Massachusetts Institute of Technology

Vol. XXXIII No. 2
November/December 2020

MIT Faculty Newsletter

https://fnl.mit.edu

in this issue we offer two of our Teach Talk features concerning online teaching, below and "Teaching Under Covid: Losses Outweigh Gains" (page 12); "The Problem with Philanthropy" (page 14); two pieces on STEM (pages 18 and 19); and "MIT Volpe Construction Plan Will Damage Faculty Housing Initiative" (page 21).

On Campus Fall 2020

MIT's Plan for the Spring Semester

Cynthia Barnhart

ON NOVEMBER 2, 2020, I wrote to the MIT community to share our current plan for the spring semester. I reiterated the principles that guided our decision-making, described the lessons learned so far this fall, and expressed appreciation to the MIT community for the perseverance and care we have shown for one another throughout the pandemic. Below, please find a summary of what we decided and why.

How we got here and what we learned

As President Reif outlined in July, our plan for the fall was careful and measured. So we could test our approach and adjust it as we learned, we extended invitations to return to campus only to graduate students, rising seniors, and students facing certain hardships, plus some

continued on page 6

Teach Talk

Moving Abruptly Online: What it was like for Faculty and for Students

Shigeru Miyagawa and Meghan Perdue

LIKE SO MANY INSTITUTIONS around the world, MIT made the abrupt transition to online teaching in the midst of the pandemic, thrusting all 1,251 of its spring 2020 courses online in late March. To try to understand what this experience was like for the faculty and the students, we sifted through faculty and student surveys conducted at the end of the spring semester by the Office of Institutional Research and interviewed over 30 faculty members. We will touch on three areas – faculty's experience with online teaching, teaching remotely from home, and student reactions to learning online.

Teaching online

Faculty reaction to transitioning online ran the gamut from seeing it as an opportunity to treating it as a burden, although

continued on page 8

Editorial

I. Science Returns to Informing Federal Policies
II. The Suri and Fisher Reports on Outside Gifts

Science Returns to Informing Federal Policies

THE TRUMP ADMINISTRATION systematically used budget cuts and regulatory changes to undermine scientific contribution to public policy. These actions weakened key US agencies, including the Environmental Protection Agency, Food and Drug Administration, Centers for Disease Control and Prevention, National Institutes of Health, and Occupational Safety and Health Administration. We anticipate the incoming administration will undo the damage done to these agencies and restore the role of science in shaping policy. However, a return to the status quo ante will not address the institutional arrangements that limit science's role in shaping policy.

During the Obama/Biden administrations, corporate lobbyists from the fossil

continued on page 3

contents

The MIT Faculty Newsletter
Editorial Board

Vol. XXXIII No. 2 **November/December 2020**

	01	MIT's Plan for the Spring Semester Cynthia Barnhart
Teach Talk	01	Moving Abruptly Online: What it was like for Faculty and for Students Shigeru Miyagawa and Meghan Perdue
Editorial	01	I. Science Returns to Informing Federal Policies II. The Suri and Fisher Reports on Outside Gifts
	05	The MIT Corporation: Reviewing Governance Suzanne L. Glassburn
	07	Nationwide Unemployment Insurance Fraud Scheme
Teach Talk	12	Teaching Under Covid: Losses Outweigh Gains David Geltner, Alan Jasanoff, Caroline Jones
	14	The Problem with Philanthropy Sally Haslanger
In Memoriam	16	Angelika Amon Tyler E. Jacks
	18	LGBTQ+ Scientists and STEM Timothy F. Jamison
	19	Does MIT Support DEI Education in STEM? Jared D. Berezin
	21	MIT Volpe Construction Plan Will Damage Faculty Housing Initiative
	22	The Final Commencement Richard Stanley

Photo Credit: *Page1:* Gretchen Ertl; *Page 16:* Constance Brukin, courtesy of Cold Spring Harbor Laboratory Archives

Address
MIT Faculty Newsletter
Bldg. 10-335
Cambridge, MA 02139

Website
http://web.mit.edu/fnl

Telephone 617-253-7303
Fax 617-253-0458
E-mail fnl@mit.edu

Subscriptions
$15/year on campus
$25/year off campus

Science Returns to Informing Federal Policies
continued from page 1

fuel industry, the Chemical Manufacturers Association, Pharmaceutical Manufacturers Association, US Chamber of Commerce, and the Defense Industry exerted far too much power over national policy. The choice of John Kerry to lead the Climate efforts is a promising sign that science will have a substantive role in shaping climate policy.

