

## Elevating a School

About a year ago, a young alumnus of our school, wise beyond his years, told me something very important. Feng Deng, cofounder of NetScreen Technologies, a Silicon Valley company doing very well in Internet security, said that success doesn't necessarily result from having a good idea. Executing the idea, he observed, is far more important and far more difficult.

When I was appointed dean of the University of Southern California (USC) School of Engineering in July 2001, I said that my goal for the school was to elevate it into the ranks of the nation's elite within the next decade. Our plan is to accomplish this goal by building excellence in a number of exciting engineering disciplines crucial to the future of our society and by raising the quality of our academic departments.

The first task was to build an effective leadership team of associate and assistant deans who would help me and the faculty execute a new strategic plan that included a thorough budget overhaul to better apply our resources to our priorities: faculty, academic programs, and research. The new team also helped me create a major new external relations program. From scratch, we started new systematic efforts in fundraising, alumni relations, corporate relations, and communications, staffing each area with top professionals. This was a major shift in strategy, and it quickly proved productive.

Many researchers in signal processing have shown great leadership in academia, industry, and government administrative positions. In this new column, leaders in such positions will summarize and share their experience with other members of the community. Authors will include current or former deans of engineering colleges, department chairs or heads, directors of research groups (centers, laboratories, etc.), developers of education programs, founders of startup companies, managers in industry, leaders and managers in government positions, and other leaders. Contributors will be expected to outline their experience, milestones in building up activity, and key elements of success. They will give perspective and provide future projections. The articles will appear as a sequence following invitations and proposed contributions.

The seeds of this column were planted at my earlier invitation for Dr. Boaz Porat to share his leadership experience in a Distinguished Lecture at the SAM 2002 Workshop, of which I was co-general chair. In his presentation, Boaz then described his starting up the high tech company Savan in Israel and bringing to a successful fruition its new modem. We received an overwhelming and enthusiastic response to his presentation and paper from all the attendants. Later I met with Dr. Sanjit Mitra at a breakfast in ICASSP 2002, in which he described to me his experience in leading the effort of moving up the stature of his department in the University of California at Santa Barbara (UCSB) over the years. I found his story fascinating and inspiring. At that time, on the spot, I decided to initiate this new column, since I believed that it would benefit many other readers who could learn from these successes in developing new activities. When I proposed the new column to Dr. Ray Liu, the new editor-in-chief of *IEEE Signal Processing Magazine*, he immediately embraced it with great enthusiasm.

The author of this first column is Dr. Max Nikias, dean of the School of Engineering of the University of Southern California (USC). Max has shown excellent leadership in both administration and research. He has founded the Integrated Media Systems Center at USC, which has been the focus of tremendous interdisciplinary research. He has been a prolific author, and his cutting edge work has been recognized by many prestigious awards. In his article, Dr. Nikias shares his experience as dean in elevating his school into the top ranks in the United States. His article achieves our expectation by clearly describing a strategic plan, focus areas of effort and emphasis, elements of success as well as challenges toward achieving this goal. I am sure you will enjoy reading his article, which will give you new ideas and an interesting perspective.

—Arye Nehorai

*(Arye Nehorai is with the University of Illinois at Chicago, where he was named University Scholar. He has held several positions within the IEEE Signal Processing Society and is currently vice president, Publications. He was editor-in-chief of IEEE Transactions on Signal Processing.)*

In the first 15 months of the new administration and during a difficult economic environment, we raised US\$35 million from foundations, corporations, and private donors. With half this amount earmarked for endowment, we have increased the school's endowment significantly, a critical rise for a private school. The single biggest accomplishment was a \$10 million gift from alumnus and USC Trustee Daniel J. Epstein to name the Industrial and Systems Engineering Department, which he had attended as an undergraduate. We believe it was the largest naming gift ever made to a USC academic department or to any university industrial and systems engineering department in the nation.

## A Positive Feedback Loop

Adequate resources are the key to securing high academic quality. Our new strategic plan is based on the fact that the foundation of academic excellence is scholarly faculty. It is a positive feedback loop that works like this:

- ▲ great scholarly faculty leads directly to great teaching and research, which raises your reputation
- ▲ a rising reputation attracts quality students seeking a first-class education coupled with the opportunity to participate in exciting research
- ▲ graduates become more in demand by corporations and the government
- ▲ friends and alumni seeing the indicators of quality increase donations while government, corporations, and others also increase their support
- ▲ greater resources enable us to attract more first-rank scholarly faculty.

We invested a great deal of effort to promote this principle. The school's department chairs and other faculty identified many excellent faculty candidates, including, in particular, women and under-represented groups. In my first year as dean, we conducted 61 formal and informal

candidate interviews. The interviews included ten women and/or candidates from under-represented groups. We made 18 offers, including five to women and/or candidates from under-represented groups. Eleven of the offers were accepted, of which one was female and one a male Hispanic.

