

# Small step — or giant leap?

Are academic engineers and their STEM-trained colleagues quietly retooling the leadership of American higher education?

Jeffrey G. Harris ■ Richard A. Skinner

**F**ifty years ago, at 9:32 a.m. EDT on July 16, 1969, Neil Armstrong and Edwin “Buzz” Aldrin Jr. embarked on a 240,000-mile odyssey that captivated the world. Their once-unimaginable destination: the surface of the moon.

Along with command-module pilot Michael Collins, the appointed moonwalkers lifted off from Pad 39A at Florida’s Kennedy Space Center, propelled by 203,400 gallons of high-grade kerosene, 318,000 gallons of liquid oxygen, and the collective brainpower of some 7,200 NASA

engineers — not to mention an estimated 400,000 engineers, scientists, and technicians from more than 20,000 companies and universities.

Armstrong and Aldrin alone accounted for no fewer than four engineering degrees: a BS in mechanical engineering from Purdue University (Armstrong), a BS in mechanical engineering from the U.S. Military Academy (Aldrin), an MS in aerospace engineering from the University of Southern California (Armstrong), and an ScD in astronautics from MIT (Aldrin).



Although the combustion of the kerosene and liquid oxygen produced a bone-jarring, bird-scattering 7.5 million pounds of thrust, Armstrong, a future engineering professor, and Aldrin, the first U.S. astronaut to boast a doctorate, almost certainly would have argued that their educational backgrounds packed the bigger punch.

They knew, after all, that virtually all of the Americans who had preceded them into space shared the same two vocations: aviator and engineer. They were fully aware that, but for their own engineering credentials, they wouldn't be strapped to the tip of an ascending Saturn V rocket, headed for the moon's "Sea of Tranquility" — and the history books, one way or the other. They also recognized that, in contrast to the rocket's fuel-filled first stage, which was designed to burn out and plunge toward the Atlantic just 168 seconds after ignition, their academic bona fides would deliver a lifetime of otherwise out-of-reach opportunities.

Armstrong himself would later put it this way: "I am, and ever will be, a white-socks, pocket-protector, nerdy engineer, born under the second law of thermodynamics, steeped in steam tables, in love with free- body diagrams, transformed by Laplace, and propelled by compressible flow."<sup>1</sup>

A half-century after Armstrong and Aldrin became the first two humans to set foot on the moon, engineering has emerged as a favorite launch pad for another group seeking to ascend to lofty, if not celestial, perches that relatively few mortals could dream of reaching. Like their NASA counterparts, these gravity-defying overachievers spend years training for high-stakes missions that are, by all accounts, growing ever more complex. Missteps or malfunctions will no doubt force some of these men and women to abort their journeys. Others will end up earning ticker-tape parades — and additional trips aloft.

We're referring, of course, to *university presidents*.



NASA

**D**espite pop-culture portrayals of the nation's pioneering astronauts as swashbuckling flyboys who trusted their guts more than their gauges, most were detail-oriented eggheads who excelled in the classroom and/or the lab as much as — or *almost* as much as — the cockpit.

## Oh, the humanities

A new study by the global recruiting firm Harris Search Associates reveals that the top floor of the ivory tower, once the near-exclusive domain of humanities scholars extolling the virtues of a classical liberal arts education, now houses an unprecedented number of chief executives trained in engineering — men and women who spent the bulk of their college years immersed not in the Socratic method, the Hobbesian trap, and the Chalcedonian definition but rather in the Kelvin scale, the Faraday constant, and the van der Waals force.

According to the Harris Search study, commissioned to mark the 50th anniversary of Apollo 11's historic mission, engineers

preside over nearly 15 percent of the 300 institutions that made *U.S. News & World Report's* 2019 ranking of “best national universities.” The corresponding figure in 1969: barely 4 percent.

If that statistic doesn't rattle higher education traditionalists, another of the study's findings might: More schools on the *U.S. News* list are overseen by engineers than by anthropologists, communication theorists, economists, English scholars, geographers, historians, linguists, philosophers, sociologists, and theologians — *combined*.

