MIT Faculty Newsletter

in this issue we offer analyses on how the Institute is functioning: "Women at MIT" and "Is This Any Way to Run a University?" (below), and "Diversity is Not Enough" (page 9); Faculty Chair Susan Silbey on "The Obligations of Citizenship" (page 4); a report on federal R&D funding from MIT's Washington Office (page 10); and a new feature from Dr. Emeritus Beaver (page 17).

MIT Commencement

Women at MIT

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AS MIT WELCOMES ITS incoming students, 46 percent of whom are women, it also bids farewell to almost the same percentage of young women who are graduating from MIT. What future awaits these women at MIT and beyond as they immerse themselves in a university and in professions that are traditionally associated with men and their ways of achieving success? In the context of the global #MeToo movement, it is ever more crucial to face our challenges and continue to create a culture of inclusion and safety – which are necessary for our students to thrive, not only while they are at MIT, but beyond it as they go out into the world.

What is appallingly clear by now is that cases of sexual harassments are not episodic events that occur outside of the everyday, but rather are part of the struc-

Is This Any Way to Run a University?

Ruth Perry and Yarden Katz

IN 1972, WHEN I (RUTH PERRY) first came to MIT, the federal government – and especially the Department of Defense (DOD) – subsidized the Institute's budget to a large extent. A number of faculty and students objected to the way this funding by the war machine changed research priorities and slanted educational objectives. As federal funding was withdrawn, the Institute increasingly turned to corporations for financial support. The change was not salutary. Federal funding had trickled down better; those DOD dollars sometimes subsidized the teaching of literature and philosophy and projects in the arts; and while there was unease about the agenda of the Pentagon's research, it seemed right and proper that the federal government should support higher education beyond the narrow scope of applied research.

Editorial
A Letter to the Class of 2018

GREETINGS TO YOU THE GRADUATES – and to your families!

We join with the thousands of family members and friends gathered for Commencement, in sharing the excitement of your graduation. MIT's Faculty value and take pride in your accomplishments as MIT's new class of 2018. Teaching and mentoring you has been a source of deep satisfaction. As you have learned and grown, absorbing and generating knowledge and conceiving new insights, so have we. Now, as you take the next steps along career paths, your contributions to your communities and to society will be among the most gratifying results of our academic efforts.

We hope you will look back on your years at the Institute aware that your presence and involvement enhanced the MIT environment and contributed to the

contents

Photo credit: *Page 1:* MIT Emergency Management

A Letter to the Class of 2018

experience of the coming classes. Note that by remaining active as alumni you can continue to have a positive impact on the Institute's work and environment.

You will be entering a world of considerable uncertainty and an increased level of social and political polarization. After the last presidential election, you rose to the challenges presented by the new administration and its method of governing. Many of you joined efforts to protect international members of our community from the threat of exclusion or deportation. You became attentive to issues such as immigration, climate change, nuclear disarmament, the reduction of global poverty, and the need to protect fundamental democratic rights. Many of you joined or supported the Women's March, the March for Science, and the March for Climate.

The values of scientific investigation and assessment, previously taken for granted, have now become arenas for contention and even denial. Defending these values will require the urgent involvement

of us all. In the international area, conflicts among nations that may have once seemed very far away have intensified. We have to take more seriously our responsibilities as citizens to ensure that our

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nation's actions in the world increase the prospects of peace and prosperity for the world's peoples, rather than undermining them.

During your years with us, we on the faculty have watched the burgeoning of your many talents, your creative ambitions, your resilience in the face of setbacks, your thoughtful and quirky self-expression, your creative and entre-

preneurial energy, and your myriad achievements. We hope that, as your various individual paths become clearer, you will put your powers to work on solving some of the problems that con-

front us all, and on making our society more responsibly productive and more supportive of those in need. On behalf of the entire faculty, we wish you vision, strength, commitment, wisdom, success, and much happiness in addressing these challenges.

**The Editorial Board
of the MIT Faculty Newsletter**

From The Faculty Chair

The Obligations of Citizenship

Susan S. Silbey

SEVERAL MONTHS AGO, President Rafael Reif asked me to lead a discussion at Academic Council about what we mean when we talk about the obligations of citizenship. With the assistance of HASTS graduate student Clare Kim (who has also been the TA for the class on "MIT and Slavery"), I put together some thoughts that I hoped would invite debate about our obligations as teachers and scholars to educate responsible citizens. I am sharing those notes in this final column of the year, with similar expectations to generate a wider discussion.

What do we mean when we use the word citizenship? For any cultural analysis, it is important to begin by collecting common uses. Over the centuries, there are some patterns in the use of the term citizen. We can start with the Latin roots in *civitas*, meaning "city." From there, we can see a thread of narrow conceptions of the citizen as a subject, a legal classification – for example, as a carrier of a passport – with no further specification or implication than the individual as being a subject of state power. There are broader conceptions also, though: citizen as a member of some entity, signifying inclusion rather than subjection, and thus connectedness. Here, the citizen exists in relation to others and thus incurs obligations, duties, responsibilities to the whole of which the citizen is a part.

Turning to an early reference of this sort, Aristotle articulated a form of citizenship grounded in the *polis*, arguing that human potential could be fully realized only within a political community, such as the Athenian city-state. Citizenship, by this usage, bestowed "the power to take part in the deliberative or

judicial administration;" however, "the good citizen should know and have the capacity both to rule and be ruled, and this very thing is the virtue of a citizen." However, because Aristotle believed that people played roles appropriate to their status within a (natural) social hierarchy, only some persons qualified as *politai* or citizens. For him, Athenian citizens were males aged 20 or over, descendants of an Athenian citizen family, a patriarch of a household, a warrior possessing the arms and ability to fight, and a master of enslaved others. Women, slaves, artisans, and foreigners were inherited statuses excluded from the category of *politai* (citizens). Only those, Aristotle reasoned, with the freedom to deliberate without the constraints of necessity, could participate in governing in the public's interest.

Over time, the concept of citizenship was extended and became central to legitimating the modern state. Extensions begin in Rome; as the Republic (509 BC) continually annexed territory, citizenship was offered to the foreign communities it sought to absorb in its expanding jurisdiction. Under the Empire (beginning 100 BC), citizenship was granted to whomever the Emperor wished and as a personal reward rather than sign of territorial membership. Perhaps as a result, citizenship became more passive over this time, sought no longer for its political significance but for the honor it carried. By 202 AD, however, citizenship was extended to all free inhabitants of conquered territories incorporated within the empire.

The growth of jurisprudence under the Roman Empire helped transform citizenship from a political status (subjects within the territory) to a legal status,

which conferred certain rights and protections. Nonetheless, despite citizenship's more inclusive status there, Roman citizens never possessed anything like the political influence of the more limited and exclusive population of Athenian citizens. Most of the power still rested with the Roman Senate, a group of nobles distinct from the rest of the population, but like the Athenian citizens, relatively free from the demands of necessity.

During the long, thousand-year decline of European monarchies (and political power of the Catholic Church), Western notions of citizen evolved from being one subject to state power to membership in a collective and the *raison d'etre* of the modern constitutional state. The American and French Revolutions signal the institutional development of the state as a separate entity with specific subject members called citizens. The French Declaration of the Rights of Man coupled the notion of individual freedoms with principles of universality, equality, and community, while the American Declaration of Independence pressed more strongly on individual rights, rather than collective goods. These formulas preserve a dualism between the "public" political citizen, who acts as a collective agent and lawmaker (the "people" or the "nation"), and the private, "legal" citizen, who is a subject of the law and the possessor of "natural" rights to liberty, property, and pursuit of happiness. Good citizenship (or what we might call civic virtue), seems enshrined in the institutional processes, while the law protects (and sets boundaries, albeit regularly shifting) on selfish citizens' rights to pursue their personal interests.

In his now classic text, *Citizenship and Social Class* (Cambridge: Cambridge University Press, 1950), Sociologist T.H. Marshall described the modern development of citizenship as the product of three interrelated processes of state building, the emergence of commercial and industrial society, and the construction of a national consciousness, with all three driven forward by class struggle and war. The net effect, however, was to create a "people," who were entitled to be treated as equals before the law and possessed of equal rights to buy and sell goods, services, and labor; whose interests were overseen by a sovereign constitutionally defined political authority; and who shared a national identity that shaped their alliance to both each other and to their state. Marshall described three periods in the historical evolution of modern citizenship as different groups fought to attain equal status as full members of the community. The first period, from the seventeenth to mid-nineteenth centuries, saw the consolidation of the *civil rights* needed to engage in a range of social and economic activities, from the freedoms to own property and exchange goods, to liberty of thought and conscience. The second period, from the end of the eighteenth century to the start of the twentieth, coincided with the gaining of *political rights* to vote and stand for election, to fully participate in the governing processes and political institutions. The third period, from the end of the nineteenth to the mid-twentieth, involved the creation of *social rights* that gave citizens the right to share in the full heritage and common standards of a *civilized* – the modern extension of civitas – society.