But Biden's failure to be concerned that the Pentagon budget consumes more than half of US discretionary spending is deeply troubling, though perhaps not surprising, given the Defense Industry's ability to spend billions of taxpayer dollars to advance their interests. The United States currently spends more on national defense than China, India, Russia, Saudi Arabia, France, Germany, United Kingdom, Japan, South Korea, and Brazil – *combined*. Perhaps a new oversight position to contain the spiraling Pentagon budget is warranted.

Quoting Dwight D. Eisenhower, "This conjunction of an immense military establishment and a large arms industry is new in the American experience. The total influence – economic, political, even spiritual – is felt in every city, every Statehouse, every office of the Federal government. We recognize the imperative need for this development. Yet we must not fail to comprehend its grave implications. Our toil, resources and livelihood are all involved; so is the very structure of our society."

We hope the new administration will heed the urgent demands of those who elected them, and tap into the nation's appetite for change by putting the people's interest at the head of the queue.

Editorial Board of the MIT Faculty Newsletter

* * * * *

The Suri and Fisher Reports on Outside Gifts

THE ESTABLISHMENT OF THE Ad Hoc Faculty Committee on Guidelines for Outside Engagements ("Suri Committee") and the Ad Hoc Faculty Committee to Review MIT Gift Processes ("Fisher Committee") came as a response to the widespread concern among faculty, students, staff, and alumni about the handling of the bin Salman, Epstein, Schwarzman, and other donations. (Student committees were also consulted, and their reports appear as appendices.)

The reports from the two committees make clear that the members of the committees received substantive input from the MIT community. The two reports are thorough and thoughtful in attempting to articulate values and principles for accepting gifts, and in the latter setting up procedures to establish whether or not prospective gifts satisfy the standards set. We appreciate the Suri Committee's recommendation that these matters require a Standing Committee, and with the Fisher Committee, the need to establish a Grants Acceptance Committee for ongoing review of proposed gifts. Similarly, the "Red Light" and "Yellow Light" formulations are clear and appropriate.

Yet some of us were hoping that the committees would address the errors made, raise the issues of accountability, and address again the actual cases that launched the whole endeavor to structure outside engagements at MIT. It would have given the reports much more credibility and authority had past errors been discussed and responsibilities assigned, and corrective actions suggested. Instead, both committees were directed only to address future gifts, as yet unreceived.

The opening paragraph of the Suri Committee Executive Summary asks "Are we inadvertently helping bad actors 'launder' their reputations through their associations with MIT?". The answer to this question is "yes" for those cases that brought this issue to a head. For example, among the "Red Lights" listed in Section 5.1. #2 is: "*Has this individual directly engaged in, funded, or otherwise supported any gross violations of political, civil, or human rights; or serious violations of the laws of war?*". Human rights include political, civil, economic, social, and cultural rights and also violations by non-state actors such as the Houthis in Yemen, as the UN has concluded, or violations by States such as Saudi Arabia.

Continuing in Bad Company

In spite of the accomplishments of the Suri Committee, there remain questions about past and future gifts from Stephen Schwarzman, whose name, now closely associated with MIT, is in the news, but not for making the world a better place or for the "betterment of mankind." This time it is for deploying the exploitative power that is his hallmark and making the world a worse place for millions of its inhabitants in the process. Last year it was revealed that his company, the Blackstone Group, was one of the driving forces behind the deforestation of the Amazon rainforest, further endangering the climate of the planet and ignoring the rights of the indigenous peoples who live there[1]. Schwarzman is one of the richest men in the world and the damage caused by his activities spreads far beyond the rainforest.[2]

