements transcends gender barriers, exemplifying a progressive and inclusive work culture. The resounding chorus of encouragement and pride underscores the camaraderie shared among women professionals, fostering an atmosphere that uplifts each member.

Within this supportive framework, the woman administrator often emerges as a source of inspiration for her colleagues. Her triumphs are a beacon of possibility, igniting aspirations and bolstering determination. Witnessing the pride in her achievements rippling through the office corridors is heartening. Such profound inspiration underscores the collective belief that barriers can be surmounted, motivating women colleagues to persistently strive for excellence in their respective spheres.

Adapting to a predominantly male-dominated professional milieu, the woman administrator's journey is illuminated by remarkable resilience. However, this journey does not require her to depart from her authentic self. The key to success lies in unwavering dedication and adherence to a moral demeanor. In this context, personal transformation might not entail significant modifications but rather the tenacity to deliver the best while maintaining etiquette and professionalism consistently.

About the Author



Diah Darmawaty is a senior aircraft structural engineer and a senior stress analyst at The Boeing Company, located in Everett, Washington State, USA. She commenced her career at Boeing in 2004, previously working at the Indonesian Aircraft Industry in Bandung, Indonesia. In her prior position, her primary responsibility was analyzing the strength capabilities of fuselage structures, from the cockpit area to section 48 at the empennage.

Upon joining Boeing, she transitioned to analyzing aircraft interior structures. Her initial project at Boeing involved analyzing the overhead stowage bins of the 737 Next-Generation. With over 29 years of experience as a Stress Analyst, Diah has contributed to more than 10 different aircraft programs and over 20 interior projects. She was the stress leader for projects such as the 737 Boeing Sky Interior, 737MAX, 777DECO, 777-9, 777-8F, and 787-10.

In 2011, Diah received the Revolutionizing Flight Award from the CEO of Boeing Commercial Aircraft. Diah Darmawaty was born in Indonesia and earned her bachelor's degree in civil engineering from Sriwijaya University in Palembang, Indonesia, graduating in January 1991. Outside of her professional endeavors, Diah and her family enjoy traveling, exploring new places, and indulging in hobbies such as cross-stitching, house design, and reading.

JOURNEY 27

Resilience Through Setbacks

Zanita Zainuddin

Head of Safety Intelligent Drive and Attribute Management of E&D,
Proton
Malaysia

From a tender age, the wonders of space have held me spellbound. Contemplating the boundless expanse of the universe and its infinite possibilities fills me with awe, prompting reflection on the past, present, and future. The realization of our insignificance in the grand scheme humbles me. Thus, it's no surprise that I harbored a deep-seated ambition to venture into aerospace from as early as five years old. Discovering engineering disciplines tailored for space exploration crystallized my aspiration—I was determined to become an aerospace engineer.

Growing up as the fourth child among five sisters in a family of educators—a teacher and a lecturer—I excelled academically, often surpassing my siblings. Despite our inherent competition, our parents instilled a strong sense of empathy and the golden rule of treating others as we wish to be treated.

Throughout my academic journey in Malaysia, from Primary Year 6 (Penilaian Rendah) to the final Secondary Year 5 (Form 5 - Sijil Pelajaran Malaysia (SPM)), my academic prowess continued to shine. However, a setback emerged when I unexpectedly received an F grade in Bahasa Malaysia, seemingly jeopardizing my dream of studying aerospace engineering abroad. Nevertheless, my grade was revised to a passing Credit after a re-evaluation. Though relieved, I found myself at a crossroads, questioning my academic trajectory.

Seeking clarity, I sought guidance from mentors and peers. One pivotal moment came during a solitary run when a senior's inquiry—"Could you live with giving up?"—struck a chord. Another came from an esteemed lecturer who emphasized the importance of perseverance and sacrifice in achieving long-term goals. University life wasn't devoid of memorable moments. Alongside like-minded friends, dubbed the "6 jahanam," we challenged norms with playful, albeit harmless, acts of rebellion. Despite occasional mischief, my focus remained on my studies, culminating in graduation with an Advanced Diploma in Mechanical Engineering in 1995.

Entering the workforce during a challenging job market, I initially found myself in a management trainee role at a retail firm. However, a chance opportunity led me to a position as a homologation engineer at PROTON, where I delved into vehicle crash testing. This experience ignited my passion for vehicle safety. Over the years, I immersed myself in learning, eventually transitioning to roles of increasing responsibility within PROTON's Research and Development Division. Spearheading projects like Malaysia's first multi-purpose vehicle (MPV), I embraced challenges with a thirst for knowledge, leveraging teamwork and willingness to seek guidance.

I've led by example throughout my career, emphasizing the importance of diligence and quality work. Despite challenges and occasional misconceptions about gender roles in engineering, I've consistently advocated for competence and equality in the workplace.

My journey has been marked by notable achievements and recognitions, from media features to awards honoring safety and innovation in the automotive industry. Whether speaking at international forums or advocating for vehicle safety, my commitment to excellence remains unwavering.

In reflection, resilience, determination, and a passion for innovation have

shaped my career. As I chart new paths in the automotive industry, I remain dedicated to driving positive change and inspiring future generations in STEM fields. As I have progressed in my career, transitioning from a Group Leader to a Lead Engineer, Staff Engineer, and now as the Head of Safety Intelligent Drive and Attribute Management, I've remained steadfast in my commitment to engineering fundamentals, grounded in data, facts, and figures.

Being a woman has brought certain advantages. It's not about reinforcing stereotypes but acknowledging that women often bring meticulous attention to detail and a strong focus on thoroughness. Unfortunately, there have been instances where traditional-minded superiors made decisions without consulting our insights or engaging in meaningful discussions. By "old school," I refer to a time when men predominantly held decision-making roles. Throughout my career, I've emphasized that positions should be awarded solely based on competency and capability. Fortunately, remnants of this old-school mentality are dwindling, with a noticeable shift towards accountability and meritocracy regardless of gender. Women, having often faced the need to prove themselves doubly, bring unique mental resilience and strength to the workplace.

As someone deeply involved in vehicle safety, particularly in passive and intelligent drive technologies, my role necessitates frequent overseas business trips. Only a few recognized and accredited crash labs and proving grounds exist globally. PROTON and ASEAN countries lack a dedicated crash barrier for development work, regulatory compliance, and meeting New Car Assessment Programme (NCAP) requirements. Pre-pandemic, I typically embarked on overseas business trips twice a year, each spanning around 14 working days. Consequently, especially in the early stages of my career, I had limited family time, particularly with my son. However, I made a deliberate effort to maximize the quality of the time I spent with him when I was at home. I'm grateful for the robust family support system I have in place, which greatly aids me when I'm away. Given the limited number of women engineers, this support network extends to the

workplace. We frequently support and encourage each other, even if it's simply by being moral cheerleaders. I seldom feel judged by other women regarding my career choices, though the same may not hold for fashion-related matters.

In the current work landscape, challenges persist for women in STEM fields due to the underrepresentation of female engineers and in navigating the expectations of Gen Z and millennials. Despite these obstacles, I cherish my job for affording me the freedom to continually learn, especially with the emergence of new technologies in autonomous, automated, and connected vehicles. I also have the autonomy to shape the vehicle safety and automated driving technology roadmap for PROTON within the company's parameters. However, there are areas where companies can enhance work-life balance for their employees, particularly women. These include providing consistent and high-quality childcare facilities in workplaces, extending paternity leave beyond seven days, and educating male colleagues to respect women, regardless of ethnicity or religion. Instilling such values should commence with early education for both genders.

Regrettably, traditional gender roles still predominate in Southeast Asia (SEA), exacerbated by developmental disparities between countries in the region, such as Cambodia and Singapore. As a champion of vehicle safety, I've observed that gathering data on accident types and gender demographics in passenger vehicles remains challenging. Data gaps and discrepancies exist because vehicle safety is often considered less important in everyday life, let alone concerning gender impacts. My aspiration for Southeast Asia is to achieve gender pay equality in the workforce. In the United States, the gender pay gap has remained relatively stagnant, with women earning an average of 82% of what men earn, according to a report by the Pew Research Center (published March 1st, 2023). I hope to see a similar aspiration realized in Southeast Asia.

About the Author



For the past six years, Zanita Zainuddin has been the Head of Safety Intelligent Drive and Attribute Management within PROTON's Engineering Performance R&D division. In this role, she has demonstrated a deep commitment to vehicle safety, actively shaping safety standards and collaborating with key stakeholders such as the Malaysian Institute of Road Safety Research (MIROS) and the New Car Assessment Programme (NCAP). Zanita's contributions extend beyond her primary responsibilities, including involvement in initiatives such as developing Blind Spot Detection standards and vi2X definitions with the Malaysian Communications and Multimedia Commission (MCMC).

ASEAN NCAP recognized her dedication to advancing vehicle safety with the prestigious 2018 Excellence Award (Industry). Within PROTON, she has consistently advocated for vehicle safety as one of the company's Unique Selling Points (USPs), resulting in outstanding safety ratings for PROTON vehicles, including the PROTON PREVE, which achieved a historic 5-star ANCAP rating in 2013. Zanita holds a degree in Mechanical Engineering and is pursuing a Professional Engineer (PEng.) certification, underscoring her commitment to continuous learning and professional development in automotive safety.

JOURNEY 28

Academia to Entrepreneurship

Aseel Addawood

Artificial Intelligence and Machine Learning KSA Leader
Oracle

Saudi Arabia

I had always aspired to become a medical doctor, particularly specializing in neurosurgery. However, within certain Saudi families at the time, this field was not widely encouraged for girls. Consequently, when choosing my college major, I discussed it with my father. The university I applied to only offered an IT department for girls within the College of Computer Science. Considering my limited knowledge of computers but eagerness to learn, this department seemed like a feasible option. During that period, there was significant buzz about the prospects of computer science for girls, perceived as a gateway to numerous opportunities.

Both my parents held esteemed positions as full professors in other universities. Despite our academic background, cultural norms still imposed limitations on the choice of majors for girls. However, this landscape has significantly evolved since then. Parents with higher educational qualifications now typically encourage all their children to pursue college degrees. As a result, my parents always had high expectations regarding education. Today, all my siblings have completed their higher education.