Before concluding, I would like to offer a final, empirically derived notion of citizenship, which emerged in the work of some of my graduate students and colleagues as we observed public agency regulators, inspectors, prosecutors, private managers, and microloan officers across a range of settings. We observed that some individuals did their work differently than others, and in many cases better. We ended up calling these individuals "sociological citizens." In case studies ranging from Australia to France, Mexico, Brazil, and the U.S., we saw how some organizational agents *purposively organize themselves and their work as a link in a complex web of interactions with others.* We use the word "citizen" to name these workers because they recognize their embeddedness in a network of relations with others on whom their occupational and professional performance was dependent (rather than see their job as a cabin of demarcated tasks, limited interests and responsibilities as many others do). Instead of focusing only on their local environments, these actors view their organizations or states as a dynamic entity in which their own role was *simultaneously insignificant by itself and yet essential to the whole.* These responsible citizens saw the organization (or state) as the outcome of human decisions, as well as indecisions, and planning as well as trial and error. With awareness that not everything goes as planned, the sociological citizen regularly reached beyond what was prescribed to meet organizational goals and perform their duties. I offer this conception of the citizen as one who is essential and yet insignificant by herself or himself, who has agency and yet is unable to act entirely alone.

We turn to the notion of citizenship today because it seems essential to addressing the most critical challenges of our moment – e.g., the consequences of climate change, proliferation of nuclear weapons, increasing divide between rich and poor, retreats from democracy across the globe. Yet, popular and sustained critiques decry the likelihood of adequately resolving these persistently competing, always contested interpretations of citizenship. Efforts to determine who is a citizen, and what is owed by and to citizens, have always – perhaps inadvertently but sometimes quite violently – denied

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the protections of citizenship to many within our borders. For example, if we adopt responsible citizenship as an educational goal, what does it mean if some students will have more access to that right than others? Despite this conundrum, I offer an aspiration to citizenship as a counterpoint to the more ubiquitous conceptions of student as consumer, or disruptive innovator, insisting on a different conception of self in relation to others, to the community, the Institute, and to the polity. Here, at MIT, citizenship seems essential to secure our fundamental scholarly integrity, as well as the long-term security of the Institute itself. In the larger national and global arenas, perhaps a more radical and capacious, less individualistic notion of citizenship can ignite the creativity and energy to address these existential threats. If we take responsible citizenship as a worthy aspiration for our work, would we change what we do, what we require of our students, or ourselves? I cannot answer these questions alone, but perhaps they are worthy of some wider conversations. ■

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Corporate funding was neither so generous nor so far reaching. There was less tolerance for educational purposes and instead of a broad mandate for the public good (or the rhetoric for it) these new sponsors focused more narrowly on their own special business interests. In addition to a more instrumental focus, this funding did not last so long, results were expected more quickly, and there was little interest in "basic" research. Those of us who had opposed the corrosive effects of DOD funding were surprised, perhaps naively, to realize that this new corporate funding stifled the spirit of free inquiry even more than federal arrangements had done. Fifty years later, universities themselves have been transformed to run like corporations, top-down and hierarchical, relying on faceless bureaucracies rather than collegial debate and decision-making, viewing research through the same instrumental gaze as their corporate sponsors, and expanding their managerial capacities at the expense of research and teaching.[1]

By now, the line between education and business has all but dissolved. Corporations lease campus land for their commercial buildings; they help to direct research in campus labs; they subsidize programs designed to teach students how to fit into existing corporate structures. Students are being prepared for lives as cogs in the machine – rather than as engaged citizens of the world. The atmosphere encourages students to work on their "pitches" rather than identify problematic assumptions in arguments. Students' imaginations are trained to develop new commodities and open new markets rather than to think about ways to achieve human fulfillment for all. We should be cultivating their minds as broadly as possible rather than training them to fill cubicles in bland multinationals. We end up reproducing the view that

the "real world" is inevitably one of competition, anxiety, long hours of work, isolation, fear, and self-doubt.

MIT, like its peer institutions, has formed many corporate partnerships. The word "partner" itself deserves some attention. Used as a legal term in the eighteenth century, "partner" has always covered a multitude of sins. The legal meaning was invented to create a legal entity to share profit but avoid personal liability.

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Nowadays it is used as a blanket term for those who share their lives, a gender-blind term designed to neutralize the sexual arrangements it designates. In the present context, "partnering" continues to mean what it meant in the eighteenth century: an association whose precise terms are hidden, but whose public aspect is neutral, professional, and sanitized.

MIT's partnerships are generally negotiated confidentially, without input from the greater campus community. These partnerships have become more normalized over time, and more explicit. Last year, IBM committed 240 million dollars to build an Artificial Intelligence (AI) research laboratory at MIT, whose aim is to commercialize AI research for various industries (including defense). This corporate-academic hybrid gives IBM access to Course 6 (Electrical Engineering and Computer Science) and Course 9 (Brain and Cognitive Sciences) faculty, students, and resources. While it is hard to judge precisely, as only those involved know the terms of the arrangement, IBM is bound to have immense power in shaping MIT's research in this area. This partnership is just one of many to make up MIT's unfor-

tunately named "IQ" (Intelligence Quest) initiative.[2] Yet such alliances are presented as if there's no tension between the corporate agenda and MIT's professed educational and research mission.

When I (Yarden Katz) first came to MIT in 2007 for graduate school, I learned that such corporate partnerships are business as usual on campus. But it took more time for me to see, through conversations

with fellow graduate students, that this is more than just a story of academics pursuing an agenda in line with their corporate sponsors – that academic inquiry itself is being transformed to take on an increasingly corporate character. Academic discourse is now drenched in public relations-speak and a hyper-masculinized rhetoric of "impact" and "innovation," which all too often means funneling the labor of a broad, and generally publicly funded, academic collective, towards the creation of private wealth for the few.

This character of the university manifests in part through the relentless pursuit of "intellectual property." The Institute embarks on a kind of patent colonialism, seeking to parcel off the largest piece of collectively developed knowledge and technology for its own startups and industry partners. Whole wings of the university can be mobilized to rehearse talking points in the service of legal battles, such as the one waged over patents

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[1] For an analysis of the expansion of administration in universities, see Ginsberg, B. *The Fall of the Faculty* (2011).

[2] See Manning, K. R. "Naming the MIT Intelligence Quest." *MIT Faculty Newsletter,* Vol. XXX No. 4.

to the genome-editing system CRISPR.[3] Media spectacles are staged and millions are spent.[4] The result is a profoundly anti-scientific discourse that poisons the very well of scientific collaboration that it pays lip service to.

In the past, groups like *Science for the People*, born out of resistance to the Vietnam war, protested the accelerating corporatization of academic science. Sheldon Krimsky, writing for the group's magazine in 1985, concluded that it would soon be hard to find biomedical researchers on campus without some ties to the drug industry.[5] Krimsky turned out to be correct[6] but his prediction applies far beyond biomedicine.

MIT in fact helped extend and normalize the corporate model of research that Krimsky and others worried about. The MIT Media Lab, for instance, is funded by "member companies" who in exchange receive IP rights to the laboratory's work. The members list includes powerful corporations from nearly every industry that urgently needs to be reimagined: the fossil fuels industry (Exxon-Mobil), big pharma (Novartis, Hoffman-LaRoche, Takeda), big tech (Google, Twitter, IBM, Intel, Cisco), weapons developers (Northrop-Grumman), and big media (21st Century Fox, Comcast, Verizon).

Nonetheless, the belief that scientific inquiry is always disinterested, apolitical, and value-free is entrenched enough so that some academics still believe that their work is entirely uncompromised by corporate and military ties. Yet in so many areas that demand critical social engagement alongside techno-scientific knowledge, this has proved illusory. For one, the mainstream conversation is now waking up to the perils of a world governed by Silicon Valley and the ensuing damages of "surveillance capitalism."[7] Is it realistic to

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expect academics to scrutinize these techno-political systems, much less to help build alternatives, when their institutions share so much with the owners of these systems?

Even as a critical conversation about the techno-world emerges in the mainstream, MIT continues to look to Silicon Valley for wisdom and guidance. Eric Schmidt, the former CEO of Google, who notoriously proclaimed the end of individual privacy,[8] was appointed this year to be special MIT fellow and advisor to the university's AI initiative.[9] In a recent fireside chat at the launch of MIT "IQ", President Reif contrasted Alphabet – a company where all activities can be managed in top-down fashion – with universities, which are more decentralized.

Reif then asked Schmidt, "What can a place like MIT – what can academia do? How can we help?", essentially asking, how can MIT help, and perhaps be more like, the Googles of the world.

The university's business model entangles it in compromises that are rarely explored on campus. For instance, The Broad Institute has licensed its CRISPR genome-editing patent to DuPont for use in developing agricultural applications.