To be clear, higher education's C-suite is not at risk of becoming some galactic, pedagogic version of NASA's astronaut corps. Of the more than 300 Americans who have borne the title “astronaut” since the

program's creation in 1959, a full two-thirds started out as engineers. In contrast, non-techies still constitute a clear majority of academia's CEOs — and that's not likely to change anytime soon. Unlike present-day NASA, which requires astronauts to possess at least a bachelor's degree in engineering or a closely related STEM field, no major comprehensive university — that is, no research institution that awards undergraduate and graduate degrees in a variety of disciplines — has publicly expressed a desire to limit presidential searches to candidates from high-tech fields.

Still, there's no mistaking that plenty of academic engineers are going — boldly or not — where few academic engineers have gone before.



PHOTO ILLUSTRATION

**A**t the end of the 2018-2019 academic year, more of the nation's top research universities were overseen by engineers than by anthropologists, communication theorists, economists, English scholars, geographers, historians, linguists, philosophers, sociologists, and theologians — *combined*.

## Roots of science friction

In the earliest days of American higher education, conventional wisdom held that the moon was covered by continents and oceans and that colleges and universities were to be led by clergy — no surprise, perhaps, given that most of the nation’s oldest postsecondary institutions were founded by, or for, religious groups. Indeed, all but one of colonial America’s nine chartered colleges were sectarian. (The only exception: the College of Philadelphia, now known as the University of Pennsylvania.) Like the British universities on which they were modeled, these institutions were intended to groom the elite for leadership roles in government or the church. Students received what the academician Audrey L. Rentz described as a “classical liberal arts education with little science and much orthodox theology.”<sup>2</sup>

Over time, as public universities began to pop up and mainline Protestant schools became more secular, institutional governing bodies started to eschew administrators who were steeped in — and dedicated to — theology, piety, and conformity. Societal evolution and scientific discovery began to engender “diversity and differentiation.”<sup>3</sup>

The transformation was hastened in the second half of the 19th century by two key developments: the introduction of the “German model” of higher education, which emphasized the expansion of knowledge through research, scholarship, and the conferral of advanced degrees, and the passage of the Morrill Act of 1862, which led to the establishment of publicly supported “land-grant” institutions. The resulting schools embraced research, service, and teaching, including instruction not only in what the legislation characterized as “scientific and classical subjects” but also in “such branches of learning as are related to agriculture and the mechanical arts.”<sup>4</sup>

Throughout the 1900s, the proliferation of colleges and universities continued, spurred by population growth, socio-economic

modernization, and the widespread pursuit of opportunity and prosperity. Many institutions, old and new alike, scrambled to expand degree programs and course offerings, if only to keep pace with a flurry of transformative breakthroughs in science and technology. Higher education’s presidential ranks grew and evolved, too — though much more slowly. Since appointing bodies tended to prioritize leadership experience and institutional continuity above all other factors, most “new” hires mirrored their predecessors — in academic pedigree, in worldview, and in subject-matter expertise.

## A matter of degrees

The upshot: Notwithstanding the occasional notable exception, university presidents continued to come from “traditional” disciplines such as economics, law, history, politics, and education. Indeed, for much of the 20th century, the most formidable force for change in campus leadership wasn’t the maturation of various science- and technology-based fields but rather the emergence of an altogether new (or at least newly defined) discipline: higher-education administration.

In a 2017 report on the modern university presidency, Deloitte’s Center for Higher Education Excellence reduced the role’s evolution to five distinct phases, or periods, each identified by a distinguishing characteristic.<sup>5</sup> In the 1800s, according to Deloitte’s timeline, the typical campus chief executive was The Faculty Member, a clergyman who split his time between teaching and running the institution.

Then came The Administrator (1900-1944), a chief executive adept at managing increasingly complex academic operations. After World War II and the passage of the GI Bill, a spike in student enrollment gave rise to The Builder (1945-1975), whose forte was envisioning and erecting much-needed structures, both physical and administrative.