Growing up in a well-educated family exposed me to rich life experiences. When I was young, my family always gave me the opportunity to try various hobbies and learn new skills, from horseback riding and swimming to learning English as a second language. These experiences allowed me to overcome the fear of experimenting and taking risks.

Studying in college was a smooth ride. I completed my degree in four years

at a girls-only governmental university. We received an excellent education with great staff and facilities. I excelled in my studies and, along with my colleagues, started the first Microsoft student partner club. My aspiration then was to become a teaching assistant, finish my graduate studies, and become a professor at the university. That is exactly what happened!

After finishing my undergraduate studies, I applied to become a teaching assistant. Government universities in Saudi Arabia award scholarships for TAs to complete their graduate studies abroad. After being accepted as a TA, I secured acceptance into the computer science program at Cornell University and embarked on a new journey to the USA. I remember being very excited about being accepted to the master's program at Cornell. I felt I was the best, but that feeling quickly dissipated after arriving at Cornell.

Entering a class with more than fifty students, mostly males, was a challenging experience for me. Only a handful of females were in most of my computer science classes. I wore a hijab, a loud and clear declaration of my religion. Moreover, I was the only Middle Eastern student in my classes. That was frightening for a girl who had never interacted with male colleagues in her daily life -- only relatives. Thankfully, I had traveled extensively before this point in my life, so I thoroughly understood the cultural aspects of a mixed-gender community. However, I often wondered how I would have overcome such a situation had I not had the opportunities and background that enabled me to transition smoothly into Western society.

Before arriving at Cornell, I always thought highly of my technical and professional abilities. However, after mingling with highly competent students from around the world, I realized I was only average. This was a humbling experience. I needed to work hard to make it through college and get the degree for which I came. It was not just about overcoming exams and homework but also about building bridges with students from other cultures and collaborating on projects. That was an even bigger challenge.

After completing my master's degree in engineering at Cornell, I moved to Illinois in the US Midwest to complete my master's in MIS and Ph.D. in informatics. That journey involved multiple challenges, from changing advisors to starting a family and raising a child while away from my extended family.

I could not have completed this journey without my family's support at every step. They believed in me as a person and in my abilities to continue and finish the degree. Without their support, I would not have achieved what I have.

My journey in the US revolved around more than finishing my degrees. I was heavily involved in many other activities to support Saudi students abroad and to support women in tech. I had the chance to lead and co-lead many nonprofit organizations, such as Women Who Code, Arab Women in Computing, and the Society of Women Engineers. My enthusiasm to support and participate in such activities helped me navigate many life challenges, such as academic pressure and self-doubt.

Throughout my studies, I constantly doubted myself and my capabilities. I wanted to be a person who impacted the world, but this self-doubt always hindered my actions. The voice in my head would always say, "You still need more knowledge and experience to be able to do something." A single-life event changed all of that. In the last years of my Ph.D., my aunt, to whom I was very close, died suddenly. I then had a life realization that I should not be waiting anymore. Life will not wait for my knowledge to accumulate and for my impact to happen, nor will it continue because of me. I realized that what I have now is enough, and some people can benefit from the knowledge I share with them. From there on, I opened a very simple YouTube channel to explain AI terminology in Arabic. That evolved and shaped into a thriving nonprofit organization specializing in AI and data science called Bayan, with more than 90 volunteers and many achievements.

After returning to Saudi Arabia, I began my career in academia. This job was assigned to me while I was a TA before I left for my graduate studies. Previously, an academic job was the dream for women in Saudi Arabia -- a prestigious position, a good salary, and enough time to start and maintain a family. But when I returned eight years later, the environment had changed. Vision 2030 had been announced, and women began participating in the job market more than ever. They even assumed leadership positions in business and industry, effecting change throughout the country.

I started my academic career as an assistant professor at the university. Two months later, I realized this was not what I wanted to do anymore. I felt I had so much to give, and with the bureaucracy of academia, I would not be able to achieve my career goals. As a faculty member, I wanted to start a research group at the university focusing on AI and data science. The process of doing so was very long and hectic. I created an R&D team through a nonprofit organization to cut through the bureaucracy. It was easier to make, faster, and more efficient, and needed specific regulations and policies. This is how I continued working with any initiative that I believed in and knew could impact our community and the world, finding ways to make it happen, no matter what.

After one year as an assistant professor, I moved to Oracle, a technology company, as a consultant in AI and data in their cloud services division. It required sales skills that, again, I wondered if I had or might achieve. Once more, I had these feelings of not being able to make it, but it did happen. I was able to shine in a very short time. It was great how I was able to trust my abilities in the first few months and believe that having exclusively an academic background was not an issue.

After earning a degree such as a Ph.D., the question comes to mind: “Now what’s next?”. It was very difficult for me to know my career path after finishing my Ph.D. My work at Oracle made me realize that innovating in finding technical solutions for our customers was the key to finding my way and clearing my career path. I started seeing clear signs of how I

could advance my career and future. I continued working for Oracle as an expert in the domain, and after a year, I moved to the regional team to serve a larger geographical region.

My passion for teaching did not stop, so I started my training academy specializing in AI and data science. To date, I have founded four startups in the domain. Being an entrepreneur in tech is not an easy task, especially in Saudi Arabia. Most of our technology company founders are men. They create collaborations and deals in social settings where women are not invited. That made it very challenging to thrive as quickly as the tech startups founded by men. In addition, the number of women who founded tech companies is very limited. To overcome that, I started the Saudi Women Tech Founders' Network to have social gatherings with other women facing similar challenges. Moreover, I started having male co-founders in each startup to mitigate the risk of being a solo founder and a female. Unfortunately, these continue to be red flags for investors.

A busy life with many accomplishments should not take us away from family and enjoying life. After this journey, I realized that nothing comes above family as a priority. Everything else is less important compared to family. In reality, career accomplishments will not fix your breakdowns -- instead, it is your daily mental health and persistence to enjoy this life before it ends.

I dedicate this journey to the loving memory of my precious son, Mohammad, who departed from us suddenly, far too soon, when he was nine years old; we hold onto cherished memories of his vibrant spirit and loving heart. His absence leaves an irreplaceable void, reminding us of the fragility of life and the paramount importance of treasuring every moment with those we hold dear. Mohammad's legacy of kindness and perseverance inspires us to prioritize family bonds and embrace life's joys wholeheartedly, knowing that these treasures endure beyond all else.

About the Author



Aseel Addawood founded Bayan, an NGO specializing in innovative technical solutions in AI, data science, and machine learning, distributed through various channels, including podcasts, courses, and blogs. Since 2019, she has collaborated with government and private sectors and founded three technical startups. Aseel holds a Ph.D. in Informatics from the University of Illinois Urbana-Champaign and a master's in engineering

from Cornell University. With expertise in Data Science, she has made significant contributions to research, publications, and mentoring.

The Atlantic Council, in cooperation with Georgetown University, has recognized Aseel with the Women in Innovation fellowship. She serves as the Artificial Intelligence and Machine Learning KSA Leader, having previously directed the emerging technologies observatory at the Ministry of Energy and worked as a Senior Regional Consultant in AI, Analytics, and Data Science at Oracle. She also held an academic position as an Assistant Professor at Imam Mohammad bin Saud University.

JOURNEY 29

The Art of Accomplishment: A Personal Odyssey

May Rose Imperial

Consultant, DELFT Training and Consultancy
Philippines

I hail from Ilocos Norte, my mother's native province in northern Luzon Island, Philippines. My parents relocated to Baguio City, my father's childhood home, making it our cherished hometown. As the eldest of three siblings, I witnessed my young parents' daily struggles to make ends meet. Financial constraints prevented them from pursuing education beyond high school, with my father halting his college education after two years. However, their lack of academic credentials never diminished their work ethic, inspiring me to excel academically.

My upbringing blended school, play, and assisting my mother with various odd jobs. For eleven years, I remained the sole daughter until my younger sister's arrival. I became adept at household chores and comfortably engaged in activities typically associated with both genders. Despite his incomplete education, my father envisioned me as an engineer poised to assume a leadership role within his company. This vision drove me to pursue academic excellence and aspire to high-ranking positions within the professional realm, regardless of gender stereotypes.

Engineering was not a popular career choice in my exclusive all-girls high school. Options mainly revolved around health, business, education, and literature, leaving me unaware of engineering prospects. Witnessing my parents' entrepreneurial endeavors, particularly my mother's successful business venture despite her lack of formal education, initially inclined

me towards a business degree. However, driven to distinguish myself and challenge gender norms, I resolved to pursue engineering. My father's company provided financial support for my college expenses, while my parents covered the remaining costs.

After graduating from high school, my circle expanded to include male friends enthusiastic about engineering, influencing my decision to enroll in the same college. With my parents' support, I embarked on a journey requiring two years of general engineering courses before specialization. Understanding the necessity to prove myself in a male-dominated field, I committed to excelling academically and consistently ranked among the top achievers in my class.

My college experience was marked by a relentless pursuit of excellence and a sincere desire to challenge gender stereotypes in engineering. Despite being a minority within my program, I persevered, achieving academic milestones and assuming leadership roles in student organizations. Throughout this journey, my husband, whom I met during college, provided unwavering support and encouragement, bolstering my confidence and propelling me toward success.

Studying engineering proved arduous yet rewarding. I undertook projects independently, led teams, and pursued a double major in electrical and electronics engineering to broaden my skill set. Through resilience, dedication, and my husband's support, I shattered barriers, defying societal expectations and emerging as a competent engineer and a beacon of inspiration for aspiring female professionals.

My transition from college to the professional realm bore fruit even before graduation with a job offer. However, relocating to Makati City, a bustling business hub in the Philippines, posed a challenge. As a provincial native, I eagerly embraced adapting to this new urban landscape. Assigned as an account manager for broadcast and communications equipment, specifically for TV and radio stations, I faced fresh challenges daily due

to the unfamiliar job and environment. Nevertheless, I persisted. After approximately seven months with the company, I redirected my focus to preparing for the licensure examinations for electronics engineers—a foundational requirement in the Philippines for professional engineering practice. Gratefully, I passed these exams, ranking among the top 30% of successful candidates.

