



Transformation: Engineers Do That

A Perspective from **SEAS DEAN DAVID S. DOLLING**

It has been a long journey from being an English schoolboy in the large but sleepy coastal town of Bournemouth in the south west of England to becoming an American citizen and now dean of SEAS. Back then, in the 1950s and early 1960s, Bournemouth was a seaside town and retirement community, the Florida of England. In an era when travel for the common man was by car or rail, it was a town full of small family-run hotels and in summer packed with young and old enjoying the beaches under a watery English sun. In a few short years, the profession I was to join, aerospace engineering, changed the town forever. Engineers do that.

New products like aircraft, satellites, computers, the internet, wireless communications, and robotic manufacturing change everything—from commerce to entertainment to education to jobs. With the development of the civil turbojet aircraft, the British “holiday makers” (as they were called back then) soon found Spain, Italy, Greece, and other places where sunshine was reliable and beaches had warm white sand. Bournemouth’s hotels were slowly shuttered, converted into condominiums, or demolished for homes or stores. The town was in decline. Now, 30 or more years later, it has transformed itself, home to new IT-focused businesses, new healthcare facilities, weekend vacation homes, and many small specialty engineering companies. Bournemouth is just one example of how everything must continually reinvent itself in response to changing circumstances and new technologies.

As David Grier’s history of our early years in this magazine describes [see page 8], SEAS, like Bournemouth, has undergone its own transformations. Two world wars came and went, new technologies and disciplines emerged, and SEAS evolved from a small night school that provided engineering education in a very limited range of disciplines to a large, residential school with many undergraduate and graduate offerings and strong and growing off campus graduate programs for working professionals from across the nation. Now, once again we must adapt to changing circumstances. In a world of global connectedness and outsourcing, and in the face of national challenges in technology, science, and healthcare, we must reinvent ourselves to prepare our students for success in this new world.

Transformations: we engineers initiate them, but we can experience them, too. My own transformation started when I left Bournemouth at age 18 to study aeronautical engineering at London University. At 21, armed with my bachelor’s degree, I joined Hawker Siddeley Dynamics as an aerodynamicist, working on short range, supersonic, air-to-air missiles. I had no idea that one day I would be an

engineering professor, but on reflection, those early days were formative in shaping my views of what engineering education was, and must be. I realized quickly how essential lifelong learning was, and how grateful I was that my professors and courses had given me a thorough grounding in fundamentals on which I could build, and learn on my own.

Excellent professors can change a student’s life, but they can also change an institution. Our transformation at SEAS must include attracting additional world-class faculty. This is not an easy task; the competition for the best and brightest faculty is fierce and relentless, and building such a faculty requires endowments and other financial resources. Endowed chairs and professorships play a crucial role in attracting the leaders who will build nationally recognized educational and research programs.

Building on the fundamentals my professors taught me, I also realized at Hawker Siddeley Dynamics that in the world of missiles, where so much technology from so many different disciplines is packed into a compact space and must work seamlessly together, success hinges on “teamwork” and an ability to see and appreciate the “big picture.” Electronics and software had to interface and overlap with aerodynamics and propulsion systems, guidance and control systems and actuators, and all had to work seamlessly together for the mission to be accomplished.

The same can be said for “launching” our graduates onto their professional path: as engineering educators, we must make sure that our graduates are prepared to thrive in, and lead one of these seamless teams that may be spread across the globe, cutting across cultures and time zones, as well as disciplines. Today this is needed more than ever; few professions are as internationally based and organized as engineering now is. Design, manufacturing, and supply chains stretch across the globe and work goes on 24/7. As you read these words, design teams in Moscow may be completing tasks started by colleagues in Seattle who in turn took over work started in Japan hours earlier. At SEAS we are working hard to provide opportunities for students to have an international engineering experience, to gain this understanding and perspective.

My own international engineering experience came after two years of missile design at Hawker Siddeley Dynamics. I returned to graduate school, enrolling at the von Karman Institute for Fluid Dynamics in Brussels, Belgium, as the proud and happy holder of a fellowship that paid tuition and living expenses. I still have the letter announcing that award, which I had waited for with bated

breath. It was a godsend, a lifeline. Without it I would never have attended graduate school and now am ever mindful that that same situation is faced by many today.

A lifeline: that is what financial aid is for students who have the passion, but not the financial resources, for college or graduate study. But the benefits of financial aid accrue to SEAS, too, since attracting the best students is one of the necessary paths to growing in reputation and stature. Every engineering school has plans to grow in stature, and none of our competitors is standing still—so neither should we be. SEAS already has a large number of energetic, motivated, and very bright students, but expanding our merit and need based scholarships is essential to recruit and retain the undergraduate students we want and need.

From the moment freshmen step onto campus in the fall, families entrust them to our care, to transform their lives and prepare them for success in the world. It is not just a responsibility but a privilege, and nothing is more rewarding. I learned this when, after four years at the von Karman Institute, I was offered a post-doctoral position at Princeton University. It was there that I had my first opportunity to teach classes and there that I discovered a passion for teaching, and the responsibilities it brings with it.

