

# The Mentoring of Assistant Professors<sup>1</sup>

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We are at a crossroads in Engineering, both in its academic manifestation and in industrial practice. This essay focuses primarily on the former, but also will cite problems in the links between the two. I am writing this after having spent about ten years in academe, with eight years prior in engineering consulting practice. I am certain that much of what I will write will draw opposition since it runs counter to what exists, which I maintain is ineffective. Perhaps open minds will use these ideas as a basis for discussion and evolution.

Current Engineering scholarship in academe is similar to other academic scholarship. The field is divided into fields, and sub fields, (subsub fields, etc.) and a multitude of specialties within which the faculty are aligned, perform research and instruction. Because Engineering is inherently viewed as applied, it can attract significant financial support from federal and state governments and industry. Much faculty effort must be expended writing proposals, securing funding to support one's graduate students, summer salary, travel to professional conferences, equipment purchases, the purchasing of supplies, even sometimes phone service.

Of course, a large slice of the pie is overhead, by which we pay for our electricity and the space in which we work<sup>2</sup>. But then, the state of academic Engineering is one that has been accepted by us *de facto*. It is one that has essentially evolved since the end of W.W.II, in particular since the beginning of the space age.

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<sup>1</sup> Copyright 1999 by Haym Benaroya. This essay is based on an earlier version I wrote (anonymously) in 1988 and another briefer version written (with byline) in 1995.

<sup>2</sup>As an aside, I put the following question to the reader: Why of all professions (others: law, medicine, business) must Engineering graduate students be paid to earn their graduate degrees? One answer is that there are many jobs available for engineers who hold only a BS, whereas the other professions require a graduate degree for entry. Can part of the answer also be that this is an indicator of the kind of practice that expects the graduate Engineer? Other professionals are rarely treated as commodities, whereas engineers are hired and laid off on a regular basis.

I will explore here the mentoring of young faculty, the process of which I maintain is the key indicator of how prominent a college of engineering (COE) is or will become, how good its graduates will be, in particular its Ph.D. graduates, and finally how positively industry will view the faculty of the COE as a valuable resource for helping it to solve its applied problems.

Generally, a newly hired Assistant Professor is given a chance at two 3-year contracts, at the end of which tenure may be granted. Specifically, the first renewal is decided during the third year, and whether to proceed with tenure during the fifth year. This young faculty must, within a year or two of being a graduate student, become competent at initiating, performing and guiding research, understand the intricacies of grantsmanship, become an effective teacher, and become involved in various services to the profession, the department and the college.

Many young faculty enter this process headlong, with little guidance, spreading themselves very thin, finally not being very effective across a broad spectrum of activities. It is generally assumed that "the best" will succeed. We all know that this is not always true. Only those who are effective at juggling will succeed, and in particular those who can fund themselves have the highest probability of going on to the next step. But is this process fostering the *right skills* in our young faculty? My answer is no!

I suggest the following as a viable mechanism not only to properly mentor young faculty, but also as a way to build a world-class department and COE from the ground up. During the first three years as an Assistant Professor, the young faculty should be given free reign to do research and teach. One expects that much remains unanswered from the new faculty's doctoral research. Now is the time to develop individual research, without input from the former advisor and *without graduate students*. We must find out how good the young Assistant Professor is at independent research. The young Assistant Professor will have two to three years to continue and initiate independent research, thus creating a name and visibility for his or her own ideas. This needs to be done before this Assistant

Professor can be expected to guide students. No students should be adopted until the second three-year contract.

In addition, only a modest number<sup>3</sup> of proposals for funding should be encouraged. Of course, there are exceptions, perhaps for those with postdoc experience, but a proposal for research should come after some ideas are developed. It is extremely rare that one can propose research of great depth one or two years after completing one's Ph.D. Lastly, during the first three years, young Assistant Professors need to firm their grasp of the basics which they are asked to teach.

The dual: *research and teaching*, are given an incubation period during which knowledge and skills can be solidified and honed. During the second 3 years, our matured Assistant Professor can adopt one or two graduate students to work with and to mentor. Additionally, several well thought out proposals are now easy to write and easy to place, since there is something new to offer and the Assistant Professor is better known via the several papers already published<sup>4</sup> and several technical conferences attended.

By the end of six years, we will have a mature researcher, with a significant line of research, who has mentored several graduate students, and likely has some funding. One has in this person the beginnings of a world-class scholar. Multiply this by the number of new Assistant Professors hired, and you begin to see how a world class Engineering College begins to evolve. The current and predominant method can succeed only haphazardly but, more importantly, the proposed paradigm will result in fewer mistakes.

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<sup>3</sup>One or two, if any, during the first three years, except for those specifically targeted at young faculty, such as equipment grants and the NSF CAREER Awards.

<sup>4</sup>published alone, without dissertation advisor, other faculty or a student.