~~Three~~ Five ~~10~~ 25 Numerous Steps to an engineering deanship

relatively? common

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Pity the university engineering dean who has a child, grandchild, godchild, niece, nephew, or close family friend in middle school. Chances are, sooner our later, Eighth-Grade Career Day will roll around, and the dean, this veritable paragon of pedagogy, will end up in front of a roomful of fidgety 13- and 14-year-olds, flanked by a firefighter, an airline pilot, and a veterinarian cradling a three-legged puppy.

But *that's* not the pitiful part. The real indignity arrives with that most inevitable (and innocent) of queries: *How does someone get to be an engineering dean?*

"Good question," the dean replies, pausing for a well-timed bout of throat clearing, arm crossing, and forehead rubbing. Before long, the esteemed guest speaker is squirming more than the young audience.

Obviously, the dean knows full well how *he* reached the lofty position. (Sadly, it's almost always "he," but more on that later.) The hemming and hawing stems from a recognition that the route he took is by no means the only route — or even the *best* route.

Such is the paradox of leadership in academic engineering: Few disciplines, of course, match engineering's penchant for precision, predictability, and practicability. Bound by a dizzying array of industry protocols and government regulations (not to mention the immutable laws of physics), its practitioners approach design specifications, schematic diagrams, and international standards with a zealous reverence usually reserved for religious texts. The rigidity and exactitude that characterize the profession, however, are largely absent from the process that yields the discipline's highest-ranking educators. Indeed, calling it a "process" is a misnomer.

Read the full study

The absence of a prescribed – or even preferred – pathway to the leadership ranks of academic engineering is examined in a study that appears in the winter issue of *The Bridge*, the quarterly journal of the National Academy of Engineering. The study traces the ascents of 186 deans, all signatories to a major diversity initiative announced three years ago by the American Society for Engineering Education.

NATIONAL ACADEMY OF ENGINEERING

Although the deans of the nation's 300-plus accredited engineering schools share many characteristics — the vast majority, for example, hold doctorates, and most cut their teeth as classroom instructors — they took a variety of paths to the top.

The absence of a prescribed — or even preferred — pathway is examined, and confirmed, in a study appearing in the winter issue of *The Bridge*, the quarterly journal of the National Academy of Engineering (NAE).

The study traces the ascents of 186 current U.S. deans, chosen because they were signatories to a major diversity initiative announced three years ago by the American Society for Engineering Education (ASEE).

Among the study's key findings:

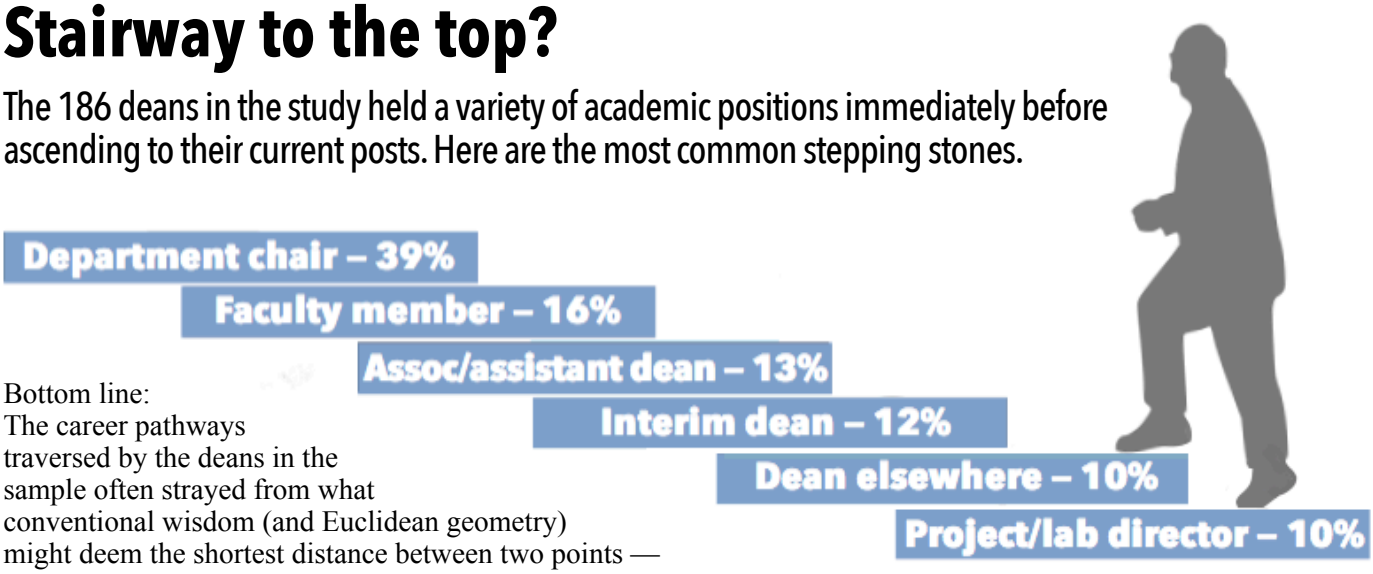
- Nearly one-third of the deans in the sample were born and/or educated overseas. The cosmopolitan flavor of academic engineering's C-suite can be attributed in large part to the Immigration and Naturalization Act of 1965, which set the stage for influxes of aspiring engineers from India, South Korea, and Iran — and, over time, their similarly inclined (and equally talented) relatives.
- Although a plurality of the deans (12) hold doctorates from MIT, the group as a whole obtained Ph.D.'s from no fewer than 83 universities — a hodgepodge of institutional heavyweights and academic up-and-comers. Attending the "right school" — especially the right doctoral-granting university — strengthens one's candidacy for a deanship in engineering, but the circle of the elite institutions from which to begin one's career is neither especially small nor fixed in its membership.
- Fifty-seven percent of the deans worked outside academia — in industry, government, or the nonprofit sector — at some point in their engineering careers. Given recent discussions in the academic engineering community about the relevance and "real world" applicability of curricula, pedagogy, and learning formats, as well as the workplace readiness of engineering graduates, a stint as a practicing engineer outside academia may add to advancement prospects as an academic engineer.
- The deans held a variety of academic positions immediately before ascending to their current posts. The most common stepping stones, in descending order: department chair, 39 percent; faculty member, 16 percent; associate or assistant dean, 13 percent; interim dean, 12 percent; and, tied at 10 percent, dean at another institution and project or laboratory director.
- Close to two-thirds of the deans in the study were "outside" hires, meaning they weren't employed at their current schools immediately prior to their appointments. More precisely, 44 percent moved from less prestigious institutions, as defined by *U.S. News & World Report*'s closely watched annual collegiate rankings. Forty-one percent relocated from peer institutions, 12 percent came from higher-ranked schools, and 3 percent came from nonacademic entities.