His Blackstone Group has been condemned by the United Nations[3] for exacerbating the worldwide housing shortage by "the financialization of housing" – the large-scale scooping up of foreclosed homes at bargain-basement prices following the financial crisis of 2008, feeding those properties back into the rental sector at steeply increased rents, onerous fees and leases, and then moving to evict them when renters fall behind. On the

continued on next page

1 https://theintercept.com/2019/08/27/amazon-rainforest-fire-blackstone/

2 https://www.housinghumanright.org/modern-day-robber-baron-the-sins-of-blackstone-ceo-stephen-schwarzman/

3 https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=24404&LangID=E

The Suri and Fisher Reports
continued from preceding page

whole, the company is making it harder for millions of men, women, and children to find decent affordable places to live and pushing them into greater poverty – violations of human rights as understood today.[4] Given that an overwhelming number of these renters are Black and other people of color, Blackstone's actions are indeed against Black lives[5]. Additionally, Schwarzman has been known for financing the campaign to frustrate California's recent attempts in 2018 and 2020 to introduce a rent-control measure which would have benefited many ordinary folks and for mounting an unsuccessful effort to stop New York's new pro-tenant housing laws in 2019. Schwarzman is part of the super-rich class that exploits and extracts profits from the most marginalized people at home and in the world. Although these moves would have activated the "Yellow Lights" described by the Suri Committee, and perhaps even "Red Lights," the Gift Acceptance Committee which has been proposed to review such cases will not be in place until July 2022, and its charge will not include revisiting current or past gifts.

Charitable and philanthropic "giving" has long been a favored mode of reputation laundering by the super-rich, although vulture capitalism brings with it a certain opprobrium when it is noticed. [See in this issue, Sally Haslanger's "The Problem with Philanthropy" (page 14)]. There is a fine line between the pragmatic and the squalid, and many think we are well across it here. The Institute is, or ought to be, a global beacon of excellence in the application of practical intelligence for the betterment of the human condition. Schwarzman's Blackstone Group works for neither of these principles.

In the town meeting on the Suri and Fisher reports, there was attention to considering gifts on a case by case basis for a while and building up a set of precedents or "case law". The Schwarzman and Epstein donations are examples of such "case law", both to determine what should be done in the future in cases like this and, more generally, to consider how to address what is reasonably seen as a past mistake.

Schwarzman is part of the super-rich class that exploits and extracts profits from the most marginalized people at home and in the world.

The Suri/Fisher reports advocate the need for reform. They offer a new set of practices according to which every researcher at MIT should think about their relationship to funding sources, however small. We heartily agree. But what will be the consequences for those who try to subvert or get around the mandated processes?

Editorial Subcommittee

4 For Schwarzman's recent anti-rent control activities in California, see https://www.businesswire.com/news/home/20200914005889/en/%E2%80%98Yes-on-21%E2%80%99-Special-Report-%E2%80%98Modern-Day-Robber-Baron-The-Sins-of-Blackstone-CEO-Stephen-Schwarzman%E2%80%99. Scholarship on the links between evictions and poverty is extensive. See e.g., https://scholar.harvard.edu/files/mdesmond/files/desmond.evictionpoverty.ajs2012.pdf

5 https://www.jacobinmag.com/2020/07/private-equity-blackstone-anti-racism-housing

The MIT Corporation: Reviewing Governance

Suzanne L. Glassburn

THE MIT CORPORATION is the Institute's governing board and, at full strength, has 78 members. Because it is difficult for such a large body to be nimble, much of the responsibility for governing the Institute has long been vested in a subset of the Corporation, the Executive Committee.

Last academic year, reflecting on some initiatives the Institute had undertaken in the recent past and on the Epstein crisis, a number of Corporation members had questions about the role of the full Corporation in MIT's governance. In response, the Corporation voted to establish an Ad Hoc Committee on Governance and charged it with examining the respective roles of the Executive Committee and the greater Corporation. The committee ultimately did not recommend changes to the responsibilities of the two bodies, but did propose a number of amendments to MIT's Bylaws. Some of the amendments were intended to document good governance practices, and others were intended to provide opportunities for more Corporation members to serve on standing committees of the Corporation. The Corporation adopted the amendments at meetings in May and August.