Soon after, an opportunity arose in academia at one of Manila's prestigious universities. Tasked with crafting and implementing the Electronics Engineering degree program and serving as a faculty member in the Electrical Engineering department, I embarked on this endeavor from scratch. Through diligence and perhaps drawing from my experience as a student leader, I ascended within the university ranks, eventually assuming the role of Assistant Department Head for Electrical and Electronics Engineering. Subsequently, I became the Officer-in-Charge of the department. Leading a team of over twenty-five male engineers and two women, many senior to me, presented new challenges. Compelled to project resilience and drive, I pursued a master's degree to bolster my technical and managerial acumen—a pursuit I deemed essential for my responsibilities.

Balancing professional ambitions with personal life was paramount. While pursuing my career goals, I nurtured my relationships, culminating in marriage to my college sweetheart. His unwavering support enabled me to pursue my engineering career even before our union. Juggling the demands of academia, earning a master's degree, assuming departmental leadership, and nurturing a budding family with two children posed challenges. I often wished for more hours in a day.

Postgraduate studies infused me with newfound confidence and skill sets, augmenting my capacity to tackle greater challenges. I actively sought opportunities to enhance my capabilities, including securing post-graduate certificates and participating in esteemed training programs facilitated by institutions like USAID and AusAID. Guided by a former dean who

recognized my managerial and leadership potential, I honed my skills under his tutelage. Gradually earning the trust and respect of my peers, I carved a niche as a competent female engineer, manager, and leader.

Nevertheless, hurdles surfaced along the way, notably during work-related travels necessitating separate accommodations due to cultural or professional norms. Though incurring additional expenses, I managed such situations adeptly.

A woman's innate aptitude for multitasking, underscored by the intricacies of the female brain, proved advantageous amidst familial responsibilities. I strategically timed my postgraduate studies to coincide with periods when my children required less attention, ensuring minimal disruption to family life. Drawing a clear boundary between work and home spheres, I dedicated myself to familial duties upon leaving the office, assuming the roles of wife and mother with zeal. While professional endeavors held authority within workplace confines, home life was defined by warmth and nurture.

Emotional sacrifices punctuated my journey, exemplified by poignant moments like departing for overseas studies with toddlers in tow, leaving them under maternal care. The emotional toll, though immense, was countered by the pursuit of professional aspirations. As a former university administrator, balancing leadership with empathy posed a unique challenge. Leveraging my engineering background, I approached problems with analytical precision, finding solutions akin to solving complex engineering puzzles. By empowering and mentoring subordinates under my purview, I fostered a culture of mutual respect and collaboration, ensuring collective decision-making and inclusivity.

In a predominantly male milieu, adopting the role of an elder sister or maternal figure engendered a supportive environment, nullifying any sense of intimidation. Fostering open dialogue and embracing diverse perspectives underscored my leadership style, promoting a harmonious

work atmosphere. As a fervent advocate for women's empowerment, I championed increased female representation in engineering—a pivotal aspect in fostering balanced and inclusive environments. While progress in the Philippines is evident, women still grapple with the dual responsibilities of family and career, often hampering career progression. Despite prevailing challenges, women engineers exhibit resilience and capability, deserving recognition in leadership roles.

Amidst the pandemic's trials, leading a team in designing affordable ventilators for COVID-19 patients underscored the resilience and tenacity essential for women engineers. The successful project culmination and subsequent establishment of a start-up company exemplified the rewards of perseverance and dedication.

I impart this wisdom to aspiring women engineers: Though the path may be fraught with challenges, steadfast commitment and unwavering persistence ensure eventual success. Together, we shall continue breaking barriers and shaping the future of engineering.

About the Author



Dr. May Rose Imperial is a distinguished Professional Electronics Engineer with extensive leadership roles. Currently serving as a Consultant at DELFT Training and Consultancy and as Project Manager for the USAID ESP WISER Project, she demonstrates consultancy and project management expertise. Dr. Imperial chairs committees and panels, including:

- The Technical Panel for Engineering and Technology at CHED
- The Continuing Professional Development Council for Electronics

Engineering at the Professional Regulation Commission

Within the Philippine Technological Council, she holds key positions such as:

- Chairman of the Engineering Accreditation Commission
- Co-Chair of the Education and Capacity Building Committee, representing the Philippines in AFEO

Furthermore, her leadership roles in foundations and networks include:

- Treasurer of the Electronics Engineers Foundation
- Secretary of the Foundation of Outstanding Professionals

Dr. Imperial's exceptional contributions have garnered prestigious awards, including:

- The Excellence Award in the Academe/Research and Development Category
- The Distinction Award from the Philippine Federation of Professional Associations
- Recognition as an Honorary Fellow by AFEO
- Named Outstanding Professional of the Year by the Professional Regulation Commission

She continues to inspire and shape the field of electronics engineering with her exemplary achievements and leadership.

JOURNEY 30

Footprints of Achievement: A Journey Unfolded

Polana B Pramesti

Chief Executive Officer (CEO), AirNav Indonesia
Indonesia

I was born and raised in Jakarta. My father, an air traffic controller, and my mother, a teacher, wholeheartedly supported my education. Growing up surrounded by three brothers and predominantly male neighbors, my childhood play experiences differed from typical activities associated with girls. While pretend play, board games, and outdoor activities like tag and hopscotch are often linked to girls, my playtime took on a more ‘boyish’ nature. I found myself deeply engaged in activities such as soccer matches, biking adventures, and daring runs in the rain. Games like hide and seek were the norm, and I ventured beyond conventional boundaries, even climbing to the rooftop in pursuit of thrilling adventures. This environment allowed me to explore activities typically labeled as ‘for boys,’ shaping my childhood experiences uniquely and adventurously.

Our parents treated us equally, striving to ensure that each child received the same level of care, attention, and opportunities, regardless of individual differences such as age, gender, or personality. By fostering a sense of fairness, they created a harmonious family dynamic where each child’s needs and well-being were equally important.

Women should prioritize their independence and refrain from relying solely on men. By acknowledging their capabilities, women can seize control of their lives without constantly seeking support from men. This self-reliance cultivates confidence, assertiveness, and strong decision-making skills. Dependence on men restricts women’s potential, subjecting

them to unequal power dynamics. Relying on men for financial support or validation undermines women's autonomy and perpetuates gender disparities. Instead, women should concentrate on honing their skills, pursuing education, and establishing their careers. Financial independence allows them to make choices aligned with personal values, enabling them to chart their own paths and shape their destinies.

I am truly fortunate to have a family that offers unwavering support, especially from my father. My parents have instilled in me a firm belief in the equality of men and women. This understanding runs deep within our household and has significantly influenced my perspective on gender equality. I am immensely grateful for their teachings, as they have cultivated an environment that esteems and values both men and women equally. They exemplified mutual respect between my father and mother, and through their guidance, they imparted the importance of respect towards each other to us, their children. Their invaluable advice enabled me to construct a sturdy foundation rooted in justice, fairness, and inclusivity.

Working to make a positive impact on others is challenging. It requires dedication, skills, and perseverance. It involves utilizing abilities and resources for beneficial outcomes. This entails a strong work ethic, commitment to excellence, and continuous self-improvement. Empathy and compassion are also crucial in understanding people's needs and connecting with them. Listening to feedback and involving stakeholders is essential for effective contribution.

To be successful, one must challenge dogmas such as self-doubt, fear of failure, and the belief that success is limited to certain circumstances or individuals. Embracing growth, resilience, inspiring others, and open-mindedness fosters achievement. I decided to pursue a career in engineering/entrepreneurship during my high school graduation. Standing on the threshold of entering the next phase of my life, I pondered the various paths I could take. The allure of STEM (Science, Technology, Engineering, and Mathematics) fields captivated my curiosity and ignited

a deep passion. Throughout my formative years, I was always fascinated by the wonders of science and the possibilities of technological advancements. I found great satisfaction in solving complex problems and uncovering innovative solutions. The prospect of contributing to the advancement of society through engineering and entrepreneurship seemed intellectually stimulating and socially impactful. As I embarked on my journey beyond high school, I recognized the importance of acquiring a strong foundation in STEM. I sought opportunities to engage in hands-on projects, participated in science fairs, and immersed myself in mathematics, physics, and computer science. These experiences further solidified my passion and affirmed my desire to pursue a career in the STEM field.

Each day, my conviction to become an engineer/entrepreneur grew stronger. I envisioned myself at the forefront of technological breakthroughs, designing and creating innovative solutions that could shape our world. The prospect of launching my ventures and bringing forth ideas that could positively impact people's lives excited me immensely. Pursuing engineering/entrepreneurship during my high school graduation marked a turning point. It set me on a path of relentless pursuit of knowledge, continuous growth, and the desire to make a tangible difference in the world. Since then, I have dedicated myself to honing my skills, seeking opportunities for learning and innovation, and collaborating with like-minded individuals to bring my visions to life. I am grateful for the moment I made this decision, as it has shaped my aspirations, fueled my motivation, and propelled me forward on a remarkable journey of exploration and impact.

Balancing marriage and career has never been a choice I've had to confront, as both aspects of life are equally significant. Maintaining an equilibrium between marriage commitments and pursuing a successful career is imperative. One can ensure a fulfilling and meaningful life by striking a harmonious balance between the two. Marriage, a sacred bond between two individuals, requires nurturing, commitment, and effort. It involves building a strong foundation of love, trust, and understanding with your partner. It demands time and attention to foster a healthy relationship,

create memories together, and support each other's aspirations and dreams. Prioritizing one's spouse and investing in the relationship's growth is crucial to sustaining marital bliss. At the same time, a career holds immense importance in shaping an individual's personal growth and financial stability. It provides a platform for self-expression, skill development, and the opportunity to make a difference. By dedicating oneself to professional pursuits, one can achieve personal fulfillment, contribute to society, and secure a prosperous future.

Finding a balance between marriage and career involves making conscious choices and effective time management. Open and honest communication with one's spouse is essential to ensure understanding and support for each other's commitments and goals. It may require adjusting schedules, compromising on certain aspects, and prioritizing tasks based on their significance. Building a strong support system, including family, friends, and colleagues, can also help alleviate the challenges of juggling marital and professional responsibilities.