This was spun by the institute as "democratic" licensing,[10] although it is hard to square this rhetoric with DuPont's size and dominance, and its decades-long record of polluting the environment with the toxic chemical C8, which has since been linked to various cancers – the same diseases that the Broad Institute claims it is seeking to understand and alleviate. Our university has ties to corporations that have interests and policies antithetical to our declared educational and ethical mission.

In 2012, the Broad also received a $32.5M commitment from Seth Klarman's foundation to launch the Klarman Cell Observatory.[11] Klarman is

3 See Katz, Y. "Who Owns Molecular Biology?" *Boston Review* (2015).

4 For MIT's involvement in media war over CRISPR, see Hall, S. "The Embarrassing, Destructive Fight over Biotech's Big Breakthrough." *Scientific American* (2016), and Katz, Y. "Patently Biased." *Jacobin* (2016). Also: CBS 60 Minutes episode on CRISPR, Apr. 29, 2018.

5 Krimsky, S. "The Corporate Capture of Genetic Technologies: Scientists' Corporate Affiliations Surveyed." *Science for the People Magazine* (1985).

6 See Angell, M. "Is Academic Medicine for Sale?" *The New England Journal of Medicine* (2000) and Mirowski, P. *Science-Mart: Privatizing American Science.* (2011)

7 See Zuboff, S. "The Secrets of Surveillance Capitalism." *Frankfurter Allgemeine Zeitung* (2016)

8 "Google CEO Eric Schmidt Dismisses the Importance of Privacy." *Electronic Frontier Foundation*, Dec. 10, 2009.

9 "Eric Schmidt to join MIT as visiting innovation fellow." *MIT News*, Feb. 5, 2018.

10 Broad partnership with DuPont on agricultural application of CRISPR. See "DuPont vs. the World: Chemical Giant Covered Up Health Risks of Teflon Contamination Across Globe," *DemocracyNow*, Jan. 28, 2018.

11 "Klarman Family Foundation to fund new Cell Observatory." *The Harvard Gazette* (2012).

the manager of the Baupost Group, a hedge fund that holds much of the debt over Puerto Rico. As the island was devastated by Hurricane Maria and suffocated by these financiers, there were campus protests against Baupost across the country.[12] Students at universities whose endowments are invested in the hedge fund, such as Harvard, Princeton, and Yale, called on their schools to divest. MIT, however, has remained silent.

Some students, working at the margins, are the exceptions to this picture of the university. But it is easier for the administration to promote start-up culture and claim to "hack" at big issues than it is to listen to their voices. Why else would the administration refuse to embrace the guidance of passionate students who, in a 116-day long sit in, showed MIT the way to fossil fuel divestment? Instead, the administration put on "Solve," a TED-like networking opportunity for university decision-makers, their connected donors, and "members" who pay $5,000 to participate. With respect to the climate, Solve is arrogantly premised that "We" at MIT can "Solve" the climate using our technological prowess. This technocratic framing sidelines the impor-

tant political and social dimensions of climate issues. It also further marginalizes other communities, outside the wealthy networked spheres that Solve is targeting, that have not only thought of different

ways to care for the earth, but are also likely to pay the heaviest price for climate catastrophes.

While the effects of corporate "partnering" on science and engineering are the easiest to see, the business model of our university can also cast a shadow upon subjects in the humanities and social sciences. The profit motive is not a good model for either research or education. It commodifies thought and emphasizes what can be quickly done, is "hot," or "trendy" over the thorough, painstaking, and valuable work that contributes to our collective mosaic of knowledge. It fosters competitiveness rather than cooperation, puts constraints on free speech about funders and their business interests, and encourages cynical materialism at the expense of idealism. It turns students into consumers and forces faculty to offer what

"sells" rather than what contributes to a meaningful education. Students are encouraged to think of themselves as commodities and how to "market" themselves in a ruthlessly competitive environ-

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ment. Attending university becomes more of a resume-enhancing activity than an opportunity for enrichment through study and discussion with others.

The space for seeking un-pragmatic truths on campus is shrinking. It is collapsing under the weight of marketing and markets. Faculty ought to learn from, and make alliances with those students, community members, as well as colleagues at neighboring schools who want to resist these trends. Working together, perhaps we can make more room for different kinds of thinking on campus. ■

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[12] "Harvard's Endowment Is Profiting From Puerto Rico's Debt As The Island's Schools Face Crippling Cuts." *The Intercept* (2018). See also: "Baupost's Puerto Rico Debt Holdings Targeted in Campus Protests," *Bloomberg* (2018).

Diversity is Not Enough

Ceasar McDowell

ON MAY 1, 1992, three days after an all-white jury failed to convict three white police officers for brutally beating him, Rodney King pleaded for an end to the ensuing LA Uprising: ". . . can we all get along? Can we, can we get along?"

A month later, MIT President Charles Vest reminded the graduating class that there was no greater goal "than that of restoring some modicum of tolerance and civility in this country and this world." He went on to set this charge for the audience:

"You must help to stem the centrifugal forces that would pull us apart. We need tolerance, not divisiveness; mutual respect, not disdain; love, not hate; civility, not revenge; hard work, not empty rhetoric; excellence, not mediocrity; grand strategies, not just tactics."

Two voices, 3,000 miles apart. One black, one white. One speaking to the disheartened and marginalized, the other to the hopeful and privileged. In the ensuing 26 years, MIT has pursued inclusion and diversity as the means to build a culture of tolerance, mutual respect, love, and civility, all grounded in hard work and excellence. But inclusion and diversity, while necessary, do not represent a sufficient response to the primary challenge this country and the world face: the belief in a hierarchy of human value. This is the belief that whiteness is the pure race and all other races are less valuable. Your value as a human being decreases as the pigmentation in your skin increases. It is this belief that helped fuel chattel slavery and the enduring carnage that resulted from white privilege.

MIT seeks to *Make the World a Better Place*. As a leading institution in science, technology, engineering, and the design and development of urban spaces there is a role for MIT in helping the world be a better and, I would add, a more just and equitable place. MIT can do this by sharing knowledge, spurring innovation, and preparing the next generation of leaders. But MIT will only fulfill this potential when we acknowledge that, like the majority of academic institutions in this country, the Institute is at the very least tainted, if not partially propelled, by the history of slavery and the ongoing practices of racism and white privilege in America. Professor Craig Wilder's innovative "MIT and Slavery" class launched MIT's investigation into its ties to slavery, reminding us that as we learn more about the historical origins of the Institute's link to slavery we must also accept without question that the current culture, structure, and aspirations of MIT are defined by "whiteness and its corresponding privilege."

In short, this is a call for MIT to take steps to becoming an anti-racist organization. This is the first step in acknowledging and working to undo the role of white privilege in the day-to-day workings of MIT.

To be an anti-racist organization means to accept without question that a belief in a hierarchy of human value and white privilege are operating at every level of the Institute. It means developing a strategy for unmasking and undoing this in every part of the Institute. Clearly, it can't be done everywhere at the same time, but it can be made clear that it will be done everywhere within a specific timeframe. It means providing leadership across the Institute with the knowledge and skills needed to move the institution through this work. It means doing whatever it takes to diversify across the Institute. It means being dedicated to equipping itself and those it educates to be leaders in disrupting and dismantling the daily practices that continue to uphold white privilege.

Where to start. Let me make three simple suggestions.

> In short, this is a call for MIT to take steps to becoming an anti-racist organization.

• Conduct an anti-racist assessment of every School, using recommendations and the analysis of Craig Wilder and Melissa Nobles, whose work should continue and be fully funded.

• Increase the Target of Opportunities slots for junior and senior faculty of color across all departments.

• Over the next five years add a specialist on anti-racist practices and strategies to every Visiting Committee.

Final note. In my work I promote the concept of Design From the Margins. The idea here is that if you design an intervention or change to work for (and with) those who are most marginalized, then you inevitably cover them and those who are in the majority. Within the structure of the United States, it is blackness that defines the fundamental marginal group. The marginalization of blacks is in the origin story of this country and the current politics of this country. While I know the importance of gender-inequality and the marginalization of differently-abled people and queer folk, I ask in this instance that we focus on the victims of the original sin of this country (slavery and white privilege) and have faith that if we build an anti-racist institution it will be an institution that tends to us all. ■

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Update From Washington
The Positive Near-Term Picture
for Federal Research Funding

David Goldston

TO THE SURPRISE OF MANY, 2018 has turned out to be a banner year for federal research funding thus far, and that appears likely to continue. This does not mean, of course, that more funding is not needed, or that the funding is adequate to meet all current demands; and some areas of research are in better shape than others. But despite the political polarization in Washington and around the country, the overall numbers for research increased significantly in fiscal 2018 and are likely to be sustained in fiscal 2019.

What happened, and why?

First, let's look at the current fiscal year, which began last October 1. For the first six months of the fiscal year, funding was held to the previous year's levels, as stalemate in Washington kept Congress from doing anything on appropriations besides allowing agencies to limp along at prior spending levels. But the stalemate broke in late February, and on March 23, President Trump signed into law a bipartisan omnibus appropriations bill providing funding for all federal agencies through September 30.