Subsequent reductions in direct state appropriations produced The Accountant (1976-2008), a de facto fiscal agent focused on cutting overhead, raising money, and forging cost-sharing partnerships. Since 2009, the institutional reins have been in the hands of The Multidisciplinarian, academia's answer to baseball's utility infielder — i.e., someone capable of juggling multiple responsibilities.

If and when Deloitte identifies a sixth phase in the evolution of the college presidency, a strong case could be made for labeling it "The Engineer." Exhibit A: the aforementioned study by Harris Search Associates.

### The new space sage?

Harris Search, which specializes in the recruitment of campus executives, analyzed the highest degrees earned by the presidents or chancellors who, at the conclusion of the 2018-2019 academic year, were in charge of the 300 institutions that made *U.S. News & World Report's* most recent ranking of "best national universities."

The biggest takeaway from the study: Forty-four (or nearly 15 percent) of those CEOs are engineers by training.

The Harris Search analysis also makes clear that technology's foothold in the stratosphere of postsecondary leadership extends well beyond the 44 administrators who hold terminal degrees in engineering. An additional 72 institutions on the *U.S. News* list are led by administrators who earned their highest degrees in other disciplines that the U.S. Department of Education's National Center for Education Statistics classifies as STEM fields — areas such as physics, mathematics, and computer science.<sup>6</sup>

It's also worth noting that the foregoing list of institutions doesn't include top-tier national universities overseen by individuals who hold credentials in two other academic disciplines sometimes lumped into the



**F**orty-four of the 300 institutions on *U.S. News & World Report's* most recent ranking of "best national universities" concluded the 2018-2019 academic year with engineers at the helm. The roster of tech-savvy campus CEOs included, from left, Florida Tech President T. Dwayne McCay, onetime senior engineer and division chief at NASA's Marshall Space Flight Center; USC Interim President Wanda M. Austin, retired CEO of Aerospace Corp., a federally funded think tank dedicated to the development and evaluation of military space programs; and longtime California Santa Barbara Chancellor Henry T. Yang, formerly Purdue University's Neil A. Armstrong Distinguished Professor of Aeronautics and Astronautics.

STEM universe: medicine and dentistry. Expanding the STEM definition to include frontline medical practitioners adds 12 CEOs to the tech tally.

In other words, of the 300 universities that *U.S. News* classifies as the nation's best, 128 (or close to 43 percent) finished the 2018-2019 academic year with chief executives who bypassed American higher education's traditional, humanities-heavy leadership pipeline and instead emerged from STEM fields or the health professions.

## Rethinking the 'right stuff'

This new frontier of leadership development is particularly striking when viewed against the backdrop of history.

To put the contemporary figures in context, the authors of the Harris Search study also analyzed the academic credentials of the men and women who were leading those same “best national universities” 25 years ago — and 50 years ago, when Armstrong and Aldrin were preparing to walk on the moon.

(A caveat: Back then, of course, not all 300 institutions existed, at least not in their current forms. Some, for example, went by “college” instead of “university.” Some operated under altogether different names. Others had yet to gain their independence from statewide systems — or had yet to affiliate with such systems. Whenever possible, the researchers used precursor institutions. In the end, only four of the schools on the *U.S. News* list lacked a heritage traceable to 1969 — and two of those newcomers were up and running by 1994.)

At the conclusion of the 1993-1994 academic year, 28 of the institutions in question were overseen by engineers.

At that point, the academic disciplines that shaped the greatest number of campus CEOs were, in descending order, education/school administration (in which 44 individuals earned their highest degrees); law (26); divinity/theology (25); history (22); economics (17); political science (16); business (13); English (13); and philosophy (9). Among the senior administrators were experts in classical French literature, German literature, and Greek literature, respectively.