Additionally, self-care and maintaining a healthy work-life balance are vital. It is crucial to carve out time for oneself, engage in activities that promote relaxation and rejuvenation, and avoid burnout. Taking care of one's physical and mental well-being makes managing the demands of marriage and career effectively easier. Ultimately, a successful marriage and a fulfilling career are not mutually exclusive but can complement and enhance each other. Dedication, effective communication, and a commitment to self-care can strike a harmonious balance between the two and lead to a truly rewarding life.

My family wholeheartedly supports any decision I choose to make. They are always there for me, providing unwavering encouragement and understanding. Their steadfast support creates an environment where I feel empowered to explore my options and pursue my aspirations without fear of judgment or disappointment. Their consistent presence in my life reassures me that, no matter what path I choose, I will have a solid

foundation of love and support to rely on. This unconditional support gives me the confidence to take risks and make choices that align with my passions and values. Knowing that my family stands by me, regardless of the outcome, strengthens my resolve and motivates me to work towards my goals with unwavering determination. I am incredibly fortunate to have such a close-knit and supportive family, as they play an invaluable role in shaping the person I am today. During my youth, I effortlessly gravitated towards what was typically considered “boys’ work” and games. I eagerly participated in outdoor adventures and physical tasks, such as building forts, climbing trees, and engaging in sports like soccer and basketball.

Additionally, I developed a deep fascination for video games and technology, actively immersing myself in gaming communities. My natural inclination towards these activities stemmed from a genuine passion rather than a deliberate attempt to challenge societal expectations. Pursuing my chosen path is made easier by the unwavering support I receive from my family. Their constant encouragement and backing give me the confidence and assurance to navigate any challenges I encounter. This strong support system creates an environment that fosters personal growth and empowers me to embrace my decisions wholeheartedly. The seamless bond between my family members enhances our interactions’ overall coherence and cohesion. Their understanding of my aspirations allows for meaningful conversations and discussions, enabling us to explore different perspectives and possibilities. We engage in open dialogue, exchanging thoughts and ideas and contributing to my decision-making process.

Moreover, the extensive vocabulary and expressive language used within our familial interactions create a rich and nuanced environment for communication. Through their choice of words and eloquent expressions, my family members articulate their support, helping me understand their belief in me. This linguistic finesse enhances our emotional connection and reinforces our unity and trust within our family. In addition to their words, my family’s actions illustrate their unwavering dedication to my chosen path. They actively participate in my journey, offering assistance,

guidance, and resources whenever needed. Their involvement amplifies the impact of their support, transforming it into a tangible force that propels me forward.

In conclusion, my family's unyielding support alleviates the difficulties I may face and transforms them into opportunities for growth. Their encouragement, meaningful conversations, expressive language, and active involvement all contribute to an environment where I feel empowered and confident in pursuing my dreams.

When I completed high school, I hesitated to pursue further studies in Jakarta. Consequently, I explored other options and applied to the Bandung Institute of Technology (ITB).

The fundamental reason we thrive is because of our unwavering commitment to support one another. We firmly believe in the power of unity and collaboration, which fuels our collective success. Our steadfast support system is a pillar of strength, enabling us to overcome obstacles and achieve our goals. We understand that the key to a thriving community lies in the bonds we form and the assistance we provide to each other. By fostering an environment built on trust, empathy, and cooperation, we create a solid foundation for everyone to flourish.

In this context, our support extends beyond mere words. We actively engage in actions demonstrating our dedication to each other's well-being and growth. Whether it's helping during challenging times or offering guidance and encouragement when needed, we continuously strive to uplift one another. Furthermore, our commitment to support goes beyond personal relationships; it permeates every aspect of our community. We recognize the importance of creating structures and systems that foster inclusivity and equal opportunities for all. Through initiatives such as mentorship programs, resource sharing, and open dialogue, we ensure that everyone's voice is heard and everyone has access to the tools they need to thrive. This spirit of mutual support sets us apart and propels us towards

collective achievement. Together, we create a harmonious ecosystem where individuals are empowered to reach their full potential, knowing they have a network of dedicated allies.

In summary, our community thrives because of the unwavering support we provide to one another. Through our commitment to unity, collaboration, and active assistance, we create an environment where everyone can flourish. This support extends beyond personal relationships and encompasses structures and initiatives that foster inclusivity and equal opportunities. Together, we form a powerful network that uplifts and empowers each member, enabling us to achieve remarkable success.

During my college years, a significant gender disparity existed, with about 90% of students identifying as male and only 10% as female. This skewed ratio affected social dynamics, creating an environment where male students outnumbered females in various settings, impacting group projects and discussions. The lack of gender diversity contributed to reinforcing traditional stereotypes, fostering a potentially hyper-masculine atmosphere. Efforts were made by the college administration and student organizations to address this imbalance, promoting women's participation in STEM fields and organizing events for gender equality awareness.

Fortunately, my college experience was marked by a supportive community where classmates and faculty fostered inclusivity and respect. The atmosphere encouraged diverse perspectives, creating camaraderie and strong bonds among students.

Facilities for women, including restrooms and security measures, were well-established, contributing to a safe and inclusive environment. Efforts were made to address the gender imbalance, showcasing the importance of creating an inclusive space for all students.

Throughout my academic journey, I was surrounded by a supportive community of classmates and faculty. The atmosphere was characterized

by kindness, respect, and a genuine interest in diverse perspectives. In group projects and discussions, everyone's voice was valued, creating a harmonious and inclusive environment.

Faculty members were crucial in guiding personal growth, encouraging open dialogue, and fostering a safe space for intellectual exploration. The mutual respect between students and faculty created an environment where everyone felt comfortable expressing themselves.

My college experience was shaped by mutual respect, kindness, and appreciation, providing a foundation for academic and personal growth. The campus environment for women was characterized by friendliness and inclusivity—women actively engaged in social and educational activities, creating a vibrant community. Adequate restroom facilities were conveniently located, and transportation options ensured convenient access. Security measures prioritized the safety of everyone on campus, with well-lit pathways, security cameras, and a dedicated security team. The campus demonstrated a commitment to providing a secure environment, enhancing the overall experience for female students.

Women often face underestimation in various settings, particularly in male-dominated industries or physical activities. This can lead to challenges in professional settings, sports, and personal relationships. Creating inclusive environments, challenging gender biases, and providing equal opportunities are crucial steps toward a society that values everyone's contributions. While challenges still exist, the present generation has witnessed positive changes. Technological advancements, improvements in healthcare, and increased awareness of social equality contribute to a better quality of life. However, environmental degradation and economic disparities require collective efforts for a sustainable future. Society's skepticism toward unconventional career paths can stifle individual aspirations. It is crucial to create supportive environments where individuals can freely express their unique career choices without judgment. Embracing diverse aspirations can inspire others to pursue their unconventional paths.

Practical experience through internships allowed me to apply theoretical knowledge in real-world settings. As a woman in STEM, I faced challenges but remained determined, using discouragement as motivation. The support of family and society played a significant role in overcoming gender-related barriers. Initially facing underestimation as a woman, consistent effort and determination led to recognition and respect in my field. Women in hardcore engineering industries face challenges such as balancing demanding careers with family responsibilities, gender bias, and limited opportunities for career advancement. Supportive work environments and policies promoting work-life balance are essential.

The loss of my father during my academic journey became a driving force, compelling me to succeed and become a guardian for my siblings. My mother's unwavering support and belief in my abilities were instrumental in overcoming challenges. Effective communication, mutual understanding, and time management are essential for balancing work and marriage. Prioritizing and setting clear expectations help integrate career and family responsibilities harmoniously.

Joining a corporate environment was met with overwhelming support, acknowledging the growth opportunities. Finding a suitor was not challenging, as my qualifications were valued. The concept of dowry was not prominent in my marriage.

Being a woman engineer expanded my professional network and challenged gender stereotypes. While some men may exhibit surprise or skepticism, many treat me with respect and equality. These experiences emphasize the ongoing need for gender equality in professional settings.

After my academic journey, I aspire to thrive as an advanced language model, contributing to various fields and empowering individuals. Continuous learning and adaptation will ensure excellence in interactions and performance.

The present generation has witnessed positive changes, but challenges persist. Embracing diversity, challenging biases, and creating supportive environments are essential for a better future.

As a female engineer, I found securing opportunities in my chosen field relatively easy due to the demand for qualified engineers, regardless of gender. However, in the early stages of my career, I faced initial skepticism and questions about my commitment and capabilities solely because I was a woman. Over time, as I demonstrated my skills and dedication, these doubts subsided, and I earned the respect of colleagues and superiors.

Though I occasionally encountered discrimination in both engineering and corporate leadership roles, it wasn't pervasive. Some individuals, influenced by gender biases, treated me differently, but most of my male colleagues recognized my competence and contributions.

In addressing departmental issues, my approach remained objective, prioritizing logical analysis and critical thinking, irrespective of gender considerations. While progress has been made in promoting gender equality, some corporations still exhibit subtle biases, limited representation in leadership roles, or pay disparities. However, many organizations strive for equal opportunities and gender diversity.

Fortunately, I haven't faced discrimination based on race, ethnicity, language, dialect, or religion. Inclusive environments that value diversity and respect shaped my positive experiences. Workplace safety, though generally prioritized, can vary depending on industry, company culture, and location.

Women contribute unique perspectives to academic and industry jobs, enhancing creativity, collaboration, and innovation. Their presence fosters a positive work culture enriched by empathy, emotional intelligence, and relationship-building skills.

In conclusion, my overall experience as a female engineer has been positive, with occasional instances of discrimination. Despite challenges, I strive for gender equality and inclusivity in the workplace.

Balancing work and family, especially for women in engineering, requires effective time management and strong familial support. Throughout my career, I faced the challenge of dividing time between job and family obligations. However, efficient time management and family support allowed me to overcome these challenges.

Recognizing the importance of both professional and personal life, I set boundaries and prioritized tasks. Quality time with family took precedence at home and work; I dedicated my time and energy to my responsibilities.

My family's support, including providing herbal ingredients to boost my stamina, reinforced the values of determination, resilience, and mutual support. Navigating societal expectations for women to prioritize family over careers required effective communication, time management, and clear boundaries.