We want to engage and empower students as never before. This is a challenge, because the changing lifestyles of our students, and a changing workplace, make it imperative to explore new teaching paradigms and tools. We need to foster and encourage the development of technology driven learning environments in which laboratories can be integrated into regular classroom activities, where students can learn in studio-type classrooms, and where they can work on curricular and extra-curricular projects in custom-equipped project spaces.

Modern, sophisticated, and flexible laboratories, classrooms, and workspaces will help us to accomplish this. The

university's Board of Trustees at its February meeting approved expenditures of up to \$10 million for engineering and architectural studies for a new building, to be shared with groups from the natural and life sciences and to provide the interdisciplinary environment we need. This new building—a powerful magnet in the heart of the nation's capital to draw world-class faculty and students—is a core element in achieving our vision. It will create a hub for technology exchange and education, workshops, development of start-ups with our partners, and technology education across the D.C.-Metro area. Close proximity to policy experts, business experts, and lawyers with expertise in entrepreneurial and intellectual property matters will offer our students an environment that others cannot emulate and will provide a unique background to succeed in today's complex world.

This will be a stretch for us; but that's okay. I learned that lesson—that stretching is a good thing—at Princeton, where I was fortunate to work under the late Professor Seymour Bogdonoff. He gave me responsibilities and made me stretch, often beyond my comfort zone. He understood that a sense of achievement, building inner confidence, does not come from doing easy things; it evolves out of struggle and

hard work. Lessons learned with Boggy, as we called him, stood me in good stead at the University of Texas at Austin as I built a supersonic wind tunnel laboratory, developed and taught my classes, passed through the ranks of assistant to associate to full professor, became chair of my department, and then associate dean for academic affairs for the School of Engineering.

And this brings me to the present, here at SEAS. Many factors influenced my decision to take the post of dean of SEAS, but two dominated. During visits to GW, the strong commitment that the Board of Trustees, President Knapp, and other high level leaders had made to strengthening engineering and science at GW was palpable, and their enthusiasm was contagious. The strong commitment to that same end of the SEAS faculty, students, and alumni I met during those interview trips was equally compelling. On the airplane back to Austin after my third and final visit, I recall thinking that a once-in-a-lifetime opportunity was presenting itself, to me and to SEAS, and it could not be turned down. There was a perfect alignment of chance and choice. The chance to grow, to improve, was being offered. We have chosen to embrace that chance.

THE ON-RAMP: “We are developing grand plans, but we are doing so in conjunction with you. As a SEAS stakeholder, I ask you to take the on-ramp onto the SEAS highway and join us in the work ahead.”



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It comes at a propitious time. From the White House cabinet room to kitchen tables in millions of homes, there is a dawning realization that as never before, education, engineering, and science are keys to our future health and prosperity. The nation faces many technological challenges: energy independence and securing a sustainable future; the urgent need for computer security, information assurance, and privacy for a myriad of commercial, medical, homeland security, and defense needs; the demand for ever more powerful computers for design and simulation of products and processes from pilotless aircraft to pharmaceuticals to robotic surgery; development of new safety technologies and regulations as fully electric and lightweight vehicles come on line; and nanotechnology, in which natural

and man-made materials are exploited for applications from pharmaceuticals to electronics to improving water quality worldwide. These are all challenges that SEAS has recognized and they are areas in which we have a strong or growing presence.

In short, we are developing grand plans. We are rolling up our sleeves and getting down to work. But we are doing so in conjunction with you and with GW. As I have said many times, no one person, no one group of stakeholders, can do it alone. Only as a team working together will we succeed, and every one of us has a role to play.

For some of you, this may mean becoming a mentor to a first-year student, or serving

on resume writing workshops that provide advice to graduating seniors, or developing an alumni chapter in Rockville or Riyadh. Others can help support student design projects with your time and financial resources. Others may be able to endow a scholarship in the name of a family member or beloved faculty member, or contribute to a scholarship in a graduating class' name. Endowed scholarships are the most amazing of gifts. They give in perpetuity.

Some of you may be able to help establish a chair or endowed professorship, or spend an afternoon with us and give a lecture in a SEAS seminar series. Seminars can change lives, sometimes unbeknownst to any of us. The passion you express for your subject may ignite a fire in a sophomore or a senior, change his direction, give her life a new focus. Others of you, perhaps reflecting on a successful career, may have the resources to help us make our dream of a new building come true. Everybody has a chance to make a difference; it is just a question of choosing how.

Above all of this, I urge you to get involved, because unanticipated and interesting forks in the road appear on every journey; people come into your life and change what you think and who you are, and from this, opportunities arise that you would never have imagined. As a SEAS stakeholder, I ask you to take the on-ramp onto the SEAS highway and join us in the work ahead.

I will end by saying I feel very lucky, and privileged, to serve as dean of SEAS. We have a strong school, a tremendous launching pad from which to go forward. I look forward to meeting you in the months ahead. If you are in D.C., look me up; if you are planning a trip to D.C., call ahead, let's have coffee or lunch. There is no combination I enjoy more than meeting you and "talking SEAS."