(President Trump provided a last-minute burst of uncertainty when he suddenly threatened to veto the measure over immigration and other matters – even though White House staff had been part of the negotiations on the bipartisan measure. But alarmed Congressional leaders convinced him to stand down.)

What happened to research spending?

The omnibus turned out to be a boon for science and engineering funding: Research spending will hit an all-time high in inflation-adjusted dollars. Basic and applied research are increased by more than 10 percent. The year-over-year percentage increase in research spending is the highest since fiscal 2009, a year that included one-time emergency stimulus money to counter the Great Recession. The last time research received such a large percentage increase before that was fiscal 2001, in the midst of the effort to double the budget of the National Institutes of Health (NIH).

Not surprisingly, NIH – long a Congressional favorite – fares well under the omnibus, with an 8.7 percent increase, but so does the Department of Energy (DOE), the home of applied research programs that conservatives have tried to limit since the Reagan Administration and a target of the Trump Administration. The omnibus provides an increase of more than 12 percent for DOE, with its research programs doing even better (in percentage terms). (See table, next page.)

Why did things turn out so well?

The key to this happy outcome was the bipartisan agreement earlier this year to increase the spending caps on discretionary spending. What the research community often fails to appreciate is that the primary determinant of the federal spending level for research is the size of the overall federal spending pie. In a bill President Trump signed into law in February, Congress raised the amount of money available for non-defense spending in fiscal 2018 by almost 12 percent and the amount available for defense spending by about 14 percent.

Once Congress reached that deal after playing a game of "chicken" for months, research was likely to fare well. For decades, research and development has received a relatively steady share of total federal discretionary spending, and this year was no exception, with R&D spending rising in parallel with overall spending.

Put another way, no one on either side of the aisle, or on either end of Pennsylvania Avenue, was gunning for research programs. With the significant exception of proposed cuts in environmental research and applied energy research, proposals to reduce science funding were driven by the macro budget numbers, not by any antipathy toward the programs. (Democrats, in the end, were able to limit the damage to environmental programs, and Democrats were joined by some key Republicans, especially in the Senate, in protecting the energy efforts.)

The increase in the spending caps enacted in February – an amendment to a 2011 law to rein in spending to reduce the deficit – was a bipartisan agreement. Both Republicans and Democrats had thought the limits on defense spending were too low, but partisan disputes over non-defense spending had held up agreement. Democrats argued that the non-defense caps should be raised by the same amount as defense. Since Democratic votes are needed to get any spending bill through the Senate, the final agreement on the caps included a significant, though not equal, increase for both defense and non-defense spending.

Note that these agreements just concern discretionary spending, which Congress allocates annually through appropriations bills. By far, the larger portion (more than 60 percent) of the budget is mandatory spending – Social Security, Medicare, other entitlement pro-

Research & Development Funding

Funding Line	FY17 Omnibus	Trump FY18 Request		House FY18		Senate FY18		Trump FY19 Request Plus Addendum		FY18 Omnibus		House FY19	
	Enacted	Released May 23	% Change ('17 to '18)	Approved Sept	% Change ('17 to '18)		% Change ('17 to '18)		% Change ('17 to '19)	Mar. 21	% Change ('17 to '18)	Appropriations Committee as of May 17	% Change ('18 to '19)
NIH total	34,084	26,920	-21.0%	35,415	3.9%	36,234	6.3%	34,767	2.0%	37,084	8.8%		
DOE Total	30,746	28,042	-8.8%	29,884	-2.8%	31,968	4.0%	30,609	-0.4%	34,520	12.3%	35,494	2.8%
Office of Science	5,392	4,473	-17.0%	5,392	0.0%	5,500	2.0%	5,391	0.0%	6,260	16.1%	6,600	5.4%
Energy Efficiency & Renewable Energy	2,035	636	-68.7%	1,104	-45.7%	1,937	-4.8%	696	-65.8%	2,322	14.1%	2,079	-10.5%
ARPA-E	306	20	-93.5%	0	-100.0%	330	7.8%	0	-100.0%	353	15.4%	325	-7.9%
NASA total	19,653	19,092	-2.9%	19,872	1.1%	19,529	-0.6%	19,892	1.2%	20,700	5.3%	21,546	4.1%
Science	5,765	5,712	-0.9%	5,858	1.6%	5,572	-3.3%	5,895	2.3%	6,222	7.9%	6,681	7.4%
DOD S&T	14,011	13,199	-5.8%	13,800	-1.5%	13,942	-0.5%	13,662	-2.5%	14,863	6.1%		
DOD Basic Research (6.1)	2,276	2,229	-2.1%	2,280	0.2%	2,259	-0.7%	2,269	-0.3%	2,343	3.0%		
DARPA	2,889	3,170	9.7%	3,170	9.7%	3,145	8.9%	3,439	19.0%	3,072	6.3%		
NIST total	954	725	-24.0%	865	-9.3%	944	-1.0%	629	-34.1%	1,200	25.8%	985	-17.9%
Scientific & Technical Research & Services	690	600	-13.0%	660	-4.3%	695	0.7%	573	-17.0%	725	5.1%	720	-0.7%
Industrial Technology Services	155	21	-86.5%	105	-32.3%	145	-6.5%	15	-90.3%	155	0.0%	145	-6.5%
NSF total	7,472	6,653	-11.0%	7,340	-1.8%	7,311	-2.2%	7,472	0.0%	7,767	4.0%	8,175	5.2%
Research & Related Activities	6034	5,362	-11.1%	6034	0.0%	5918	-1.9%	6,151	1.9%	6,334	5.0%	6,651	5.0%
Education & Human Resources	880	761	-13.5%	880	0.0%	862	-2.0%	873	-0.8%	902	2.5%	902	0.0%
EPA total	8,058	5,655	-29.8%	7,500	-6.9%			6146	-23.7%	8,058	0.0%		
S&T	706	451	-36.1%	629	-10.9%	634	-10.2%	449	-36.4%	706	0.0%		
NOAA total	5,675	4,775	-15.9%	4,966	-12.5%	5,590	-1.5%	4,560	-19.6%	5,900	4.0%	5,159	-12.6%

Budget Authority in millions of dollars
Includes initial request plus additional funding per the Addendum

grams – which Congress can change only by changing the laws governing those programs (as opposed to setting spending levels). Another aspect of mandatory spending is interest on the national debt (about 6 percent of the budget), which can't be changed without the U.S. reneging on its financial obligations.

So what explains the variation in spending increases among the agencies?
The final fiscal 2018 numbers for each agency vary depending on the politics of the specific programs and the way Congress divvies up the spending pie among appropriations categories – an arcane process that reflects everything from overall spending priorities to the power of individual appropriations members.

But certain patterns have been stable over time. NIH is a bipartisan favorite – because the value of improving health is widely understood, as is the link between research and clinical advances. NIH research is also supported by groups outside the research community, such as those focused on specific diseases, and

members of Congress view funding NIH as something constituents understand. The National Science Foundation tends to get smaller but steadier increases that reflect overall support for basic research. DOE spending has become a political commitment for some Democrats, and some key Senate Republicans also watch out for the agency. The Environmental Protection Agency has become more of an ideological football. The amount of money allocated to early-stage research in the Defense Department tends to oscillate.

What's the outlook for future spending?
Congress has now begun to write the bills that will set spending levels for fiscal 2019, which begins October 1. Importantly, Republican leaders have decided to stick to the February agreement on spending caps that covered fiscal 2019 as well as this fiscal year. (Initially, some House conservatives were interested in taking a new look at the numbers.) The fiscal 2019 caps provide a small increase over fiscal 2018 spending, so research spending is likely to hold steady, even after accounting for inflation, or see a slight increase.

President Trump's budget proposal for fiscal 2019, released in February, was better for science overall than his fiscal 2018 proposal because of the additional money made available by raising the caps. But Congress will end up being more generous for two reasons. First, the White House proposed to spend only part of the increase in the non-defense spending pie, but Congress will allocate all of it. Second, the Administration budget still targets programs the White House dislikes – such as some energy and environmental programs – that Congress will support. That's already the pattern emerging in the first fiscal 2019 bills.

So it looks like continuity will be the name of the game, as many in Congress want to avoid new spending battles going into the 2018 elections, when party control of the Congress – particularly the House – is up for grabs. Initially, the betting was that Congress would not complete work on appropriations until after the elections, but it now seems possible (if not likely) that for the first time in

decades, Congress could have spending in place by September 30.

What about after next year?

After fiscal 2019, the outlook is murky and treacherous. Without further Congressional action, the spending caps in the 2011 law will come back into effect, causing discretionary spending to plummet. It's impossible to predict what the political and economic situation will look like at that point. But the federal deficit will likely be on the rise significantly because of raising the spending caps and, most economists believe, because of the massive tax law enacted in December.

If the deficit once again becomes an issue and Congress remains too divided to reach any deals on mandatory spending, then discretionary spending will come under severe pressure.