One of the significant changes effected by the amendments is the expansion of the purview of the former Membership Committee, now named the Governance and Nominations Committee, to include responsibility for ensuring that the Corporation operates in accordance with good governance practices. The committee's specific tasks, therefore, include, among others, reviewing the effectiveness of the Corporation's governance structure, overseeing an annual self-assessment process of the Corporation and its standing committees, assessing whether Corporation members have potential conflicts of interest, and organizing new Corporation member orientation. The committee was historically chaired by the Chair of the Corporation, but as a result of the amendments, is now chaired by a non-officer Corporation member.

Last academic year, reflecting on some initiatives the Institute had undertaken in the recent past and on the Epstein crisis, a number of Corporation members had questions about the role of the full Corporation in MIT's governance. In response, the Corporation voted to establish an Ad Hoc Committee on Governance and charged it with examining the respective roles of the Executive Committee and the greater Corporation.

The new Bylaws encourage broader engagement of Corporation members in a number of ways. The term limits for most of the Corporation's standing committees have been structured in a manner designed to encourage periodic rotations in and out of the committees. Members of the Executive Committee, other than the Chair of the Corporation and the President, may not simultaneously serve on the Governance and Nominations Committee, and the overlap between the Executive Committee and the Risk and Audit Committee has been reduced from two members to one. Finally, all members of the Corporation's standing committees are elected annually, rather than for multi-year terms, to allow the Corporation to review the makeup of the standing committees each year.

The effect of these amendments, together with a general sentiment favoring broader engagement of the membership, has resulted in a lot of new faces on the Corporation's standing committees, especially the Executive Committee, the Risk and Audit Committee, and the Corporation Joint Advisory Committee on Institute Affairs. The Corporation also has a new Chair, Diane Greene SM'78, and a number of new members, including Heather Cogdell '89, Drew Faust, Michelle Lee '89, SM'89, Adrianna Ma '96, M.Eng '96, Indra Nooyi, Adedoyin Olateru-Olagbegi '20, Janet Wolfenbarger SM '85 and Mark Wrighton. You can find the Corporation membership, the standing committees' membership and the amended Bylaws on the MIT Corporation website: https://corporation.mit.edu/.

Suzanne L. Glassburn is Vice President and Secretary of the Corporation *(slglass@mit.edu)*.

MIT's Plan for the Spring Semester
Barnhart, from page 1

members of our research enterprise. We indicated then that, if all went well under that plan, we would bring back first-years, sophomores, and juniors in the spring, so that every undergraduate class would have the opportunity to be on campus for at least one semester this academic year.

In assessing whether we could proceed with the spring plan we initially envisioned, we returned to the guiding principles that informed our July decisions:

• Protect the public health of our entire community by reducing the number of people on campus;

• Preserve our ability to deliver on MIT's mission of teaching and research;

• Enable all students to stay on track to their degrees; and

• Remain dynamic and flexible in our approach, recognizing that the pandemic's course may require MIT to change direction (and plans).

To arrive at a decision for the spring, we re-examined the community's extensive due diligence that informed President Reif's July announcement. We evaluated Covid-19's worsening local and national trajectory as well as projections for its path this coming winter and spring. And we looked to the lessons we've learned so far this fall about managing life on campus.

With nearly three months of the semester behind us, we have been able to contain the spread of the virus by making careful choices about access to campus and by implementing rigorous testing, tracing, isolation, and compliance systems. But nothing has been more important than the sustained effort by those accessing campus this fall to adhere to the social compact of the Covid era. This compact – which we all need to continue to abide by now more than ever given the concerning uptick in cases across Massachusetts, the country, and the world – requires us to take responsibility for our own health, and for each other's.

What we decided about the spring

Our plan for the spring is much like our plan for the fall but involves a different undergraduate cohort. And, just as we did with our preparations for the fall, we are approaching the spring mindful of the fact that the pandemic's persistent grip could force us to pivot at a moment's notice.

Specifically, as we had hoped, all current first-years, sophomores, and juniors who would like to live and learn on campus are invited to do so. In order to access campus facilities, they will need to reside on campus. Seniors facing circumstances related to their safety, living conditions, visa status, or other hardship have applied for campus housing through the Student Housing Assistance Review Process (SHARP). A total of 122 seniors have been granted SHARP housing for the winter and/or spring.