We also invested in our current faculty. We made the difficult decision during the period of economic uncertainty immediately following September 11, 2001 to effect a mid-year salary adjustment for them. The symbolism of this decision—that our faculty would remain our first priority under any circumstances—was as important as the amount of funding involved. Building an exceptional faculty is frankly a competition among the top schools. We want to compete at the highest level, so our faculty remuneration policy must fit our goals.

## Academics

A strong faculty results in excellent academic programs, and new faculty produce new programs. We are creating new M.S. programs in areas that set us apart, areas in which we have built special strengths, such as in multimedia and computer security. We also established new major initiatives in biomedical technology and information technology/communications, two areas we deem critical to the future of engineering and society, and are successfully recruiting for them.

With the boundaries defining technology and science—particularly the life sciences—blurring, we decided to make collaboration with excellent partners and more interdisciplinary work a central part of our strategy. One result was a joint proposal to NSF from our Biomedical Engineering Department and the USC Keck School of Medicine for a new engineering research center. It is too early to anticipate the outcome,

but our proposal has already passed some tough cuts.

Another important measure of how well we are doing is the continued support for research we attract from federal agencies and corporate sponsors. We continue to have one of the largest engineering research programs in the nation and our \$121 million research volume last year was an all-time high.

## Distance Education

The USC School of Engineering has had a successful distance education operation for more than a quarter century, but we recognized that our technology was outdated. One of my first decisions was to thoroughly reorganize the Distance Education Network (DEN) and place it under new leadership. In one year, we transformed DEN from an outdated system delivering televised lectures by satellite to a cutting edge Internet delivery program with interactivity features. DEN now has a much closer collaboration with our Information Sciences Institute (ISI) and other research centers that are developing breakthrough technologies relevant to DEN's operations. The reorganization included a new delivery model, a new marketing strategy, a new database-driven Web site, and the creation of new marketing positions for an aggressive effort to expand DEN's enrollments and corporate client base. All classes, currently 70 per semester, are offered live and available on-demand over the Internet, with video streams synchronized with all digitized materials. Course materials are encoded in the classroom with little or no production, and chat and polling are provided in a threaded discussion. DEN enrollments increased immediately. Currently, we have 755 DEN students seeking master's degrees nationwide, a 27% increase. And, we are continuing to add mas-

ter's degree programs to our distance education menu. We will soon have programs in cybersecurity, biomedical devices, dynamics and control, and product development. *U.S. News & World Report* recently named DEN as one of the top e-learning engineering programs in the nation.

## Undergraduate Education

The quality of our undergraduates, already high, increased further. The average SAT score for our incoming freshmen last fall was 1366. This is by far our highest ever and higher than that for any other school at USC. Our senior class is also outstanding, and it is with considerable pride that I note that USC's valedictorian and salutatorian at commencement last May were engineering students.

However, the good news has a downside. Too many of these excellent students drop out of engineering. About 45% of our freshman class ultimately do not earn an engineering degree. This percentage is about the national average, but if USC Engineering aspires to be an elite school, we cannot settle for average. Frankly, our nation cannot continue to see almost half of the young people who start their university studies in engineering bleed off to other areas. We have been importing engineers from other countries and as our tech sector has floundered, some of those engineers have returned to their native lands with advanced technologies to compete against us.

Retaining exceptionally bright young people in engineering until they complete their studies is the single greatest challenge for me and every other engineering dean in the nation. I've spent many hours discussing this problem with the Na-

tional Academy of Engineering leadership, other engineering deans, corporate leaders and our faculty, students, alumni, and USC administration. At my school, we held a faculty retreat focused solely on this problem and appointed a faculty committee led by my associate dean for academic affairs to formulate a plan.

We are remaking the freshman and sophomore years. Our plan includes better faculty advisement for undergraduates, an updated and more flexible curriculum including exciting engineering classes in the first two years, reduction of prerequisites to make room for free electives and minors, and more innovative instruction from our full-time and best faculty employing real world examples from industry. We have begun a new series of seminars for freshman. These seminars will feature speakers who can place engineering more in a societal context. It is important for the freshman students to meet and hear from "role models"—people of different ages and different careers who began their education by earning an engineering degree.

Freshmen engineering students often enter school without a clear picture of what engineering really is. Many receive poor or no information in high school, or earlier. I urge all engineers who read this to get involved and to take the time to talk to high school and younger students about engineering. A student who has received some mentoring before going to university is far less likely to drop out of engineering.

## Conclusion

In a university environment, it is important to motivate faculty to buy

into a strategic plan and participate in its implementation. Building a faculty consensus is the key. As a private school, we must pay more attention to our alumni base for they are critical to the success we are aiming for. We need their advice and support to help us build excellence in the school. Lifting up the school adds value to their degrees and makes them feel proud. You have to lead by example. You have to be honest and straight with the faculty and justify decisions based on the strategic plan you have in place. In the end, success doesn't just depend on the quality of your plan, it also depends on how well you execute that plan. And in order to execute, you must rely on others.



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