Fewer than half as many institutions — 13 — ended the 1968-1969 academic year with engineers at the helm. The most popular presidential springboards were law (in which 51 individual held degrees); history (32); divinity/theology (28); political science (22);

English (17); economics (16); business (11); and philosophy (5).

Fifty years ago, only one of the 50 highest-ranked schools on the *U.S. News* list — Rensselaer Polytechnic Institute — was led by an engineer, and just 15 were overseen by administrators from other STEM fields. Moreover, non-techies were in charge several universities that are now synonymous with STEM education, including MIT, Louisiana Tech University, Rochester Institute of Technology, and the University of Alabama in Huntsville, which was the academic home of renowned space scientist Wernher von Braun, chief architect of the Saturn 5 rocket.

## Multiple trajectories

Academic engineering’s newfound status as a wellspring of university presidents seems to be particularly pronounced among the nation’s premier doctoral institutions. The just-completed Harris Search study, coupled with an earlier analysis done by the recruiting firm, suggests that individuals trained in the STEM fields are far more likely to ascend to the presidencies at PhD-granting research universities than to the top jobs at liberal arts institutions, community colleges, or school with strong ties to Evangelical denominations.

The previous Harris Search study, which appeared in last winter’s issue of the *Journal of Higher Education Management*, focused on the Association of American Universities, an invitation-only consortium whose member institutions are considered the cream of the nation’s collegiate crop. Specifically, that study compared the individuals who led the AAU’s 60 U.S.-based member institutions in 1992 and 2017, respectively.<sup>7</sup>

In 2017, as in 1992, law ranked No. 1 among the academic disciplines favored by AAU presidents. In fact, the number of campus CEOs steeped in jurisprudence increased to 12 (or 20 percent) from eight (or 13 percent).

The biggest jump, however, was in the number of engineers, who accounted for 11 (or 18 percent) of AAU presidencies in 2017, compared with five (or 8 percent) in 1992.

Other “traditional” disciplines, such as linguistics, philosophy, and political science, saw their administrative influence wane. Most striking, though, may have been what the report’s primary author, Richard A. Skinner, described as the “near disappearance of historians from university presidencies.”<sup>8</sup>

Those findings mesh with the results of a 2009 study in which the Council of Independent Colleges (CIC) compared the academic backgrounds of presidents at independent liberal arts colleges with those of chief executives at PhD-granting research universities, public nondoctoral four-year institutions, and two-year community colleges, respectively.

“Only 6 percent of CIC presidents reported having earned a degree in the STEM fields, a substantial difference compared with public non-doctoral four-year institutions (16 percent), and doctoral institutions (public and private doctoral universities both reported 33 percent),” the report noted.<sup>9</sup>

## Engineering success

Why are so many research universities concluding that engineers and other STEM specialists possess the, ahem, “right stuff” — i.e., the qualities necessary to succeed in the hyper-competitive, money-driven, bureaucracy-prone environment that is 21st century higher education?

Although they might not constitute rocket science, at least not in the formal sense, the day-to-day challenges faced by contemporary university presidents are inarguably complex — and certainly more varied than anything encountered by their predecessors.

Whereas the traditional institutional leader was seen as a paragon of morality, propriety, and accomplishment in a given

academic discipline, the modern-day campus CEO is — or at least is *expected to be* — a problem solver of the highest order. Increasingly, the job seems to call for someone who can (1) process myriad streams of often-conflicting information, (2) develop a transparent, outcome-driven system to prioritize challenges, and (3) employ all pertinent data, including so-called “big data,” to evaluate, implement, and measure the effectiveness of various responses.

Firing on all cylinders, however, isn’t enough. At the risk of mixing metaphors, the successful 21st century president also must maximize circuit efficiency — figuratively, if not literally.

