V. Narayanamurti's Remarks at the FAS Faculty Meeting

May 16, 2006

Regarding the Future of DEAS

Thank you, Bill.

I would like to talk to you today about Engineering and Applied Sciences at Harvard – the role of these disciplines here and in the wider world; where we are today; and the way forward for us.

I. LOOKING BACK

Just to provide some historical perspective, DEAS traces its roots back to the Lawrence Scientific School, created in 1847. Lawrence, an industrialist, saw the need to train the next generation of students in a new way. This marked Harvard's first major effort to provide a formal, advanced education in science and engineering. The Lawrence School eventually became a model for professional scientific and graduate education in the United States.

This program received a major boost near the turn of the 20th century, when Gordon McKay – also an industrialist – provided a substantial endowment for engineering at Harvard. In the mid 1940s, the University's efforts in engineering and applied sciences were consolidated into a Division of Engineering and Applied Physics and became a part of FAS, very much like what we have today. McKay's gift has grown to support 42 professorships and enables DEAS to enjoy a great deal of autonomy

When Deans Jeremy Knowles and Nancy Maull visited Santa Barbara in January 1998 to recruit me, they emphasized that Harvard recognized the importance of strengthening its programs in engineering, especially computer science and electrical engineering. It was the potential to renew and reinvigorate these programs, the McKay endowment and the commitment to new facilities like Maxwell Dworkin, along with Harvard College's

stellar undergraduate students and FAS' strong traditions in basic sciences, that attracted me here.

II. RENEWAL AND GROWTH

I am pleased to report that, today, engineering and applied sciences at Harvard are stronger than ever. Foundational areas such as Applied Mathematics and Applied Physics have been enhanced. Other key areas such Electrical Engineering and Computer Science have also been greatly bolstered. Bioengineering is beginning to emerge as a significant program. Our interdisciplinary focus and boundary-less structure – DEAS has no departments – continues to be successful. Our undergraduate programs have been expanded and strengthened and our graduate enrollment has nearly doubled.

Most important, we have enhanced our role as an integrator and connector. Our traditionally strong ties to disciplines such as physics and mathematics have been augmented through new relationships to other parts of FAS and Harvard. Thus we have worked with biologists in FAS and HMS to develop a University-wide initiative in Computational and Systems Biology; we are collaborating with clinicians at the teaching hospitals and other parts of HMS to establish the Harvard Institute for Biologically Inspired Engineering. We have established a joint PhD program on Information, Technology, and Management with HBS and are partnering with colleagues at HLS and elsewhere on activities in the area of computation and society.

We have also always been part of the liberal arts educational tradition at Harvard. Faculty members from the Division teach classes in the core and freshmen seminars, in addition to electives in Quantitative Reasoning and Science.

At the same time, we are also changing the way we educate engineers. Engineering today, in the way it interacts with other disciplines and with everyday problems, can properly be seen as both a professional field and a liberal art. I call this the concept 'renaissance engineering'. It translates into broad, collaborative, innovative, and experiential learning – and such an approach naturally blends with Harvard's mission.

III. IMPLICATIONS FOR HARVARD

As the role of engineering and applied sciences becomes increasingly important for the world, there are three main implications for us at Harvard:

First, continued investment in engineering and applied science is needed to help drive progress in science and even many other fields of knowledge. New tools are essential for scientific discovery and for the progress of applied science. We only need to think of Nuclear Magnetic Resonance (NMR), the scientific foundation for modern MRI. That was pioneered by our own Bloembergen, Purcell, and Pound more than 50 years ago.

Second, continued investment in engineering and applied science is necessary for meeting societal needs. More importantly, training broadly-educated, world-class engineers will be critical to our future.

Third, technology is also playing an ever-greater role in the lives of our undergraduates. As these students go out into the world, it is critical for them to be more than just users of technology – all undergraduates must have some level of technological literacy and an understanding how technology is shaping and being shaped by the world.

To quote Thomas Friedman from *The World is Flat*: "I'm not saying that every politician needs to be an engineer, but it would be helpful if they had a basic understanding of the forces that are flattening the world." I believe this is true not just of politicians, but also of tomorrow's lawyers, doctors, political scientists, historians, sociologists, etc.

At the same time, we also have to continue to change the way we educate engineers, ensuring that they not only master the necessary skills in engineering and applied sciences but also are more familiar and responsive to societal issues and concerns.

We cannot be a great global university if we don't have research and educational programs commensurate with the changing needs of the times.

IV. LOOKING FORWARD

In light of all of this, I believe we need to take the Division to the next level. At the most elemental level, this continued transformation has two facets:

The first facet is scale: While we have come a long way over the past decade, we still need to strengthen our research presence in a number of strategic areas. We also need to enhance the scope of our undergraduate education programs in line with what I mentioned earlier... all of this will take faculty growth.

But let me put the scale of Harvard's program in engineering and applied sciences into context. If I round up and count our entire participating faculty, we have about 70 FTEs in the Division. The two engineering programs that I consider my peers, CalTech and Princeton, have about 110 and 125 faculty members, respectively. MIT, that small school down the road, has about 360 engineering faculty -- and has added 80 in the last seven years.

I am pleased to report that despite our smaller faculty presence our research strengths shine through: we have some of the most cited faculty in their areas and the selectivity of our graduate programs is among the highest in the country. But quality cannot always compensate for scale.

The second facet is visibility. Enhancing our visibility outside Harvard is critical to our future; it will allow us to continue to attract the kind of faculty and students we want at a time when all major engineering schools in the country are expanding their programs. The issue of visibility has been specifically highlighted in the reports of our last two Visiting Committees in 2002 and 2005, which strongly recommended that the Division be renamed into a School of Engineering and Applied Sciences within FAS.

This is not a radical idea. In fact, all major engineering programs in the country reside in their own schools. This is also true of all the Ivy Leagues, with the exception of Brown.

As a senior faculty member in the Division said, creating a Harvard School of Engineering and Applied Sciences would put an end to pesky (but non-trivial) questions such as “Harvard has engineering?” and “What’s a Division?” As the Visiting Committee highlighted, this would also “announce to the world that engineering and applied sciences at Harvard have come of age.”

This evolution has been under discussion at various levels of the University over the last few months, with support and encouragement from the Board of Overseers, the Corporation, President Summers and President Bok. Provost Hyman, Dean Kirby, and I fully support the idea. Within DEAS, I recently created a senior and a junior faculty committee to formally examine the issues surrounding the possibility of becoming a school and to focus and develop a mission and vision for our programs. The committee members were unanimously supportive of such a step, and the broader DEAS faculty has also been enthusiastic about it, while emphasizing that the need to maintain close connections with FAS and Harvard College.

As Harvard is a place of tradition, I want to emphasize that this transformation is not a departure from history – in some sense, the wheel is coming a full circle. The Lawrence School will be reborn, but in a new form appropriate for the 21st century – rooted in this faculty, nimble and interdisciplinary, connected to the professional schools, and directed towards discovery, innovation, and impact on society.

Thus, ultimately the renaming of DEAS to a school will raise the prominence of the program both within the university and nationally – and most important, allow Harvard to do an even better job of what it already does so well: give students a well-rounded education and use its intellectual resources to make a positive contribution to the world.

Thank you.