We will make a decision by the end of the fall semester about whether seniors who choose to live nearby can have access to campus facilities in the same way that graduate students who live off campus do now. We will be able to make a more informed determination after we learn more about our ability to manage the health of our community during cold weather, with Covid-19 prevalence on the rise and flu season beginning, and after we see how many first-years, sophomores, and juniors will access campus in the spring.

Other key details of our current spring 2021 plan:

• Research operations will continue as they are now, as will graduate student education, which will follow the modified spring semester calendar described below. This could change depending on Covid-19 infection and transmission on campus and in the broader community.

• Just as in the fall, many of our subjects will be taught exclusively online, with some opportunities for undergraduates living on campus and some graduate students to have in-person instruction. Departments will continue to make arrangements to ensure all students are able to stay on track with their degree progress.

Specifically, as we had hoped, all current first-years, sophomores, and juniors who would like to live and learn on campus are invited to do so. In order to access campus facilities, they will need to reside on campus.

• Because cold weather makes it harder to socialize outdoors and because the to-and-fro of spring break travel presents an obvious risk of viral spread, the spring semester will start two weeks later for all students; instruction will be entirely online for the first two weeks to accommodate a one-week quarantine period for all on-campus students; and we will replace spring break with several long weekends distributed throughout the semester.

• IAP 2021 will be all virtual and begin on Monday, January 4, 2021 and end on Friday, January 29, 2021.

• We aim to continue to follow key residential life policies to reduce the possibility of infection and transmission while enabling safe, meaningful social connections:

• The undergraduate pod program and the graduate residential visitors policy will be available to students in the spring.

• Undergraduate students residing on campus will be required to be on a meal plan, which MIT will continue to subsidize.

continued on next page

MIT's Plan for the Spring Semester
Barnhart, from preceding page

• There will be no competitive winter season athletics (a final determination about spring sports will be made in the coming weeks).

• Restrictions on visiting student and scholar appointments will continue into the spring term as will our current travel guidelines for the MIT community.

It's important for all students considering returning to campus for the spring (or in the case of first-year undergraduates, coming to campus for the first time) to know what life at MIT will be like. The Covid-19 policies and procedures in effect this fall will largely stay in place but we will work with our entire community to make sure we stay connected and create opportunities to safely socialize.

Gratitude

The students, faculty, and staff who are regularly accessing MIT's campus this fall as well as those who are studying or working remotely have been essential to the success of the fall semester so far and contribute to our belief that we can safely extend our unique *mind, hand, and heart* educational opportunities to a larger cohort of students in the spring.

Cynthia Barnhart is Chancellor and Ford Foundation Professor of Engineering *(cbarnhar@mit.edu).*

Nationwide Unemployment Insurance Fraud Scheme

DURING THE PANDEMIC, AN unemployment insurance fraud scheme has been targeting unemployment assistance programs across the country. Those who are committing the fraud are believed to be using stolen personal information from earlier national data breaches. There is, however, no indication that these fraudulent claims stem from any breach of MIT data.

If you receive correspondence from the Department of Unemployment Assistance (DUA), such as a notice of application, an approval letter, or a DUA debit card, or if you otherwise learn that an unemployment claim has been filed in your name, information about what to do is available on the Human Resources website: https://hr.mit.edu/unemployment-fraud. *The most important step to take is to fill out the DUA's fraud reporting form promptly.*

The usual process for unemployment approval is that as soon as a person files a claim with the DUA, the DUA contacts Corporate Cost Control (CCC), MIT's unemployment claims administrator, with information about the claim. CCC immediately alerts MIT to the claim and confirms whether the claim is legitimate. If it is not legitimate, CCC swiftly notifies the DUA of the fraud, and the claim is stopped.

Unfortunately, due to the dynamics of the pandemic, and in an effort to provide income to those who need it, there have been instances where the DUA has approved unemployment benefits before verifying that the individual is no longer employed. CCC and MIT are objecting to claims that are not legitimate as quickly as possible.