While I never sacrificed a travel assignment due to family commitments, I once refused a prestigious position offer to prioritize caring for my parents, emphasizing the value of family. In the workplace, I strive to instill in my children the belief in gender equality, teamwork, and individuality.

Contrary to stereotypes, I haven't downplayed my professional accomplishments among male colleagues. Instead, I believe in showcasing unique talents and skills, contributing significantly to the workplace. The support and understanding of loved ones consistently reinforced my confidence and determination.

In conclusion, balancing work and family as a woman in engineering presents challenges, but it is achievable with effective time management

and family support.

As a woman administrator, excelling in a career faces unique challenges. Open communication, time management, and fostering camaraderie among women are essential for success in a male-dominated work environment.

Some women may hesitate to pursue higher positions due to balancing multiple roles. Open communication, support, and sharing responsibilities can help overcome these challenges. Support from fellow women colleagues, acknowledging achievements, and fostering empowerment and mutual support are crucial.

Women administrators bring a unique perspective to the workplace, complementing male counterparts with diverse insights, problem-solving approaches, and collaborative skills. Success lies in cultivating professional relationships based on trust, competence, and mutual support.

Navigating a male-dominated work environment as a woman administrator requires effective communication, time management, and colleague support. Embracing diversity and collaboration, rather than perceiving gender differences as barriers, leads to success. Encouraging women in engineering is crucial to breaking gender stereotypes. Women must showcase competence, logic, and resilience to challenge the notion that these fields are exclusively for men. Changing societal beliefs and attitudes is essential to create a less hostile environment for women.

Women in leadership roles empower others by providing guidance, mentorship, and opportunities for growth. Balancing work and personal commitments requires supportive policies, such as flexible work arrangements. Over time, societal perception of working women has evolved, with organizations prioritizing increased representation of women in leadership roles. Women worldwide face similar challenges, emphasizing the need for collective efforts to address gender disparities

and biases. Acceptance and recognition in professions hold significant importance. Creating a supportive and inclusive work environment fosters a sense of acceptance and recognition for women professionals.

In my job, making a difference and inspiring others bring immense joy and fulfillment. The transformation and growth of individuals under my guidance highlight the positive influence of education. The inspiration comes from remarkable women who broke barriers before me, motivating me to push my limits and be a guiding light for others.

Though my journey had struggles, perseverance, and support helped me overcome obstacles. Achieving a leadership role in a male-dominated field was a significant victory, affirming my capabilities and inspiring other women.

To all women, I say: You have the strength, intelligence, and resilience to conquer any challenge. Embrace your potential and dreams, and never let anyone dim your light. Surround yourself with a supportive community; together, we can pave the way for a more inclusive and equitable future.

About the Author



Polana B. Pramesti is a pioneering figure in aviation, serving as AirNav Indonesia's first female CEO. With a background in Civil Engineering from the Bandung Institute of Technology and a Master's in Transportation, her career started in public service as the Head of the Airport Infrastructure Division at DGCA Indonesia. She then held roles like Technical Director at PT Angkasa Pura I and Director of Air Navigation at the Ministry of Transportation.

Recognized for her leadership, Pramesti became Director General of Civil Aviation and later headed Jakarta's Transportation Management Agency. As CEO of AirNav Indonesia, she navigated the challenges of the COVID-19 pandemic, leading the organization to success despite industry disruptions. Under her leadership, AirNav Indonesia received accolades such as the "Best State-owned Enterprise 2022 with Top Financial Performance and Advancing of Aviation Services."

JOURNEY 31

Mastering the Impossible: Stories of Personal Victory

Emiliana C. Patal-Dela Cruz

Prime Consultant at E. Patal-Dela Cruz Engineering & Consultancy
Philippines

My life story powerfully testifies to the resilience of the human spirit and the unwavering determination that can conquer adversity.

Born into a humble household in Laiya, San Juan, Batangas, I faced poverty's challenges from a young age. My journey exemplifies defying societal expectations and forging success through sheer grit and determination. As the fifth child among nine siblings in a financially strained household, hardship marked my early life. Despite their limited education due to economic constraints, my parents instilled in me the values of hard work and the importance of education to rise above our circumstances.

My pursuit of education was challenging. Financial constraints forced me to switch schools multiple times during my primary and high school years. I vividly recall the daily trek to school, often walking barefoot on muddy roads during the rainy season, yet I remained determined to excel academically.

During my formative years, I dreamed of becoming a nurse, driven by compassion and a desire to make a difference in the world. However, fate had other plans, leading me to discover a passion for engineering through various work experiences.

My journey into engineering was unconventional. While working in various jobs, I collaborated with clients and architects on projects. This exposure

ignited my passion for the field, and I began taking on side projects. With relentless dedication, my husband, an architect, and I eventually registered our own business, starting a successful entrepreneurial journey.

Throughout my life, I confronted societal expectations and gender stereotypes. Growing up in a conservative environment, I faced skepticism and was often told I needed to work extra hard to prove my worth. Nevertheless, I refused to let these limitations define my capabilities. I firmly believed I could overcome any obstacle to demonstrate my worth, dismantling the societal barriers in my path.

In conclusion, my remarkable journey from a modest background to a successful engineer and entrepreneur inspires us all. My life underscores that anyone can achieve their dreams with unwavering determination, hard work, and refusal to be confined by societal expectations. I stand as a living example of the power of perseverance and the conviction that one's potential knows no gender or societal boundaries.

My advice to “work hard and wait for God’s perfect timing” reflects the resilience of the human spirit and the boundless possibilities that await when one refuses to be constrained by circumstances. My story serves as a beacon of hope, reminding us that with unwavering determination, we can overcome any obstacle and reach for the stars, proving that resilience and determination are the keys to success in any journey.

My Journey Through Engineering and STEM

My journey through engineering and STEM is marked by practical experiences, determination, and the support I received along the way. My experiences as a student in these fields provide valuable insights into the challenges and triumphs I encountered.

Practical field experience was integral to my learning process during my college education. I participated in fieldwork and on-the-job training, particularly in ongoing building construction. This hands-on exposure

enriched my education and prepared me for the real-world applications of engineering.

Crucially, despite my gender, no one discouraged me from pursuing fieldwork. Societal expectations or stereotypes did not hinder my passion for engineering. This speaks to the supportive environment I encountered, which recognized my potential as an engineer regardless of my gender.

In college, I did not constantly need to prove myself to my classmates and teachers. I was not burdened by the weight of gender bias or stereotypes that often plague women in STEM fields. Instead, I could focus on my studies and practical experiences, which is a testament to the inclusivity of my educational institution.

My college journey was free from instances of objectification or pressure to conform to traditional gender roles. I dressed comfortably in my preferred shirts and jeans, aligning my appearance with my career choice rather than societal expectations. My experiences illustrate how embracing one's authentic self can lead to a more fulfilling educational journey.

One remarkable aspect of my college experience was my admiration for my classmates, who excelled in math, science, and physics. As a product of a public school in the province, I was inspired by the talent and dedication of my peers, who demonstrated exceptional academic prowess. This admiration showcases my appreciation for my educational community's diverse talents and skills.

I also want to mention a special person who played a pivotal role in my journey—a female teacher who taught geometry and was also a civil engineer. This teacher believed in my capacity and knowledge, entrusting me with the student-teacher role during teacher's week. This experience during high school left a lasting impact, demonstrating the power of mentorship and encouragement in shaping young minds and fostering a passion for STEM fields.

In conclusion, my experiences in engineering and STEM education reflect a journey marked by support, inclusivity, and a determination to pursue my passion regardless of societal expectations. My story testifies to the importance of hands-on learning, the power of positive role models, and the freedom to embrace one's authentic self in pursuing academic and professional excellence. My journey inspires future generations to break barriers and pursue their dreams in STEM with confidence and determination.

Beyond Engineering and STEM Education

My journey beyond engineering and STEM education reflects my unwavering determination and steadfast commitment to personal and professional growth. My post-graduation experiences testify to my resilience and perspective on gender dynamics within my chosen field.

After completing my engineering degree, I faced harsh realities, including financial struggles and the need to support my family and siblings in their pursuit of education. These circumstances led me to enter the workforce immediately after graduation. However, my hunger for knowledge and determination to excel pushed me back into academia two years later. I pursued another degree, the Environmental & Sanitary Engineering program, and later embarked on a Master's degree, though I have yet to complete my thesis. My dedication to continuing my education amidst life's challenges highlights my commitment to personal growth.

My preference has always leaned toward industry practice rather than academia. I found fulfillment in applying my engineering expertise in real-world situations, making a tangible impact on my chosen field. My decision to pursue a career in the industry reflects my passion for practical problem-solving and my desire to contribute to the workforce.

Within my field, I experienced equal treatment as a woman. I emphasized that hard work and dedication were the keys to success, and I did not need

to prove myself based on gender constantly. My experiences point to an inclusive and meritocratic work environment that recognizes my abilities and contributions regardless of gender.

When discussing the challenges women engineers face in hardcore engineering-oriented industries, I highlighted the difficulties associated with balancing parenthood and career demands, particularly during pregnancy. This underscores the need for supportive policies and practices in the workplace to accommodate the unique challenges female engineers face.

Looking back on my academic journey, I consider myself fortunate. I found a good job and a supportive working environment, which I viewed as a reflection of my hard work and dedication.

My family and society celebrated my accomplishments when I officially became a qualified engineer, particularly after passing the Civil & Sanitary Engineering board examinations. This was even more so when I was recognized and conferred as an ASEAN Registered Engineer and later as an ASEAN Chartered Professional Engineer (ACPE). My achievements were a source of fulfillment and pride for my family and community.

I was not pressured to prioritize marriage over my career; I made my own decisions independently, demonstrating my determination to forge my path.

My decision to work in a corporate environment did not elicit any notable comments or concerns from those around me, suggesting that my career choice was seen as a matter of course.

I did not face difficulties in finding a partner due to my qualifications or choice of job, and the issue of money did not arise.

Reflecting on my social status, I acknowledged that my status was not

particularly recognized during my early years in the industry. However, as I gained more experience and actively participated in professional organizations, my social standing improved, and others increasingly acknowledged and respected my contributions.