Other issues could also complicate the overall political environment for research spending and higher education. Surveys continue to show strong and steady public support for science, but political polarization over issues like climate change could at some point start eroding that. And antipathy toward elite research institutions – demonstrated by the new tax on university endowments – is also something to watch (and combat). But the biggest concern remains the overall fiscal situation.

What has MIT done about all this and what will it do?

MIT has continued to work closely with the Association of American Universities and the Association of Public and Land Grant Universities to make the argument for federal research spending. President Reif and Vice President Zuber have met and are continuing to meet with White House and Congressional officials to press

the case. The MIT Washington Office is working not only to raise overall funding for R&D, but has worked with faculty to hammer home the need for funding for specific areas of concern, including fusion and specific NASA projects.

Notably, White House and Congressional budget documents have mentioned growing competition with China, including in Artificial Intelligence, as one reason that U.S. research spending needs to remain strong. So at least some of our arguments are registering.

If you have any general questions about federal spending (or other federal policies) or if you need help with specific spending or policies, please contact me at *dgoldsto@mit.edu* or call the MIT DC office at 202-789-1828. We also put out a weekly news update. Please let us know if you would like to receive that.　■

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ture and culture of our patriarchal society. Sexual harassment is not separate from the systematic everyday inequality and gender subordination, argues Faculty Chair Susan Silbey ("#MeToo at MIT: Harassment and Systemic Gender Subordination," *MIT Faculty Newsletter*, Vol. XXX No. 3). Normalization of women's lower status, often subconscious, is a precursor to sexual harassment. And MIT has its own share of harassment incidents, including some high profile ones, while statistically its record is comparable to other universities in size and status.

We at MIT firmly believe that neither sexual harassment nor gender inequality should exist. The academic environment with its pronounced hierarchy with respect to students and professors, the labs with their built-in long hours and social isolation, and conferences with accompanying travel, present only some of the basic challenges that we must consider

when building a women-friendly and harassment-free Institute. Achieving this goal requires cultural, psychological, material, and institutional commitments and an understanding on the part of each of us that past achievements need to be protected to move forward.

Continuous Work

The 1990s were a time of change at MIT and the numbers reflect it. In 1994, only 15 tenured women were faculty members in the six departments of the School of Science, as compared to 194 men. Only nine women faculty belonged to the School of Engineering. ("Study of the Status of Women Faculty in Science at MIT" *web.mit.edu/fnl/women/women.html*). By 2011, the numbers had increased to 33 in Science and 35 in Engineering. This is a significant improvement given that prior to 1995 the number of women remained the same for more than a decade (*news.mit.edu//sites/mit.edu.newsoffice/ files/documents/women-report-2011.pdf*). This improvement resulted from years of

systematic work that began with the "Report of the Committee on Women Faculty in the School of Science" in 1996. In addition to the improvement in numbers, interviews with women faculty also reveal a significant improvement in the quality of life, recognition, and resource distribution.

However, these advances are not sufficient, and we must press forward because of the setbacks, stagnations, and a need for improvement of the condition of women at MIT. It is alarming to hear that the number of women faculty in some of the Schools at MIT has begun to drop in recent years. Issues regarding equity in compensation and resource management need additional attention and action. To move forward with change, many women faculty at the recent women faculty dinner suggested reconstituting the gender equity committees that MIT set up in the '90s in every School. The success of female faculty and the improvement in the quality of their lives is important in inspiring both male and female students,

as well as for normalizing the idea that women can excel in engineering and science.

MIT has been striving to deal with sexual harassment – a tip of the iceberg of misogyny – rigorously. Even before the appearance of #MeToo, over the past several years the Institute has been developing some tangible ways to address sexual misconduct and other forms of gender discrimination. In 2015, The Committee on Sexual Misconduct Prevention and Response was formed. During the academic year, 2017-2018, all faculty members were asked to complete an online training course to ensure they understood what constitutes sexual misconduct, how to intervene when it happens, and how to respond effectively to someone affected by it. All incoming students and staff are required to complete this program. Almost all employees (faculty included) are "responsible employees," which means that they will now be trained to respond to a student who experienced sexual misconduct and to connect them to resources on campus. These individuals have an obligation to report cases of sexual misconduct to the Title IX office, whose officers then follow up with the student. However, a recently introduced Massachusetts bill, *An Act relative to sexual violence on higher education campuses*, requires that it is the employee, not the Title IX office member, who must follow up with the student. Sarah Rankin, MIT's Title IX coordinator, expressed a concern that this requirement might limit the number of "responsible employees," possibly impeding the efforts for more widespread responsibility. With up to 10,000 employees, it is impossible to train everyone to follow up with the cases of sexual misconduct. This requirement aside, MIT is supportive of the bill, which will greatly improve the overall landscape of safety on campus (see Shi; 2018 *https://thetech.com/2018/05/03/campus-sexual-assault-bills*).

Incoming students should note the multiple confidential resources on campus at work, such as Violence Prevention & Response (617-253-2300;

24 hours); the Bias Response Office; Mental Health & Counseling; Chaplains; MIT Medical; and the Ombuds Office. Another important resource for students is the Student Support Services or S³. Reminders about the available resources and a flowchart with pathways to deal with violence have been posted inside both the women's and men's bathrooms throughout the campus (*https://titleix.mit.edu/sites/default/files/documents/MIT Support and Reporting %28flyer%29.pdf*).

Investment From Everyone

Most female students at MIT would probably disagree with MIT's outside reputation of being unfriendly to women. (Indeed, MIT *was not* friendly to women only a couple of decades ago.) MIT's conscious effort to treat male and female students with equal support and attention might provide a temporary respite from the largely hostile and unsupportive workplaces in engineering that many women will encounter as they begin their jobs. According to Susan Silbey, female students in engineering believe in meritocracy and that their talents and hard work will be evaluated objectively and without gender bias. But experience presents counter to that: My women students interviewing for jobs in their senior year express a great disappointment when they realize that their potential employers treat them based on demeaning gendered and ethnoracial stereotypes. Meritocracy, unfortunately, does not characterize the gendered workplaces of engineering.

Given these experiences and circumstances, more must be done to ensure pathways to opportunity and equality after our students leave MIT. As political essayist Ellen Willis notes ". . . male

> MIT has been striving to deal with sexual harassment – a tip of the iceberg of misogyny – rigorously. Even before the appearance of #MeToo, over the past several years the Institute has been developing some tangible ways to address sexual misconduct and other forms of gender discrimination. . . . Almost all employees (faculty included) are "responsible employees," which means that they will now be trained to respond to a student who experienced sexual misconduct and to connect them to resources on campus.

supremacy was in itself a systemic form of domination – a set of material, institutionalized relations, not just bad attitudes." (*No More Nice Girls*, 2012). A salient example of this is engineering, which is the most male-dominated field in the U.S. Only 13 percent of engineers are currently women. Large companies in Silicon Valley, Wall Street, and elsewhere are being spotlighted on gender inequality and a culture of harassment. Thus, in addition to providing the best technical education, we must make sure our students can face these challenges so they may be able to succeed in engineering.

Many classes and activities offered by the School of Humanities and Social Sciences offer insights on inequality, marginality, and gender issues. Perhaps, in some cases, women engineers have to become feminists to instigate change in the social structure of their work environment. Some have already done so. And more people, including many of our graduating women engineers, are being trained to persevere, despite working in our currently flawed system, by relying on their hard work and believing in meritocracy. But we also must encourage them to question and transform the system. ◼

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Engineering Enrollment Data at MIT

Louis Bucciarelli

ACCORDING TO A REPORT of the Computer Research Association (CRA), undergraduate (and graduate) enrollment in Computer Science (CS), over the years 2006-2015 has increased dramatically.[1]

The average number of undergraduate CS majors is larger today than at any previous time, and greatly exceeds the peak enrollment of the dot-com boom period. For example, the average number of CS majors at doctoral-granting academic units[2] has more than tripled since 2006 and more than doubled since 2011.[3]
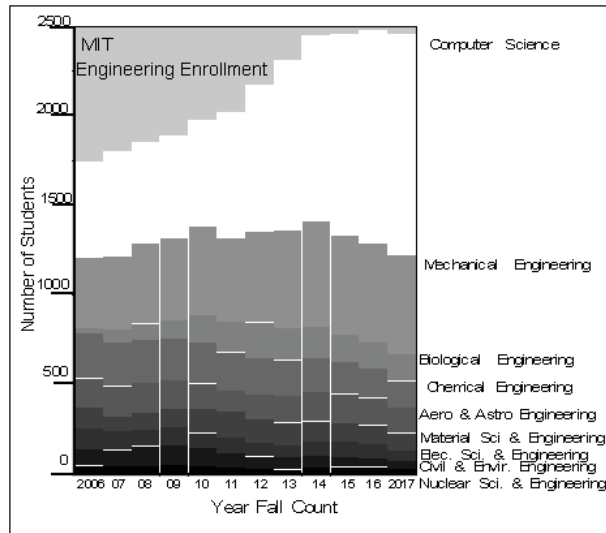
The report goes on to describe how this expansion – in *nonmajor* enrollment as well as major – has affected diversity; challenged faculty workload, strained instructional resources, increased demands for space. A section reports on how academic units are responding to these challenges.[4]

The National Academies established a committee to study the *Growth of Computer Science Undergraduate Enrollments*.[5] They met eight times in 2016 and produced a report, *Assessing and Responding to the Growth of Computer Science Undergraduate Enrollments* (2017). Since 2009, the number of undergraduate degrees in CS has increased by 74 percent (at non-profit institutions). Like the CRA report, this document considered strategies schools might pursue (and are pursuing) to accommodate this increase in enrollment, strategies . . .

