NATIONAL ACADEMY OF ENGINEERING

Asad Madni

NAE President C. D. Mote, Jr. with NAE Member Asad Madni, his son Jamal, wife Taj, and former NAE Chair Member Chad Holliday.

Our members amaze us. This month we'd like to say thank you to Asad Madni ('11) and his family for being so helpful to the NAE. Dr. Madni is the chair for the Bernard M. Gordon Prize for Innovation in Engineering and Technology Education, Past Chair for section 7 Search Committee, member of the Advisory Board for the Arnold and Mabel Beckman Center, Membership Policy Committee (MPC), and provided leadership and service on numerous other committees. He's thoughtfully created a 'procedures manual' for Section 7 and shared it with other sections. We're deeply grateful to him for the two giving challenges he and his family created early in his tenure and for the friends he's introduced us to. We hope you reach out to him at the next NAE National Meeting in February.

1. At what age did you become interested in electrical engineering and what was the spark that intrigued you about your career field?

The transistor played an important role in shaping my life and successes, just as it changed the future of engineering. After graduating from high school in Bombay, India, I decided to come to the U.S. to pursue higher education in electronics/electrical engineering. I recognized that advancements in this field had the potential to alter the course of humanity.

2. You've been a pioneer in engineering technology. Can you tell us something about your career choices?

I served as President, Chief Operating Officer & CTO of BEI Technologies Inc. headquartered in California, from 1992 until my retirement in 2006. I led the development and commercialization of intelligent sensors, systems and instrumentation for aerospace, commercial, transportation, and medical industries, including the Extremely Slow Motion Servo Control System for Hubble Space

Telescope's Star Selector System which provided the Hubble with unprecedented accuracy and stability, resulting in truly remarkable images that have enhanced our understanding of the universe; and the revolutionary MEMS GyroChip® technology which is used worldwide for Electronic Stability Control and Rollover Protection in passenger vehicles, thereby saving millions of lives every year.

Prior to joining BEI, I was with Systron Donner Corporation for 18 years in senior technical & executive positions, eventually as Chairman, President & CEO. Here, I led the development of RF & Microwave Systems & Instrumentation which significantly enhanced the Combat Readiness of the US Navy (and its allies) and which provided the Department of Defense the ability to simulate more threat representative Electronic Counter Measures environments for current and future advanced warfare training. I am currently an Independent Consultant; Distinguished Adjunct Professor and Distinguished Scientist in the Electrical & Computer Engineering Department at UCLA; and Executive Managing Director & Chief Technical Officer of Crocker Capital, a San Francisco based private venture firm specializing in emerging technologies.

I feel particularly gratified by the fact that all my inventions were commercialized by my respective companies resulting in substantial revenues and earnings which allowed us to employ a large number of engineers, scientists and technicians. Most of all, however, I am humbled by the fact that these inventions have had a major impact on society and humanity in general.

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3. Now, in your 'retirement,' how do you see your role in the world of engineering?

I genuinely believe that a professionally successful career that does not include philanthropy is an incomplete and unsatisfying one. I never forget that achieving this privilege in my profession makes it incumbent upon me and my family to give back and help and guide the generation following us, especially the underprivileged. Taj, Jamal and I actively pursue our philanthropic goals by contributing to the NAE and various academic as well as charitable organizations. In my retirement, I am serving as a distinguished adjunct professor at UCLA and spending my time guiding doctoral research, mentoring students, inspiring the next generation of engineers, and bringing an awareness of the NAE Grand Challenges to university, community college and high school students.

4. What is the most pressing and solvable problem you see – that innovation could solve?

At the request of the National Science Foundation, the NAE convened a diverse committee of experts from around the world – some of the most accomplished engineers and scientists of their generation – to identify the Grand Challenges for Engineering facing humanity. The committee proposed 14 challenges without ranking them or endorsing particular approaches to meeting them. Instead, the committee chose opportunities that were both achievable and sustainable to help people and the planet thrive. The panel's conclusions were reviewed by more than 50 subject-matter experts and the effort received worldwide input from prominent engineers and scientists, as well as from the general public. The Grand Challenges range from making solar

energy economical to providing access to clean water, and from advancing health informatics to engineering the tools of scientific discovery. These challenges facing humanity will have to be addressed by us as a global society if we are to continue humanity's trajectory of progress. Traditional technologies based on classical disciplines and thought processes of the past several decades are no longer viable in addressing these challenges, and new approaches based on interdisciplinary thinking is necessary. Fortunately, numerous emerging technologies such as MEMS, nanotechnology, deep machine learning, artificial intelligence, behavioral informatics, cloud computing, advanced signal processing and numerous others are advancing at an unimaginable rate and it is the convergence of these technologies that demonstrate the potential to address these challenges and have a major impact on our lives, businesses, government, society and our planet.