Regarding interactions with men, I noted that there was sometimes a sense of amazement or admiration when they learned about my status as an engineer or entrepreneur, which I considered a positive acknowledgment of my achievements.

In conclusion, my post-education journey testifies to my tenacity and determination to overcome life's challenges while pursuing my passion for engineering and STEM fields. My experiences reflect an evolving societal landscape where gender biases are gradually challenged, and meritocracy is valued. My story is an inspiring example of a woman who has navigated the complexities of life and her chosen profession with grace and independence, breaking barriers and earning recognition through dedication and hard work.

Professional Journey and Work-Life Balance

My unwavering commitment to my profession has characterized my journey as a woman in engineering and STEM. My family has supported me steadfastly, and I am dedicated to maintaining a harmonious balance between my career and personal life. My experiences offer valuable insights into the challenges and triumphs faced by women in male-dominated industries.

From the outset of my career, I easily secured a job in my chosen field. My qualifications and capabilities spoke for themselves, demonstrating that gender posed no barrier to employment in the engineering sector.

Throughout my tenure, I never faced doubt regarding my commitment or abilities due to my gender. Whether navigating construction sites or participating in decision-making processes, my colleagues treated me

equally, with my gender never impeding my professional progress.

Discrimination was a non-issue for me in both engineering and corporate leadership roles. I was treated equally and occasionally received special consideration as a woman, indicative of a supportive and inclusive work environment. I approached problem-solving and decision-making without regard for my gender, focusing solely on finding effective solutions to challenges.

In my observation of the corporate world, I noted that women were treated fairly and equally, occasionally receiving recognition for their gender but never experiencing discrimination. I attributed my success not to my gender but to my qualifications, skills, and dedication, emphasizing that my career progression was merit-based. I felt secure in my workplace environment throughout my STEM education and career, with no negative experiences to report.

I highlighted women's efficiency and strong work ethic as valuable contributions to academic and industry settings, citing their multitasking ability as a productivity-enhancing trait. While acknowledging the demands of my job on my time, I stressed the importance of time management in balancing my professional and family responsibilities. I received unwavering support from my family as I pursued my career goals, engaged in further studies, and undertook various projects.

Although not a frequent lecturer, I willingly shared my experiences with newcomers and recent graduates, exemplifying my commitment to supporting the next generation of female engineers. I emphasized the necessity of proper scheduling and time management to navigate the demands of my career and family life. I acknowledged the occasional need to maintain a low profile about my professional life within my household but underscored the importance of communication in achieving a harmonious balance. I faced no judgments regarding my workload, finding fulfillment in my choices and enjoying the support of my family. Despite the demands

of my job, I encountered no opposition to dedicating significant time to my work, as my family supported my professional pursuits.

In conclusion, my journey in engineering and STEM fields testifies to my determination, commitment, and effective time management. My experiences underscore the importance of supportive family and workplace environments and the ability to balance professional and personal life successfully. My story is an inspiring example of a resilient woman who navigated career challenges, demonstrating that gender should never hinder one's pursuit of passion and ambition in STEM and beyond.

About the Author



Engr. Emiliana Patal-Dela Cruz, or “Emie,” is a distinguished Civil and Sanitary Engineer, recognized as an ASEAN Engineer in 2015 and an ASEAN Chartered Professional Engineer (ACPE) in 2022, alongside the Filipino ACPE-SE designation.

Since founding E. Patal-Dela Cruz Engineering & Consultancy in 2015, Emie has excelled in designing Sanitary/Plumbing and Fire Protection Systems for projects of various scales. She received the PFPA Distinction Award in 2024 and previously earned recognition as an Inspiring Filipina Engineer and Outstanding Alumnae in Sanitary Engineering. Actively involved in professional organizations, Emie has held significant roles, such as vice-chair of the Philippine Technological Council—Women Engineers’ Network (PTC-WEN).

Additionally, she has served as an alternate representative to the Women Engineers of the ASEAN Federation of Engineering Organizations (WE-AFEO) since November 2022, contributing significantly to the advancement of engineering within and beyond the Philippines.

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There Is Nothing Girls Cannot Do—Provided They Have Passion and Willingness To Work

Reham El Sebaie

Director of Strategic Business & Marketing,
MENA Region
Siemens Digital Industries Software
Egypt

I was born in Cairo and have lived here ever since. As the middle of three girls, I grew up in a loving, strict, traditional family. My father, who has an architecture and engineering background, owned a business designing interiors for homes and commercial buildings. My mother worked as an administrative manager at a local high school.

My parents, especially my father, strongly supported education for my sisters and me. They set high expectations for our grades! However, my father had specific ideas about which subjects and careers were best for women.

My sisters and I attended an all-girls private French Catholic school for primary and secondary education. In the last year of high school, students chose between various specializations: literature/language, philosophy, history, etc., and science, which included math, physics, and chemistry—what we now call STEM.

My older sister, now a senior administrator at a local university, wanted to choose science, but our father opposed it. He believed literature was a better fit, referring to it as “ladies’ education.”

My father, though rigid, was very caring. He thought many STEM fields

were too harsh and demanding for women, especially if they were interested in someday forming families and raising children. Consequently, my older sister and I chose the non-STEM track.

We managed to change his mind by the time my younger sister came along. He relented and allowed her to choose science. Today, she's a successful doctor. As for me, I only started my technical education after finishing my university degree.

My father loved and supported us, changing his mind over time for various reasons. He realized that challenges existed everywhere and that non-technical careers weren't necessarily easier, so we should pursue our interests. Additionally, we proved our toughness and resilience due to his high expectations and the environment in our Catholic school, which was very formal and strict. The sisters at school scrutinized our every move—how we sat, ate, and even the level and tone of our voices.

My early schooling significantly impacted my life. Throughout its history, the school shifted from a religious boarding school to a day school open to non-Christians. Religion wasn't a significant part of the curriculum. I was raised and remain a practicing Muslim.

This environment shaped how I communicate today. I never focus on religion or nationality when meeting and working with others, though I respect differences and beliefs. The school was elite, representing the upper echelon of girls' education in Egypt, and my father's expectations about manners mirrored those of the school. He wanted us to be among the best. Today, even in high-tech industries, it's not uncommon to wear sneakers to work, even here in Egypt. My father would never accept that! He believed a woman's appearance outside the home in a work environment should be elegant, with a dress, styled hair, and nice shoes—even heels. Etiquette mattered.

We were a close-knit family, and my parents were my biggest influences,

the ones whose advice I valued most.

While strict in specific ways, my father was very open to others. He always ensured we had the latest electronics at home and computers early on. It's clear now that he wanted us to stay current with world developments.

I had a vague interest in engineering, but computers and even fax machines particularly piqued my curiosity. I loved their 'black box' nature, the mystery. I first encountered a fax machine when I was 9 or 10. I remember wondering how it could take a paper; moments later, it would appear in another country.

I recall the early days of the internet and the distinctive sounds the dial-up modem made while establishing a connection. I remember setting up a Hotmail account and marveling at the ability to write a note, push send, and know it was delivered instantly. I also remember the icons—the ICQ online chat system flower and how you could change the virtual assistant in Word from an older man (Shakespeare or Einstein, as it turns out) to a superhero dog or a robot. All of this excited and fascinated me.

Although I work for a large multinational company, I'm excited about entrepreneurship. My father owned his firm, and I encouraged my husband to create a startup that now works on mobile and artificial intelligence applications, augmented reality, and data analytics. Siemens has supported various entrepreneurial pursuits in my job, and I've created a unique program related to training and recruitment in this part of the world. It bridges the gap between academic programs and industry needs, especially for highly specialized software such as that used in electronic design automation (EDA), which relates to creating computer chips and systems.

I've faced many obstacles, and juggling various responsibilities has been challenging. It still is! I married young, at 23, right after finishing my university education. So, I started both my technical journey—I have two

master's degrees and a Ph.D., all related to business and technology—and my married family life simultaneously. I spent much time studying when my children were small, trying to squeeze things in around family responsibilities and doing coursework after they had gone to bed. Effective time management was crucial.

Girls can accomplish anything, provided they have passion and willingness to work. However, I worry that too many girls seem blasé or bored about everything today. This wasn't the case for my daughter, who is off to study engineering at the American University in Cairo, but it was true for some of her friends. Their attitude is, "Why do I need university or high school? I can find whatever knowledge I might need on the internet right now." Some don't seem interested in work or even being out in the world. They think they can just order what they need for delivery and hire a service to clean their house! Why learn to cook or clean?

All these conveniences can go too far. We need to use technology for positive purposes. Cultural expectations mix with all these conveniences in unfortunate ways. The strong expectation that men will work and provide for their families persists, so some girls have become lazy rather than energized by all the new opportunities.

One of my messages is that having a supportive spouse is hugely important. I'm fortunate because my husband has always been supportive. My graduate degrees are from universities in the U.K. and France. While I completed some coursework online, I also needed to travel, study, and work on my dissertation. Much of this occurred when my children were relatively young, so I needed his support.

Another lesson is that learning never stops. I started in my current role 15 years ago. Our focus then was the highly technical realm of EDA, and it took me a whole year to understand its full breadth. Yet EDA is only part of the Siemens Xcelerator offering. Our software cuts across technical domains and market verticals, so I continue to learn as much as possible

using any resource I can.

The quarterly and annual sales and business review meetings are essential. I attend with the country manager and always take copious notes. Afterward, I download all the presentations and reread all the material, paying specific attention to unfamiliar words and concepts. I always look these things up!

My earlier education's rigor and note-taking skills help me in these contexts. As an Arabic speaker with an early education in French and a university degree in French civilization and literature, I've always had to look up unfamiliar words and concepts.

Remember, I studied in an all-girls environment through high school, and because of my undergraduate focus, women outnumbered men in my university studies, with a ratio of about 60/40. Things changed when I switched to more technical pursuits starting in graduate school, where the ratio was more like 70/30, men to women. This remains the breakdown in the engineering programs I work with today.