If you have any questions, contact your Human Resources Officer, or Lianne Shields (Director, Employee and Labor Relations), at *lshields@mit.edu*.

Moving Abruptly Online
Miyagawa and Perdue, from page 1

a large portion of the faculty expressed enthusiasm. When describing the online transition as an opportunity, faculty noted, "It turned out better than I thought" and "I encourage more remote teaching in the future." Some were non-committal about its value: "it is reasonable but definitely not ideal," and when describing it as a burden one person noted, "It just doesn't work."

Adapting courses for remote teaching

Transitioning the courses online proved to be an enormous task. One faculty member noted, "this is an entirely new method of teaching for us and we have very little experience of what works and what doesn't." Some had difficulty covering all of their content. "Everything got scaled down and back," reported one faculty member, while another noted "the nature of my hands-on class just doesn't work remotely" and that "I'm mourning the lost learning outcomes." Others reported that they were able to transition their course without much loss, noting, "the course had minimal deviation from the format used in the prior ten years" of teaching.

While many found the transition to online teaching overwhelming at first, most were up to the challenge. The Institutional Research survey and the interviews we conducted revealed a picture of instructors engaging creatively and energetically not only to teach online, but to do so with a fresh attitude towards teaching. One instructor said that before the pandemic, his department had monthly faculty meetings that were not always well attended, but once they began teaching online, a weekly faculty meeting was attended regularly by the majority of the faculty. The conversation at these weekly meetings inevitably turned to teaching – from how to use a tablet to draw equations to how best to utilize the Zoom breakout rooms. The discussions were engaging and animated, and reinforced the broader sense of responsibility that the faculty have to students and the importance of interacting with them.

When asked why there was such a key interest in teaching once the shift was made to online, the answer was revealing. According to one instructor, in a face-to-face classroom, we know – at least we think we know – how to teach because we were taught that way as students. With the switch to online teaching, there was no prior experience to fall back on, so that they had to think through even the most basic steps in ways they had never had to do before.

Many spoke enthusiastically about the online teaching experience, seeing it as an opportunity to try new ways of teaching. One observed that "my teaching is always changing, this will accelerate it, push it in new directions," while another said "I grew a lot as a teacher by being forced to think outside the box; pedagogically it was an exciting time." Many faculty restructured the class to emphasize small and large group discussion and experiential exercises, rather than spending the majority of the class time lecturing. In describing the overall experience, one observed, "This semester was easily the most rewarding teaching experience I ever had. The challenges we faced require innovation, nimble thinking, and a willingness to try things that might fail. We as educators must rise to that challenge and overcome it in order to help our students grow and continue their intellectual and professional journeys." In all, the majority of MIT faculty found that teaching online was indeed possible, with 89% agreeing that it would be reasonable to continue to teach their subject remotely if needed. (See charts next page.)

Pass no record grading

When the spring semester was abruptly shifted online, MIT decided to enact the "pass no record" grading policy to reduce the burden on students and faculty. Faculty reacted to this policy in different ways. Some were frustrated that there was "no way to hold students accountable" and that "emergency grading greatly lowered the performance of the majority of students in the class." Others did not feel impeded by the grading policy, holding that the students are "young adults who should be held responsible for their learning." Still other faculty found the grading policy liberating, feeling that it allowed them to focus more on teaching and less on tests and grades.