– such as adding faculty and resources, imposing targeted controls on enrollment, or using innovative technologies to deliver instruction to large numbers of students, among many other options.[6]

This brief paper looks at MIT enrollment data within this context. Of interest is in how this surge in computer science enrollment has affected enrollments in other fields of engineering (and science).

The portion of the bar "Computer Science" is an aggregation of data for the majors *Computer Science and Engineering, VI-3* (Fall 2017 count 757); *Computer Science and Molecular Biology, VI-7* (73);

Engineering Enrollment Fall Count

Year	Civil Env Eng	Elec Sci & Eng	Mat Sci & Eng	Aero Astro Eng	Chemical Eng	Bio Eng	Mech Eng	Computer Science
2017	28/42 66.7	22/61 36.1	66/97 68.0	48/142 33.8	77/147 52.4	109/149 73.2	255/553 46.1	518/**1235** 41.9
2016	34/49 69.4	30/78 38.5	76/107 71.0	46/152 30.3	100/164 61.0	106/146 72.6	273/551 49.5	463/1193 38.8
2015	39/56 69.6	29/86 33.7	74/104 71.2	56/163 34.4	112/176 63.6	105/151 69.5	259/558 46.4	445/1122 39.7
2014	49/68 72.1	24/80 30.0	81/112 72.3	53/161 32.9	107/189 56.6	119/176 67.6	274/**586** 46.8	386/1039 37.2
2013	47/68 69.1	22/68 32.4	80/125 64.0	54/152 35.5	103/198 52.0	123/178 69.1	242/548 44.2	334/948 35.2
2012	54/72 75.0	23/74 31.1	82/134 61.2	45/135 33.3	107/206 51.9	125/**199** 62.8	231/506 45.7	282/822 34.3
2011	52/79 65.8	33/88 37.5	86/**144** 59.7	35/116 30.2	124/216 57.4	104/169 61.5	183/466 39.3	210/703 29.9
2010	73/101 72.3	29/84 34.5	75/132 56.8	40/143 28.0	138/226 61.1	92/157 58.6	179/491 36.5	186/596 31.2
2009	77/110 70.0	38/**102** 37.3	49/101 48.5	54/157 34.4	133/231 57.6	63/104 60.6	162/460 35.2	173/569 30.4
2008	73/**114** 64.0	34/92 37.0	45/94 47.9	52/**168** 31.0	133/**239** 55.6	52/90 57.8	164/446 36.8	174/566 30.7

Computer Science, Economics and Data Science, VI-14 (22); Electrical Engineering and Computer Science, VI-2 (380), and *Aerospace Engineering with Information Technology, XVI-2* (0).

In the table (previous page) the first number in each cell is the number of women enrolled in the major. The second is the total number of students, enrolled. The decimal number below is the percentage of the total who are women. The total number in bold is the maximum over the year cited. Source: ***https://web.mit.edu/ registrar/stats/yrpts/.***

Computer Science, Economics and Data Science, VI-14 (22) is the most recent new joint major, first open to students in the fall of 2017.[7]
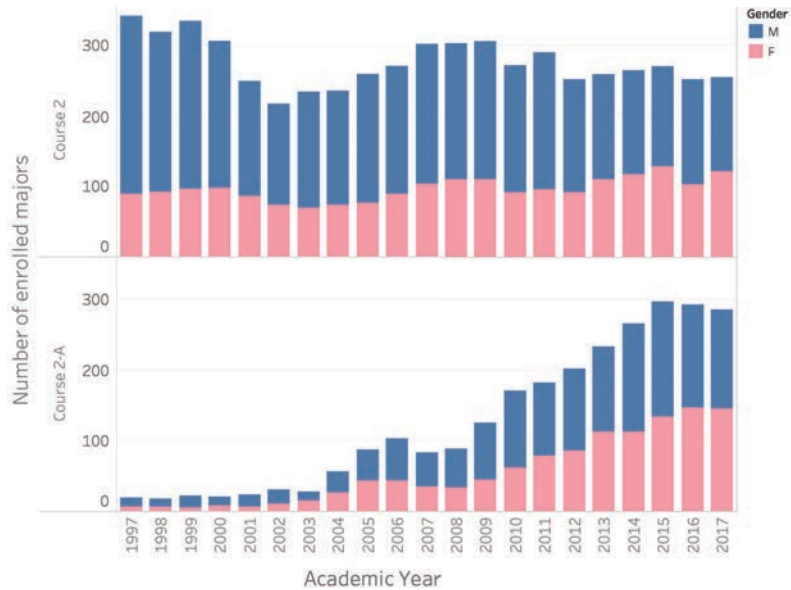
Computer Science and Molecular Biology, VI-7 was launched in fall 2011.

The degree program *Aerospace Engineering with Information Technology XVI-2* was begun fall of 2000. It attracted some 20 students throughout the years until the program was phased out in 2014.

The portion of the bar *Mechanical Engineering* is an aggregate of data for the department's two majors, "Course 2" and "Course 2A" and the major *Mechanical and Ocean Engineering 2-OE.* Prior to 2006, the latter was an independent department.

The two bar graphs show enrollment in Course 2 and Course 2A over the past 20 years.[8] Data for fall 2007 shows *Mechanical Engineering Course 2* enrolling a total of 302 students, 104 (34%) women. Fall 2017 shows a *decrease* in the total to 249 students, 106 (43%) women. The popularity of the program *Mechanical Engineering Course 2A* increased over the years. Total number of students went from 83, 35 (42%) women, to 295, of whom 142 (48%) were women. Course 2A, compared to the traditional Course 2, offers the student more elective freedom allowing a choice of technical electives outside the department.

The total enrollments for three of the engineering majors – *Aeronautics and Astronautics, Chemical Engineering,* and *Civil and Environmental Engineering* – includes the number of undergraduates who have chosen an option within each major that offers the student more freedom in choosing courses beyond the core requirements of each major. *Aeronautics and Astronautics XVI-ENG* and *Chemical Engineering X-ENG* were launched in fall 2011. *Civil and Environmental Eng I-ENG* did not become available to students until fall 2014.

MIT Student Enrollment, School of Science

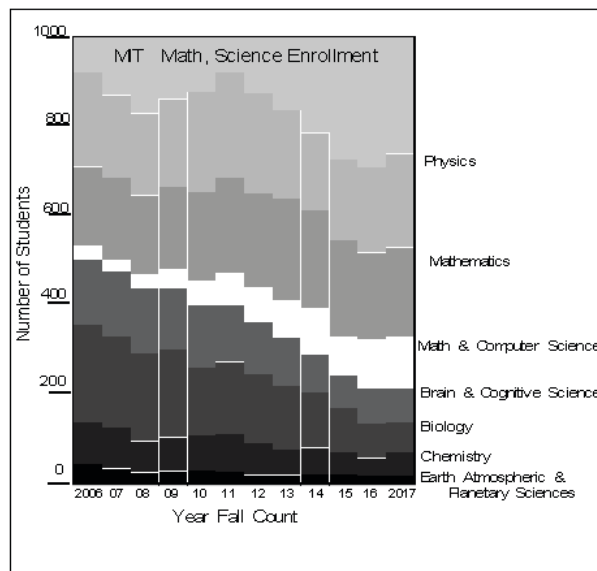A look at enrollments in the School of Science over the same period (see table, next page) reveals a different picture. Whereas enrollment in the School of Engineering has increased (almost) uniformly over the years, here the picture is one of decrease. Particularly noteworthy is the drop in numbers of students choosing to major in *Chemistry*, in *Biology*, and in *Brain and Cognitive Sciences*.

The "new" major, *Math & Computer Science*, shows again the draw of computer science in attracting students.

Engineering Enrollment Data at MIT
Bucciarelli, from preceding page

Footnotes

[1] https://cra.org/data/generation-cs/phenomenal-growth-cs-majors-since-2006/

[2] The term "academic unit" or "unit" denotes the administrative division responsible for the CS bachelor's program. Often, but not always, this is an academic department.

[3] The CRA credits its own Taulbee Survey: https://cra.org/resources/taulbee-survey/

[4] A CRA spin-off committee, the "Booming Enrollment Committee" addressed four questions: How are departments responding to the "boom"? Is the "boom" affecting all levels of the curriculum? Why are students so eager for our classes? How will the current "boom" impact diversity in an already demographically, homogeneous field? http://mags.acm.org/inroads/june_2016?folio=12&pg=14 - pg14

[5] https://www8.nationalacademies.org/cp/projectview.aspx?key=49765.