It's important to note that this overrepresentation of men here in Egypt doesn't stem from explicit or implicit discrimination. Instead, it's mostly about student choice. I remember being shocked in a cross-cultural communication course to learn that sometimes, in Europe and the U.S., women are paid less to do the same jobs. The concept of a glass ceiling doesn't translate here. Egypt is a socially conservative nation, certainly, and women do encounter individuals with prejudices. However, generally, there is much support for women in the workplace, including in the law.

My experience has been primarily positive, though I've been treated differently or singled out at various times. During my graduate studies at the University of Sheffield, instruction was in English. In discussions, I sometimes stumbled and could only think of specific words in Arabic or French. As a result, my classmates, mostly native English speakers, didn't

always include me in group projects. Then there was the issue of being a relatively young woman mentioning life at home with a baby while dealing with young single men who really couldn't relate.

Being in a more open world with men was jarring, beginning at university and even at the start of my career. There was 'boy talk,' as most women have experienced. Worse was when my male classmates would speak in English in front of me about inappropriate things and invariably say, "Don't worry...she won't understand." And they were right—I mostly didn't understand!

In hindsight, it's clear that some of my challenges in working with men stemmed from my early experiences. Today, I take time to figure things out, adapt, and open up, whether working with men or women.

My workplace experiences have been mostly, but not entirely, positive. After university, I got a job conducting qualitative market research for an Italian company. I focused on accounts in Algeria, researching, moderating focus groups, compiling information, and presenting analysis to customers as part of our firm's services.

My direct manager was an Egyptian from America. It was a multinational company, and we mostly spoke English. The firm's general manager (GM), his boss, was also an Egyptian. Unfortunately, he harassed me, though I didn't necessarily recognize it as harassment at the time.

I still adhered to the sensibilities from my upbringing regarding my appearance and always cared about how I dressed for work. One day, the GM asked me about my perfume. Then he inquired about my husband, who was traveling frequently. The GM continued making harassing statements and concluded with, "Your husband is foolish to travel and leave you alone."

I left his office quite shaken. Thankfully, he didn't touch me. I went to my

office, visibly upset. My American manager came in and asked what had happened. I should mention that this American was quite young, while the GM was much older. My boss went straight to the GM's office, grabbed him by the shoulder, and said: "If you ever harass one of my daughters again, I will slap you!"

Two years later, this American manager left to return to the U.S. The GM asked me to return to his office and said, "Now that your manager is gone, who will have your back?" Time had passed, and I felt much stronger. I replied, "Now I'm grown up and don't need a man to have my back. I can look after myself. And if you ever harass me, I will take action, and there will be consequences."

Soon after that, I left that job with my husband's support. I was well into my graduate studies and wanted to pursue other opportunities. The harassment stood out partly because it was so unusual. My experiences with most co-workers, graduate school classmates, and professors were positive. Many remain friends today.

I trust my instincts. There are people with whom I maintain a formal and distant relationship or avoid altogether. However, even with those I know and trust, I always strive to remain professional and within limits regarding my behavior and expectations. Don't exceed limits.

Early in my career, I also worked for an Egyptian civil engineering company focused on project management. The company was very male-dominated, with approximately 60 men and three women. It treated women as mere helpers and assistants.

I worked in the training department and disliked how the courses were presented. Trainers would stand before a class, read text, and distribute paper copies of the material. I approached a director and suggested creating more compelling and concise presentations using PowerPoint, images, and animation. He agreed and said, "So, it sounds like you want to make an

extra effort. I'm doing my MBA. Here are some of my assignments. Will you please do them for me?"

Although his request was inappropriate, I completed the assignments for him. Throughout my life, I've always loved learning. This experience got me thinking about pursuing an MBA, so there was a silver lining. I realized I could do the work and thought, "Why don't I just do one of these myself?"

The company's environment was horrible. When I was pregnant with my daughter, my boss asked me to stay late to work on a project. Later, he found me in tears and asked what was wrong. I told him it was 10 p.m., and my feet hurt because I was pregnant. He said: "This is why we don't hire women." Then he asked an office boy to bring over a trash can, flip it upside down, and place it in front of my chair. "Put your feet up there," he said.

I wasn't driving because of my swollen feet, and my husband was out of town, so my dad came to get me. He was furious...remember, he wanted to protect us from these environments. He wanted me to be respected. He said, "You speak three languages! You could work as a translator at an embassy and be around elites! Why are you in such a rough environment?"

The whole experience almost killed my interest in engineering. However, I never lost my curiosity about computing.

Men aren't always the ones engaging in problematic behavior against women. Sometimes, women uphold norms that might be at least slightly discriminatory. During my business school studies, I wrote a thesis on IoT's impact on business leadership. I ended up in a debate with a female professor. We were reading a particular author, a man, who argued that leadership can be taught and leaders can be created. I disagreed, feeling that while anyone could manage a small team to some extent, certain people, based on temperament or personality, could never lead complex, large organizations, regardless of training.

The professor once said, “Who are you to know more than this author? And besides, you don’t have the skills to create or test a theory.” The author, of course, was male. He had a well-known leadership theory. I remained adamant. I said, “Look, we’re not debating the Bible here. This is just a marketing book that describes a theory, and yes, I do know how to create theories or hypotheses. It’s just a matter of methodology, definitions, research—all of which I’m familiar with from my time in market research.”

One of my male classmates later turned to me and said, “Oh, now you’re in trouble...you shouldn’t challenge our professor so much...your grade might suffer.”

My grade turned out fine, and the funny thing was that later, the same professor presented ideas from another writer about the importance of genes and latent characteristics as a starting point. This author held that specific environments could certainly draw leadership out of people, but not if they lack some essential attributes and wiring. My same classmate raised his eyebrows and said, “Isn’t this what you were saying before?”

Discussing differences is fraught, but it’s also common sense. Any parent knows that the differences between children are real. My daughter is relatively quiet, studious, and responsible. My son, her younger brother, is also a good student but is much more outgoing and likes to play and be with his friends. When he was nine, one of his teachers called and said, “We have a problem with your son.” The teacher explained that because my son was charismatic and often spoke up, the other kids followed him, making it challenging to control the class, particularly if they were following him in being rambunctious.

I said, “It sounds like you have a leader. Use him like one.”

My son has done well in school with teachers who have delegated specific classroom duties and relied on him. He has had a harder time with teachers who want him to stay in his chair, remain quiet, and follow the rules.

His personality was apparent from an early age. He started playing football (soccer) when he was three years old, and I remember one early game when he cried and asked to be put in as goalkeeper, a high-stakes position. That's become his full-time spot on the pitch. He takes responsibility for his team and becomes distraught when they lose. So, I think it's clear that leaders can be born, though they need training and support to make the most of their personalities.

I feel fortunate to have created an exciting role at Siemens Digital Industries Software. I'm responsible for all marketing, communications, and PR for the Middle East and North Africa. I manage all academic relationships for a larger region, including Israel, South Africa, and Turkey. We are primarily an R&D center in Egypt, so I serve as the interface with leadership across global product groups. I ensure that our engineers appropriately support multiple development goals and release schedules.

A significant part of my job involves anticipating hiring and talent acquisition needs. Before the pandemic, I'd travel for business reviews with senior management and listen closely to hear about challenges in finding skilled technical talent. I would always follow up with the executives after the presentations to gather more information. In many ways, our product in Egypt is the technical development talent, and I want to ensure we have a product-market fit!

Several big multinational tech companies, some of which are our customers, operate here, so we must manage strategic issues. We don't want to poach talent from important customers, though we need to meet our needs. One way to address this is by forming strategic partnerships and collaborating on academic outreach—we have done this, particularly in integrated circuit verification.

We maintain gender-blind technical recruiting efforts, and our male/female ratio, about 70/30, mirrors the proportions in the academic programs from which we recruit. Our message is, "We find the *crème de la crème*."

Again, women fare surprisingly well here, and when I have encountered problematic situations, I have addressed them subtly. I worked with one professor who insisted on segregating male and female students in their seating. I stopped working with him for a while. When I checked in with him later and saw that he had abandoned his approach to separating students, we resumed providing training material. However, I got involved in selecting students for the course to ensure girls were well-represented.

I observe some differences across domains, which are apparent worldwide. Generally, fewer women work in equipment-intensive fields like mechanical engineering and mechatronics. Women are better represented in computer engineering, computer science, communication, and networking. Even those women I encounter in mechanical engineering show more interest in factory automation and programming/digitalization than working directly on machines. The good news is Siemens offers many opportunities for women that extend far beyond coding.

I have made concerted efforts to promote women in STEM, including among younger students. I arranged a program here that brought in women with technical backgrounds from various institutions, including NASA, Microsoft, Yahoo, and other tech companies. The fact that so many big tech firms operate here indicates that Egypt is a tech hub. We held various events at schools, primarily for teenage girls. The idea was to put them on track to choose a STEM education. In Egypt, students begin specialization even in high school.

Things have improved at Siemens, with an explicitly stated goal to promote women into senior positions. Already, a handful of women occupy the company's top ranks, including positions on the managing board. Siemens can learn from the best practices in companies they acquire, like Mentor Graphics, which did a much better job hiring women.

Efforts to promote women remain a work in progress, and women must step up. I've attended meetings about various initiatives and have often found

myself in many conversations about childcare, including the availability of lactation rooms. While this is important, we must also focus on developing leadership skills, managing your manager and career, becoming a more effective communicator (including delivering tough feedback), and negotiating a promotion.

I'll continue to do my part. As of mid-2022, I've arranged to train around 1000 university students here in Egypt, which increases yearly. Women aren't the only ones to complain about discrimination. I recently posted information on social media about training in an electrical engineering topic. One of the commenters complained that he felt discriminated against, given his interest in computer science! As an aside, the plunging number of EE graduates relative to their peers in computer science is a significant topic, particularly in chip design.

I'm incredibly proud of my daughter. She is serious about STEM and will start studying at American University in Cairo this fall. When she was 14, she completed an internship in a department led by a highly competent woman; her immediate supervisor was a man. My daughter worked on an A.I. image recognition project that could notify parents by cell phone when a toddler was near an electrical socket.

Navigating the choice of higher education is challenging here, as I know it is elsewhere. My daughter applied to and was accepted by several universities. I told her it was her choice. I'm honored she chose to stay in Egypt.