5.You and your wife and son have been very generous to NAE, becoming a member of both the Einstein Society and the Heritage Society. Can you talk about your decisions to become involved philanthropically?

I am a NAE member of the class of 2011 and was fortunate to attend the Induction Ceremony & the Annual Meeting, with my family. During the course of the Orientation Program, chaired by President Charles Vest, and the excellent lectures & panel discussion, my wife Taj, son Jamal & I were embedded with three key impressions.

1. Rarely, if ever, does one get an opportunity to be exposed to so many brilliant minds under one roof, selflessly providing their expertise and working in tandem towards the common goals of globally improving the quality of life and offering independent, well researched strategic recommendations that are vital to our nation's ability to maintain our global economic and technical leadership.

2. The NAE has a substantial need for discretionary financial resources to assure the independence of our voice on national policy; to advance our work to increase the number, quality, and diversity of U.S. engineering graduates; and to advance our national capacity for 21st century innovation and global competitiveness.

3. The reports and studies conducted by the NAE, together with subsequent recommendations, have played a critical and pivotal role in our national policy making. Private support enables the NAE to initiate projects that our members and committees consider vital to the nation's future. "Rising above the Gathering Storm" and "America's Energy Future" are but two examples of privately funded, influential reports on fundamentally important issues.

Even before the Annual Meeting ended, it had become quite clear to Taj, Jamal and I that as an organization the NAE truly represents and embodies our views and values from a philanthropic standpoint. With this in mind we approached Radka Nebesky and Maxine Savitz in order to determine how we could, in our own humble way, play a role in assisting the NAE. We established two challenges.

1. The first challenge was focused on newer members and matched, dollar for dollar, up to $50,000, any gift to the NAE made by December 31, 2012 by the classes of 2009, 2010, 2011 and 2012.

2.The second challenge was the first ever section specific challenge focused on The Electronics, Communications and Information Systems Section (section 7), the largest of the 12 NAE sections. This challenge matched dollar for dollar, up to $50,000, any new gifts to the NAE or any increase in a donor's 2012 contributions above what he/she made in 2011.

I am pleased to state that the challenges generated $457,000 for the NAE and have since inspired challenges from other members. This year we decided to include NAE in our estate plans and established an annuity.

6. What can you say about your roots and the challenges that others who come after you might face?

Dr. Chuck Vest, the late president of NAE and of MIT stated that "we live in the most exciting era for science and engineering in human history". I could not agree more with him. Having said that, I must emphasize that our generation is leaving behind a most paradoxical legacy to the generation following us. While we are providing them with unprecedented advances in technology that have the power to revolutionize the world in as yet unimagined ways, we are also leaving behind a world in turmoil. We bequeath them a far better understanding of our universe than we ever thought possible, with advances in medical science and healthcare that will continue to improve longevity and the quality of life, and a greater sense of awareness of our planet and our environment. We also leave them with poverty, global warming, energy and water shortages, ethical violations at the highest levels, and major on-going wars as some of the challenges to address. Their inheritance may be best described in the opening of Charles Dickens' "A Tale of Two Cities'. It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of light, it was the season of darkness, it was the spring of hope, it was the winter of despair.

I am thoroughly convinced, however, that as we look forward we will see an increasing number of Engineers, Scientists and Technologists that will be called upon to carry and advance the banner of human progress. These engineers, however, will have to be trained in new ways to address the challenges.

Two reports produced by the NAE, "The Engineer of 2020" and "Educating the Engineer of 2020, analyzed the global dynamics, societal needs, changing expectations from science and technology research to determine the attributes that will be essential for the engineer of 2020, as well as the transformation that educational institutions will need to undergo in order to educate these engineers. I quote the concluding paragraph of the first report:

"He or she will aspire to have the ingenuity of Lillian Gilbreth, the problem-solving capabilities of Gordon Moore, the scientific insight of Albert Einstein, the creativity of Pablo Picasso, the determination of the Wright Brothers, the leadership abilities of Bill Gates, the conscience of Eleanor Roosevelt, the vision of Martin Luther King, and the curiosity and wonder of our grandchildren."

What the authors were trying to convey is that new engineers will have to be educated with depth as well as breadth , they will need to have extraordinary communication skills, they will have to be able to work in interdisciplinary and multicultural teams comprising of individuals with different areas of expertise and who come from varied backgrounds, countries and cultures,; they will need to understand the importance of diversity and its advantages, they will need to be dedicated and focused, they will not only have to be good at problem solving but will need to be creative, imaginative and visionary; they will have to be inspirational leaders; and finally, they will have to uphold the highest ideals of ethics and be cognizant of the impact of their work on society, humanity and our planet.

I hope to continue supporting the NAE in its most important mission of providing engineering leadership in service to the nation.