[6] http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=24926

[7] https://news.mit.edu/2017/mit-creates-new-major-computer-science-economics-data-science-0904

[8] http://kiwi.mit.edu/mit-gender-diversity

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Math, Science Enrollment Fall Count – Selected Majors

Year	EAPS	Chemistry	Biology	Brain & Cog Sci	Math & Comp Sci	Math	Physics
2017	10/16 62.5	30/53 56.6	57/67 85.1	54/76 71.1	47/**116** 40.5	60/199 30.2	59/210 28.1
2016	13/17 76.5	19/40 47.5	59/77 76.6	61/79 77.2	49/109 45.0	58/194 29.9	57/190 30.0
2015	16/20 80.0	29/50 58.0	73/98 74.5	59/72 81.9	35/88 39.8	62/216 28.7	54/180 30.0
2014	19/21 90.5	29/59 49.2	92/123 74.8	63/85 74.1	37/103 35.9	57/220 25.9	44/173 25.4
2013	17/19 89.5	33/56 58.9	108/142 76.1	76/109 69.7	23/85 27.1	67/**225** 29.8	61/199 30.7
2012	17/19 89.5	35/71 49.3	113/155 72.9	86/116 74.1	20/78 25.6	61/209 29.2	63/224 28.1
2011	22/26 84.6	48/84 57.1	120/162 74.1	92/126 73.0	32/73 43.8	70/212 33.0	68/**235** 28.9
2010	20/28 71.4	41/80 51.2	110/150 73.3	106/139 76.3	29/57 50.9	63/197 32.0	73/225 32.4
2009	20/27 74.1	43/76 56.6	139/197 70.6	100/136 73.5	22/43 51.2	67/185 36.2	66/195 33.8
2008	19/24 79.2	41/70 58.6	136/196 69.4	110/145 75.9	16/33 48.5	63/176 35.8	59/183 32.2
2007	23/33 69.7	49/92 53.3	143/204 70.1	115/**146** 78.8	9/24 37.5	59/185 31.9	58/184 31.5
2006	30/**43** 69.8	52/**93** 55.9	155/**219** 70.8	110/145 75.9	8/31 25.8	49/177 27.7	63/210 30.0

Looking Forward/Looking Backward Across the Retirement Line

Dr. Emeritus Beaver

Health Insurance Post-Retirement

THIS COLUMN IS INTENDED for MIT faculty who have already retired or are contemplating such a decision in the near future. The purpose is to provide some practical advice about health care at home and abroad, income sources, taxes, insurance decisions, and numerous other matters that may be helpful in preparing for the transition from active service (teaching, research, advising) to retirement. The goal is to help prepare for the new adventure that awaits you following the transition. The inspiration for writing such a column came from discussions that I had with colleagues during my own final months as an active MIT faculty member, many of whom were themselves contemplating retirement, and wondered how best to prepare for the many decisions they had to make.

In this issue of the FNL I address health insurance post-retirement. MIT faculty have the benefit of a terrific health plan by any standard, both in terms of low cost as well as access to the best medical facilities in the country. Whether or not you remain at your current residence following retirement, you may keep all your current doctors, but some services that are currently covered will not be. An example is the annual eye examination for prescription lenses. MIT's Benefits Office will supply you with detailed information, but a brief summary of key components is the following.

Medicare will become your primary health insurance if you are age 65 or older. You can enroll in Medicare after your 65th birthday and are eligible for a Social Security benefit. You may already have Part A and with retirement you must enroll in Part B. Part A covers hospital, skilled nursing facility, nursing home, and home health care as well as hospice. Medicare will not cover all your medical bills, so MIT has arranged for you to purchase a Blue Cross Blue Shield plan called Medex or a Tufts Medicare Preferred Plan to bridge the financial gap. Depending on your years of service, its cost will vary from nothing (for example, born before July 1, 1940 with at least 10 years of retirement-plan-eligible service) to over $2,500 per year. This fee will be deducted from your MIT Pension monthly payments (more on this topic in a future column). If you purchase an MIT-sponsored retiree health plan, you will be enrolled in a Medicare Part D prescription drug plan administered through Express Scripts. There is no cost to Part A. The cost of Medicare Parts B and D can be ~$150 – $500 per month depending on your income as reported on your Federal Income Tax return. Dental insurance can be purchased. You can continue your Delta Dental insurance for the first 18 months following retirement at COBRA premium rates that are lower than the regular Retiree Dental Insurance rates, which you can switch to subsequently.

The MIT Benefits Office will help you with the enrollments described in the previous paragraph. Enrollment in Part B of Medicare is best done by traveling directly to the Cambridge Social Security office, located at 10 Fawcett Street, First Floor, Cambridge, to deliver your completed forms. Arriving mid-day may help to avoid long lines.

If you purchased a long-term care policy from one of the suppliers that MIT offered, such as John Hancock, it will continue into retirement. You will no longer be on salary from MIT if you fully retire, so the premiums will have to be paid directly to the insurance company.

Finally, you will need to provide for medical insurance when traveling abroad because the International SOS insurance program ends when you retire. Medicare does not pay for medical expenses incurred outside of the United States. In general, neither does the Medex plan (see above). So, it is best to purchase international health care insurance before taking a trip outside of the U.S. However, there are some instances where you may be covered for essential medical care. Save your receipts for doctor bills, lab tests, and prescription drugs. The MIT Benefits Office will help you prepare the forms, although you should not expect a speedy recovery of your money. ◼

Student Leaders Emerge at MIT Conference to Address Danger of Nuclear War

Jonathan King

STUDENTS FROM CAMPUSES across the Northeast gathered at MIT this spring to share their experiences in challenging the U.S. government's aggressive foreign policy, growing nuclear arsenal, and neglect of pressing domestic needs. They were in town to lend their voices to the conference "Invest in Minds, Not Missiles: Reducing the Threat of Nuclear War" on April 7 and 8. This meeting, responding to the continuing risk of nuclear war or accident, continued the long tradition of advocacy for nuclear disarmament through the efforts of former MIT faculty, including: Vicki Weisskopf, Philip Morrison, Herman Feshbach, Randall Forsberg, Bernard Feld, Henry Kendall, Kosta Tsipis, George Rathjens, and Aron Bernstein. Prof. Bernstein was a lead-off speaker.

The students – who represented a spectrum of ages and academic levels, ranging from high school students and undergrads to recent alums, grad students, and postdocs – traveled to Cambridge from more than 15 campuses in New England, New York, and New Jersey to attend. Grants from the Ploughshares Fund and the Amy Rugel Foundation were vital in supporting the travel and lodging expenses of out-of-town students, as well as support from MIT's Technology and Culture Radius program, and Mass. Peace Action.

The focus on campus organizing had emerged at the end of the 2017 MIT anti-nuclear conference, where participants realized the need to actively recruit young people and support their campus organizing efforts. Students have a leading role to play in the peace movement, which in recent times has been represented mostly by older activists and experts. Organizers of this year's conference heeded the call.

Nuclear Dangers Reviewed at Saturday Plenaries

Analysis of the nuclear weapons dangers and tense international situations were provided by Aron Bernstein (MIT), Elaine Scarry (Harvard University), Joseph Gerson (American Friends Service Committee), Hon. John Tierney (Council for a Livable World), Charles Knight (Commonwealth Institute), Chuck Johnson (International Physicians for Prevention of Nuclear War), Gary Goldstein (Tufts University), Lisbeth Gronlund (Union of Concerned Scientists), and Mike VanElzakker (Mass Peace Action). Prof. Scarry's call for Congress to assert their Constitutional Article I authority to declare war, and to pull back the President's thumb from the nuclear launch button, was shared by all.

Cogent analyses of the economic pressures from the weapons industry were provided by William Hartung (Center for International Policy), Stephanie Scammel (Costs of War Project, Brown University), and Richard Krushnic (Institute for People's Engagement). The proposed $1.2 trillion nuclear weapon triad upgrades were concerns for all. Hartung described how these dollars are recycled through political donations to influence Congressional and Pentagon appropriations and policies.

Medea Benjamin of Code Pink, Kristina Romines of WAND, Jonathan King of Peace Action, Paul Johnson of the Poor People's Campaign, Andrea Miller of People Demanding Action, and Paul Shannon of the People's Budget all described campaigns underway to broaden and expand the base of people concerned about the nuclear danger and the human burdens and economic cost of endless wars. City Councilor Dennis Carlone, State Rep. Mike Connolly, and Lucas Perry of the Future of Life Institute described how calling for pension funds, college endowments, and other funds to divest from investing in companies that manufacture or maintain nuclear weapons educates the public that nuclear weapons are a domestic business as well as a component of foreign policy.