Balancing everything remains a challenge even now that my kids are older. And though I've done my best to treat them the same, there are differences. My husband is tougher on our son and less so on our daughter. There are, in fact, expectations about what it means to grow up as a man. I eventually stopped going to soccer games because I'd worry too much, especially when my son would sometimes get hurt or emerge from a scrum with blood on his uniform. My daughter rode horses seriously, so I'd attend her

events while my husband went to the soccer games. Like in many families, my husband and I play different roles for our kids. My son still comes to me to talk and share secrets. My husband asks, “Why doesn’t he share with me?”

The answer is that maternal instinct and concern are real. I treat all the students who come through our sponsored training, men and women, the same—the only special treatment is that I treat them all like my own children!

I have encouraged and sometimes even pushed my daughter into STEM, especially computing, though she does enjoy it. It’s clear now that computing, software, and apps apply to all fields. As a capstone to her French baccalaureate high school curriculum, she built two apps—one related to smartwatches and notifying caregivers about specific patient needs and another associated with the smart home.

I’m not worried about her ability to juggle a career and a family. She watched me do it, and she is competent and determined. Having a supportive spouse is critical. My husband runs his own business, which offers certain advantages. Even before the pandemic, he had flexibility and could sometimes more easily stay home to help with the kids than I could.

Every family divides responsibilities differently. My husband doesn’t cook, not even eggs, so I prepare all the meals. We’d rather spend our extra money on our kids, so we pay for housecleaning, though I do most of it. The days are tiring, and I often wonder if I’ll have the energy to finish all that needs to be done.

Work and purpose are essential; I’d never give up my career. Ultimately, having a job is nourishing. I’ve seen many people, primarily women, who seem to age prematurely when they abandon the workplace to focus on being at home, though that’s an honorable choice. STEM is also relevant for these stay-at-home women, who will likely oversee their children’s education.

I firmly believe that workplaces benefit from a mix of men and women. Our minds work differently, with men generally focusing on one thing at a time and women being more synthetic thinkers who never stop scanning the environment and connecting the dots.

I recall one of the last senior business review meetings at Mentor Graphics before the Siemens acquisition announcement. During breaks and lunch, I noticed the Mentor CEO, president, head of H.R., and other senior people huddled together in earnest, serious conversations. I told my country manager, “I think Mentor is being sold.” He responded incredulously, “What are you talking about? Are you stupid?” He said this good-naturedly but remained skeptical. He’s been very supportive, and I consider him like a father.

After the review, we went our separate ways—my boss traveled to Canada while I returned to Cairo. My boss called during a stop en route home and said, “Well, the news is out on Reuters... you were right!” Whenever we disagree, I say, “Remember the acquisition...you should listen to me!” Women’s intuition is real, and men often miss things women notice.

Despite everything, I’m hopeful for women and our world in general. Certainly, evidence of a backlash against progress exists everywhere, including in Egypt. But here, in our national government, I observe a healthy mix of men and women in leadership positions, including among cabinet officials, and there is loud pushback any time gains made by women are threatened. At Siemens, much attention focuses on promoting women.

The role of families and parental love is enormous. Our current country manager/CEO strongly supports women and is the father of two girls—these facts are not unrelated. Whether raising girls or growing up with sisters, many men have experienced wanting the absolute best for a girl they love.

And no one would be here if not for their mother.

About the Author

Reham El Sebaie is the Director of Strategic Business and Marketing, MENA region, at Siemens Digital Industries Software. Reham's career spans more than 24 years, focusing on marketing, business development, strategic partnerships, and collaboration with higher education. She joined



electronic design automation (EDA) vendor Mentor Graphics 16 years ago and, following Siemens' acquisition of Mentor in 2017 for \$4.5 billion, played an instrumental role in the successful integration and rebranding of the company in the region.

Reham El Sebaie's efforts have significantly strengthened Siemens' relationships with governmental and educational institutions. Her role in positioning Siemens as a leading software development entity in advanced technology across MENA is noteworthy. However, her most significant contribution lies in expanding Siemens' university cooperation framework. This initiative, which supports the recruitment of top engineering talent through various programs, diplomas, and training courses, demonstrates her commitment to talent development and recruitment.

In the last six years, Reham has concentrated on business development and fostering strong partnerships with Siemens business units beyond software, including factory automation and smart infrastructure. She has built lasting, trust-based relationships that have expanded Siemens' influence in the MENA region. One example is helping Siemens secure a cooperation agreement for Egypt's Electronics Industry Capacity Building program.

Reham El Sebaie's academic achievements and ongoing education underscore her commitment to learning and professional development. She holds two MBAs from Sheffield University (UK) and ESLSCA Paris (France), and a PhD from Toulouse University (France) in the impact of AI

on marketing strategies. In addition to these, she holds several certifications, including Software Development Lifecycle (SDLC) and Agile Software Development, Artificial Intelligence and Automation for Non-Technical Executives and AWS Cloud Practitioner Essentials.

Afterword

IFEES and GEDC Secretariat

On a personal note...

It is my privilege and pleasure as Secretary General of IFEES (International Federation of Engineering Education Societies) and Executive Director of the Global Engineering Deans Council (GEDC) to have been a part of publishing this latest volume in the Rising to the Top (RTTT) book series. This is Volume V in the ground-breaking RTTT series in which women in engineering from around the world share compelling stories of their inspiration, motivation, challenges, and victories along the way from girlhood to taking their right place among the women leading knowledge, research, and practice in engineering across disciplines, in varied professions, and countries around the globe. Volume V brings you a collection of stories by 30+ women across the Arab World and Southeast Asia - stories told in their own voice, stories that, when you hear them, will resonate as perhaps similar to your own journey to making the world a better place through the problem solving, creativity, resilience, and passion that makes us the best of web engineers.

Several years ago, during my residency in East Africa, I had the opportunity to visit a then-war-torn Sudan. While traveling in the region, I gained personal insight and a better understanding of the complex political, cultural, and historical challenges of Sudan and its neighboring states, and the experience moved me deeply. I had the opportunity to meet the African and Sudanese leader in engineering education, Professor Tagwa Musa, Sudan's first and only female engineering dean. Tagwa inspired me through her vision, commitment, courage, and capacity to overcome obstacles while pursuing her passion and profession. She became the inspiration for what has become the RTT series. She has also become a respected and trusted advisor and a true friend.

More people should have a window into the experience of women like her from around the world in engineering. I asked Tagwa to share some of her reflections about her journey with our global community; she wrote a beautiful and insightful article, which we published in our IFEEES-GEDC Global Engineering Bulletin. I reached out to many others worldwide and asked if they would be willing to share their journeys as female engineering leaders in their respective countries. The affirmative and enthusiastic responses were overwhelming – 32 leaders from every continent agreed to author a chapter for the first volume; Tagwa’s inspiring story was included. Her initial article became the seed of the flourishing and many-branched “Rising to the Top” book series, which you now read in our fifth edition.

Our first global volume was so well-received that we quickly published a second. I engaged a key international leader in Australia, the former WFEO president Marlene Kanga, to work closely on Volume II. Thanks to her leadership and deep connections with many leaders globally, she identified and encouraged a significant number of co-authors for our second volume.

Volumes I and II were so well received that we experienced a groundswell of demand for more stories, which prompted our decision to focus more specifically on selected regions. As a result, Volumes III and IV focused on stories authored by women engineers in India and Africa, respectively - common stories from among women who shared so much, even in countries with such diverse realities and cultures.

Among the many colleagues, contacts, and close friends who contributed to Volume III, I want to especially thank Professor and current GEDC Chair Sushma Kulkarni for writing Volume III. Under her leadership, we engaged thirty Indian leaders who contributed. Devasmita Dey contributed effectively as the editor. Volume IV focuses on the personal and professional journeys of women engineering professionals from 31 countries across the African continent. The commitment and deeply valued engagement of Tagwa Musa, Valerie Agbera, Debby Blaine, Soma Chakrabarti, and Theresa Mkandwire were fundamental to writing this edition. Through engaging with these two special journeys, we witnessed

the diversity and complexity of the Indian and African realities and the uniqueness of the experiences of these women co-authors, all generous with their time, authentic with telling their stories, and well-represented through varied narratives.

As a collection, all volumes in the RTT series provide an inspirational insight into the lives and journeys of all authors. These reflections will inspire a younger generation of aspiring women leaders. Hopefully, these amazing stories of journeys to success will foster meaningful dialogue among women and men around gender parity issues in the STEM field. All involved in the series hope these shared stories will result in meaningful conversation, a powerful way to make a real difference in this complex and evolving global environment.

In addition to our many authors, I also wish to acknowledge my thoughtful, hardworking, and generous colleagues who contributed to the writing, editing, design, and other aspects of bringing this important series of books to publication. It could not have been done without you.

I feel honored and fortunate now to be able to accompany, support, and learn from the 30+ stories in *Rising to the Top Volume V*, stories about their individual and collective journeys in the Arab World and SE Asia in this fifth edition. We value the original idea of focusing on the Arab World, as Sirin Tekinay, Alaa Ashmawy, and Ghada Amer expressed. We deeply appreciate the leadership provided by Khairiyah Mohd Yusof in developing the relations, commitment, and contributions of the women of Southeast Asia to this fifth joint edition.

Keep rising, one and all!

Hans Jürgen

About the Author



Dr. Hans Jürgen Hoyer is the Secretary General of the International Federation of Engineering Education Societies (IFEES) and the Executive Director of the Global Engineering Deans Council (GEDC). He is a Resident Scholar in Global Engineering at George Mason University and the Dean of the School for International Training, World Service in the U.S. He is an Honorary Professor at numerous universities globally. He serves on the advisory boards of

EPOKA University, Morgan State University, the International Center for Engineering Education (a UNESCO organization at Tsinghua University), and the United Nations Institute for Training and Research (UNITAR) in Geneva. He is a strategic advisor to Quanser and a co-founder of the Indo-Universal Collaboration for Engineering Education. A former Resident Scholar at MIT and Harvard University and faculty member at George Mason University and Montgomery College, he served as CEO of the World Bank organization World Links. He led numerous international NGOs in Africa, Latin America, and South Asia.