“Presidents are also increasingly tasked with leading their institutions to utilize technology — including online and hybrid courses, modular instruction, automated student advising systems, and predictive analytic software — and to create cost savings, educate more students, and increase efficiency,” the Aspen Institute concluded in its 2017 report *Renewal and Progress: Strengthening Higher Education Leadership in a Time of Rapid Change*. “But while technology has transformed aspects of operations in all institutions, higher education as a whole has been slower than other sectors to adopt technology and build the infrastructure necessary to derive efficiencies from its integration into the core functions of the college.”<sup>10</sup>

## Does it take a rocket scientist?

That the concentration of engineers is greatest in the leadership ranks of the nation’s elite research universities might further explain the phenomenon identified by the Harris Search study.

Obviously, the national universities that appear on the latest *U.S. News* list are locked in fierce competition — not only for bright and talented faculty members but also for federal research grants and philanthropic dollars.

Because of this ongoing, multifront battle for market share, the nation's preeminent universities are under enormous pressure to offer coursework in emerging fields such as robotics, nanotechnology, and artificial intelligence and to pursue potentially lucrative research — i.e., research that yields patentable intellectual property capable of closing funding gaps created by reductions in government support.

It's possible that university search committees and appointing bodies subscribe to the notion, maybe even subconsciously, that engineers are uniquely equipped to develop, expand, or market programs in emerging fields. Similarly, such administrators might be viewed as ideal drawing cards for tech-savvy matriculants and/or as quintessential poster boys/girls for life-enhancing (and, ideally, income-generating) research projects.

No one is arguing, of course, that other postsecondary establishments — e.g., liberal arts institutions, community colleges, and church-operated schools — are free from competitive pressure. However, because they pursue more narrowly defined missions, because they enjoy “built-in” constituencies, and because they focus on instruction as opposed to research, their imperative to be The Latest and Greatest is not so all-consuming.

## Getting down to business

Critics who lament the commercialization of higher education are sure to suggest that the uptick in tech-trained university presidents is a reflection of the academy's growing infatuation with the corporate sector, which, by most any measure, has embraced engineering as a cradle of executive talent.

Last fall, for the second straight year, engineers outnumbered MBA recipients on the *Harvard Business Review's* annual ranking of the world's top 100 chief

executives.<sup>11</sup> Similarly, engineering is now the most common undergraduate degree among Fortune 500 CEOs.<sup>12</sup>

Yet another theory for the rise of the engineer in higher education leadership is articulated by Richard K. Miller, founding president of Olin College, a private engineering school that opened in Needham, Massachusetts, in 2002.

Miller contends that over the past 30 years, curricular revisions have undercut the ability of non-STEM students to obtain a well-rounded education — i.e., the kind of education that would befit a campus CEO. Unfortunately, Miller says, too many well-regarded universities allow humanities majors to fulfill their degree requirements by taking dumbed-down courses in math, science, and other subjects that supposedly aren't germane to their career aspirations.<sup>13</sup>

“There are lots of physics-for-poets sorts of courses out there, but there aren't any courses in history or English or philosophy for STEM majors,” Miller told *Nautilus* magazine. “You have to take the same English, history, and philosophy course that the majors in those disciplines take in order to complete those general education requirements.

“Over time, what's happened, I believe, is that the competence in the STEM fields of college graduates in America has weakened, but the competence in the verbal and social science fields has not. That really means that, at the end of the day, it's the engineering graduates who still have the well-rounded rigorous background in all disciplines that used to be there for all majors.”

## Houston, do we have a problem?

Regardless of what precipitated it, the emergence of engineers as a new — and potentially disruptive — force in the governance of American's most respected research universities does raise several important questions.

Will the current boom in high-tech presidents and chancellors permanently reshape higher education leadership, or will the academy's apparent fascination with data-driven decision-making (aka administration by algorithm) fizzle like the first stage of a Saturn V rocket?

Will higher education's seeming preoccupation with immediate, measurable signs of institutional improvement fundamentally change the way the academy operates? Might some of the nation's oldest, most esteemed universities start to resemble publicly traded startups scrambling to beat analysts' quarterly projections?

What are the implications for academic units that train engineers and for those

dedicated to instruction in, say, history, philosophy, and linguistics? Should they alter their curricula and pedagogical protocols — or double-down on their traditional strengths?