Students Share Organizing Strategies at Sunday Roundtable

While the Saturday conference consisted of a daylong series of plenaries and workshops analyzing the current war danger, Sunday morning was devoted to a roundtable discussion of campus organizing, in which students shared their varied experiences and tactics. Many described a low level of concern among their student peers about nuclear issues; however, they said addressing related issues such as the suffering of refugees, the militarization of police forces, and the defunding of human service programs, had allowed them to reach more students. Their programs included holding forums with guest speakers, showing films, and collecting signatures on petitions.

Luisa Kenausis, a former MIT undergrad mentored by Aron Bernstein, described how she and other students contacted Physics Department faculty members, asking them to include in their lectures material on the bombing of Hiroshima and Nagasaki, including the unimaginable human suffering. Now Luisa and Prof. Bernstein are developing a website with model curriculum modules to distribute broadly.

Hainan Zhang of Rutgers described his participation in research under

Prof. Alan Robock on "nuclear winter," the inevitable result of a general nuclear war, or even a limited nuclear exchange such as one between India and Pakistan: the smoke and soot from the firestorms would be lofted into the stratosphere, would block out the sun for a decade or more, lowering temperatures to the level of the last Ice Age, and killing harvests around the globe, leading to near universal starvation. He promised to share his material with other campus groups.

Andrew King, from UMass Boston, described the importance of student peace activists joining in the Poor People's Campaign. He said one of the six weeks of PPC non-violent civil disobedience, starting in Massachusetts the day after Mother's Day, was devoted to protesting the war economy, which is draining resources from essential social programs. He noted this issue is especially relevant

for peace and justice groups on many campuses.

Emma Budd and Eric Stolar of Fordham University addressed the issue of student groups obtaining resources from their universities. They described how their organization, Humanitarian Student Union, was able to hold educational talks and secure resources from an academic department interested in international affairs. Several groups mentioned receiving support and resources from their campus ministries. Sebastien Phillipe reported success at Princeton University in securing financial support from academic departments for a campus-wide day of action, which covered a range of issues, including climate change, immigration, and restrictions on free speech.

Participants agreed to form a Northeast Campus Peace and Justice Organizing Network to provide mutual

assistance and support, and to help seed peace and justice clubs on other campuses. This work will build on the campus organizing efforts of Peace Action of New York State and of Massachusetts Peace Action. The next step may be organizing a similar forum in the New York/New Jersey area.

The conference was co-sponsored by MIT Radius; American Friends Service Committee; Campaign for Peace, Disarmament and Common Security; Council for a Livable World; Future of Life Institute; Greater Boston Physicians for Social Responsibility, Institute for People's Engagement; and Massachusetts Peace Action.

Special thanks to Cindy Woolley, Patricia Weinmann, Christina English, and Alexander Plowden for their logistical support. ◼

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letters

Promoting Mental Health and Well-Being at MIT

To The Faculty Newsletter:

IN HIS LETTER IN THE previous issue of the *Faculty Newsletter* (Vol. XXX No. 4, March/April 2018), Professor Dan Stroock criticized President Reif and Provost Schmidt for focusing attention on sexual harassment more than on student suicide. He strongly objects to the call for all employees (including faculty) to take an online training module on Sexual Misconduct Prevention and Awareness.

I support Professor Stroock's right to state his views but respectfully disagree with some of his statements. His claim that the President and Provost threaten "to remove any faculty member or staff who does not take the sexual harassment course" is false; his claim that the content of the sexual misconduct training "violates every principle for which an MIT education stands" is tendentious. Among the principles MIT promotes is that "every person brings unique qualities and talents to the community and

that every individual should be treated in a respectful manner. All members of the MIT community are expected to conduct themselves with professionalism, personal integrity, and respect for the rights, differences and dignity of others." (*Policies and Procedures*, Section 9.1) This principle of conduct aligns with efforts to increase faculty awareness of sexual misconduct and the faculty role in prevention and response.

MIT has made substantial investments in mental health and suicide prevention efforts, including adding four new staff in the past two years, the offering of "Let's Chat" confidential consultations in the main group area, and a new investment in communications, program management, and evaluation staff to promote mental health and well-being through the MindHandHeart Initiative. The Division of Student Life together with Mental Health and Counseling provides a strong infrastructure for student support and well-being. In addition, the CARE Team has
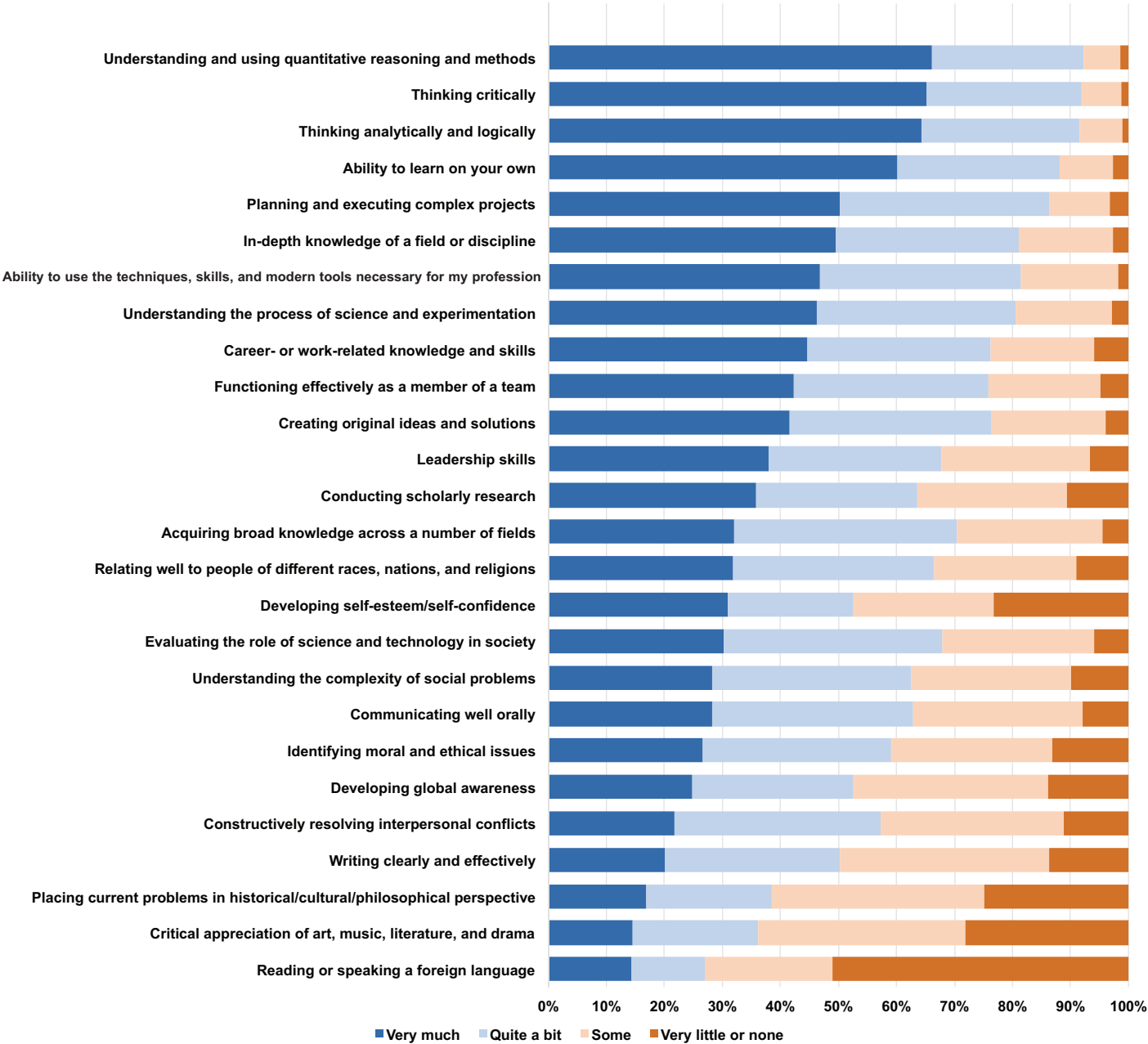
transformed the support of students with serious mental health challenges. MIT also supports efforts to promote faculty efficacy such as this video advice (*mindhandheart.mit.edu/node/162*) and this guide (*https://medical.mit.edu/sites/default/files/faculty_brochure.pdf*). A faculty member's experience can be a powerful humanizing element in these discussions.

Mental health and freedom from sexual harassment and gender-based discrimination are not and should not be in tension with each other for attention from the administration or from faculty. In order to thrive as faculty members, we require that our students be physically and psychologically safe and able to learn. I encourage all our colleagues to take these issues seriously, and to become familiar with effective ways of helping our students thrive such as those resources mentioned above.

Edmund Bertschinger
Institute Community and Equity Officer

M.I.T. Numbers
from the 2018 Senior Survey

To what extent has your experience at MIT contributed to your knowledge, skills, and personal development in the following areas?

■ Very much ■ Quite a bit ■ Some ■ Very little or none

Source: Office of the Provost/Institutional Research