Deans' doctorates come from a wide range of universities

Doctorates obtained by the deans:	Schools that awarded the degrees:
13	MIT
8	Berkeley, Stanford University
7	University of Michigan
6	Caltech
5	Georgia Tech, NC State University, PennState, Rice, Virginia Tech
4	Carnegie Mellon University, University of Minnesota, Ohio State
3	University of Cambridge, University of Cincinnati, Cornell University, University of Colorado Boulder, University of Notre Dame, Purdue University, Texas Tech University, University of Texas at Austin
2	17 universities
1	45 universities
3	Unable to determine
1	M.B.A. other than Ph.D.

Stairway to the top?

The 186 deans in the study held a variety of academic positions immediately before ascending to their current posts. Here are the most common stepping stones.



Bottom line:
The career pathways traversed by the deans in the sample often strayed from what conventional wisdom (and Euclidean geometry) might deem the shortest distance between two points — namely, a *straight line*.

No surprise there. In fact, the reason should be obvious to any first-year engineering student: The straight-line dictum that Archimedes put forward more than 2,200 years ago is valid only when both points lie on the *same plane*. When the points lie on spheres or other shapes with more than two dimensions, all bets are off.

The 186 deans featured in the study didn't start on a level playing field (i.e., the same plane). Far from it.

Some are products of K-12 schools that remained characterized by racial segregation and unequal funding and resources well after *Brown v. Board of Education, Topeka.* More often than not, most of them were the only or one of very few women of color in engineering programs, both as students and as professors.

Not surprisingly, therefore, the leadership ranks of academic engineering lack the gender and racial diversity seen in the top tiers of some other disciplines, including, most notably, teacher education and the arts and sciences. Eighty-two percent of the deans in the engineering study are male, and 74 percent are white.

If the profession's proverbial pipeline is any indication, those demographic disparities aren't likely to disappear anytime soon.

Optimists — those who view the pipeline as "half-full," if you will — note that the percentage of engineering deanships held by women is virtually identical to the corresponding figure in academic medicine, which in recent years has earned generally high marks for its pursuit of gender diversity. That's true, but women are joining med-school faculties at a pace that far surpasses the rate at which their engineering counterparts are entering academia. From 2001 to 2015, the number of female faculty members at U.S. med schools jumped by more than 34 percent. In comparison, from 2006 to 2014, the nation's engineering schools saw an increase of only 4 percent.

As for academic engineering's racial breakdown, African Americans and Hispanics constitute just 2.3 percent and 3.7 percent, respectively, of U.S. faculty positions — and those figures have barely budged in a decade. The numbers would be even worse but for the engineering programs offered at the nation's historically black universities and colleges as well as institutions in Puerto Rico.

Professional advancement for women in general and African American women in particular has been slow in academic engineering, notwithstanding the good-faith efforts of individuals and organizations to improve that condition. One example of such efforts: last summer's installation of an African American woman, Stephanie Adams, as ASEE's president.

Ideally, this study will suggest areas for improvement to expand access and enhance representation so that he people in these important positions better reflect the vibrant diversity of their students and the population. It's possible, for example, that academic engineering's ongoing push for greater gender and racial diversity needs to be focused on children in earlier stages of the K-12 continuum.

And *certainly* before Eighth-Grade Career Day rolls around.

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