While the answers to such questions might not come into focus for years, one thing is clear: Through their heightened visibility, their direct influence on curricular development, and their off-campus advocacy of scientific and technological advancement, the current crop of engineers-turned-presidents is sure to influence and inspire not only the next generation of postsecondary leaders but also young people as a whole — just as Armstrong and Aldrin did a half-century ago. ■

## Sources

- <sup>1</sup> Krulwich, Robert. "Neil Armstrong Comes Home." NPR. August 27, 2012. <https://www.npr.org/sections/krulwich/2012/08/27/160118311/neil-armstrong-comes-home>. (Laplace – Pierre-Simon Laplace – was an 18th century French mathematician, astronomer, and physicist best known for his investigations into the stability of the solar system. According to *Encyclopædia Britannica*, he applied Sir Isaac Newton's theory of gravity to explain why planets deviated from their theoretical orbits.)
- <sup>2</sup> Rentz, Audrey L., and Naijian Zhang. *Rentz's Student Affairs Practice in Higher Education (Student Affairs Practice in Higher Education)*. Charles C. Thomas, 2011.
- <sup>3</sup> Ibid.
- <sup>4</sup> "Colleges of Agriculture at the Land Grant Universities: Public Service and Public Policy" at NAP.edu. National Academies Press: OpenBook. <https://www.nap.edu/read/5133/chapter/2>
- <sup>5</sup> Selingo, Jeffrey J., Sonny Chheng, and Cole Clark. *Pathways to the University Presidency: The Future of Higher Education Leadership*. Report. Stamford, CT: Deloitte University Press, 2017. 4-6.
- <sup>6</sup> "Web Tables—Science, Technology, Engineering, and Mathematics (STEM) Graduates: Where Are They 4 Years After Receiving a Bachelor's Degree?" <https://nces.ed.gov/pubs2018/2018423.pdf>.
- <sup>7</sup> Skinner, Richard A. "A Profile of and Generational Change in the Leadership of American Research-Intensive Universities." *Journal of Higher Education Management* 33, no. 2 (December 2018): 136-44.
- <sup>8</sup> Ibid.
- <sup>9</sup> Hartley, Harold V., III, and Eric E. Godin. *A Study of Career Patterns of the Presidents of Independent Colleges and Universities*. Report. Washington, DC: Council of Independent Colleges, 2009. 11-12.
- <sup>10</sup> "Renewal and Progress: Strengthening Higher Education Leadership in a Time of Rapid Change." The Aspen Institute. May 15, 2017. <https://www.aspeninstitute.org/publications/renewal-progress-strengthening-higher-education-leadership-time-rapid-change/>.
- <sup>11</sup> Harvard Business Review Staff. "The Best-Performing CEOs in the World 2018." *Harvard Business Review*. October 23, 2018. <https://hbr.org/2018/11/the-best-performing-ceos-in-the-world-2018>.
- <sup>12</sup> "What Are The Most Common Majors Of Fortune 500 CEOs?" StraighterLine. May 19, 2017. <https://www.straighterline.com/blog/common-majors-fortune-500-ceos/>.
- <sup>13</sup> Segal, Michael. "Ingenious: Richard K. Miller - Issue 40: Learning." *Nautilus*. September 29, 2016. <http://nautilus.com/issue/40/learning/ingenious-richard-k-miller>.

**About Harris Search Associates**

**Harris Search Associates** is a leading global executive search and talent advisory firm. Established in 1997 by Jeffrey G. Harris, the firm focuses on the recruitment of senior leaders to support the growth of the foremost universities, research parks, institutes, national laboratories, academic health centers, hospital enterprises, and organizations driving global innovation and discovery. Based in Dublin, Ohio, a suburb of Columbus, Harris Search Associates maintains satellite offices in Dallas and San Francisco. The firm is a shareholder member of IIC Partners, one of the largest global retained executive search organizations, with 43 offices in 29 countries.

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