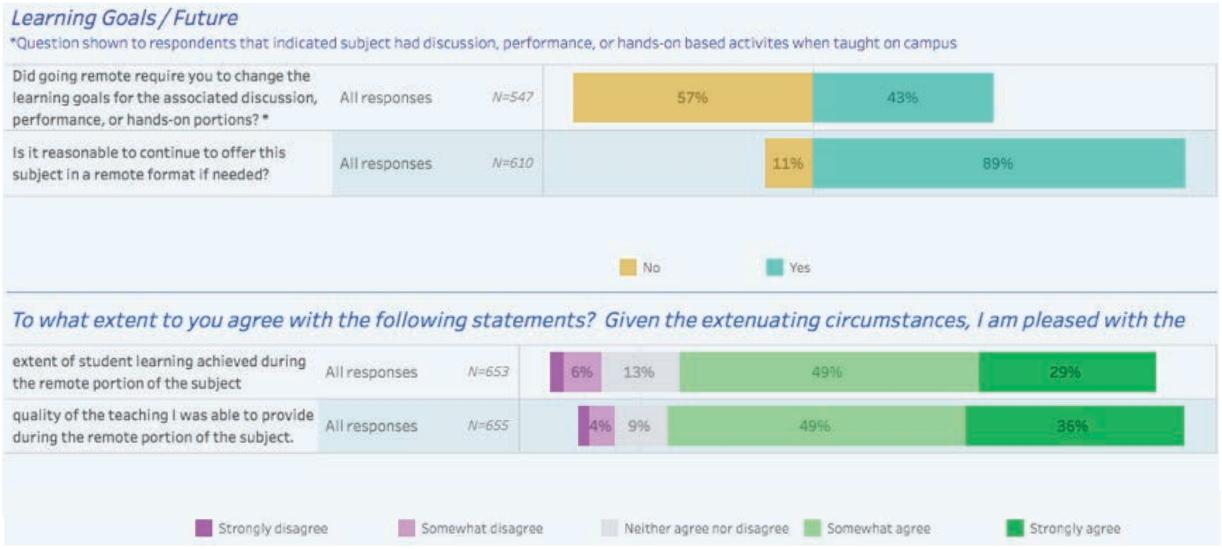
While many found the transition to online teaching overwhelming at first, most were up to the challenge. The Institutional Research survey and the interviews we conducted revealed a picture of instructors engaging creatively and energetically not only to teach online, but to do so with a fresh attitude towards teaching.

Discovering new opportunities

Some were surprised to learn that teaching online worked fine, or even better for particular topics, with one instructor noting, "I discovered that a particular component of a course I was teaching worked so effectively that I would continue to offer it in an online format in the future, even when we're back to 100% on campus teaching." Others were excited about the opportunities that teaching online could bring, such as allowing for guest lecturers to join the class from anywhere, or even collaborating with professors teaching similar courses at other institutions to create mixed group assignments and give students an opportunity to work with colleagues from around the world. When we exit this remote learning experience and return to the physical classroom, we're hopeful that some of these innovations will be maintained, such as asynchronous online learning to add to the

continued on next page

Moving Abruptly Online
Miyagawa and Perdue, from preceding page



face-to-face classroom teaching, as noted in Sarma 2020.

Engaging with students online called for an entirely different set of skills, and many voiced concern about their ability to manage the technology and maintain a sense of community, although some discovered ways to connect with students even more effectively once online. "I think the learning was a little bit deeper than when we're in the classroom," observed one. Similarly, some faculty found a surprising boon to the level of engagement once online, observing that "it felt much more relaxed than a usual classroom, things became a little bit more informal." Many faculty reported that office hours online were much more successful than in person, and others found that holding office hours immediately after the class allowed for a lively informal discussion that rarely occurred on campus.

This sudden change allowed for a re-evaluation of the teaching practices that were previously unquestioned. Said one instructor, "Having to change the course so dramatically did give me more focus on what was meaningful and important. For instance, a midterm exam and formal lectures became much less important, whereas student mentoring . . . and finding ways to support group interaction were more important." Across the campus, there was a significant interest in making classes more interactive, to spend more class time working in groups, solving problems, and discussing issues and less time lecturing.

The satisfaction of the faculty is shown in the survey, to which 830 instructors responded (56% response rate). Nearly 80% said that they were pleased or very pleased with the student learning achieved, and 75% were pleased or very pleased with the quality of instruction they were able to offer. (See charts next page.)

While many instructors found positive elements to transitioning to online teaching, there were many challenges as well. Some didn't find it as fulfilling as teaching in person. One bluntly remarked, "This is not the kind of teaching I want to do." The frustration with online teaching was particularly pronounced in hands-on or lab-based courses, which had to shift focus away from learning technical skills to experiment design and analysis. Others lamented, "This semester was terrible. I had to lower my standards." Most agreed that "teaching via Zoom is exhausting."

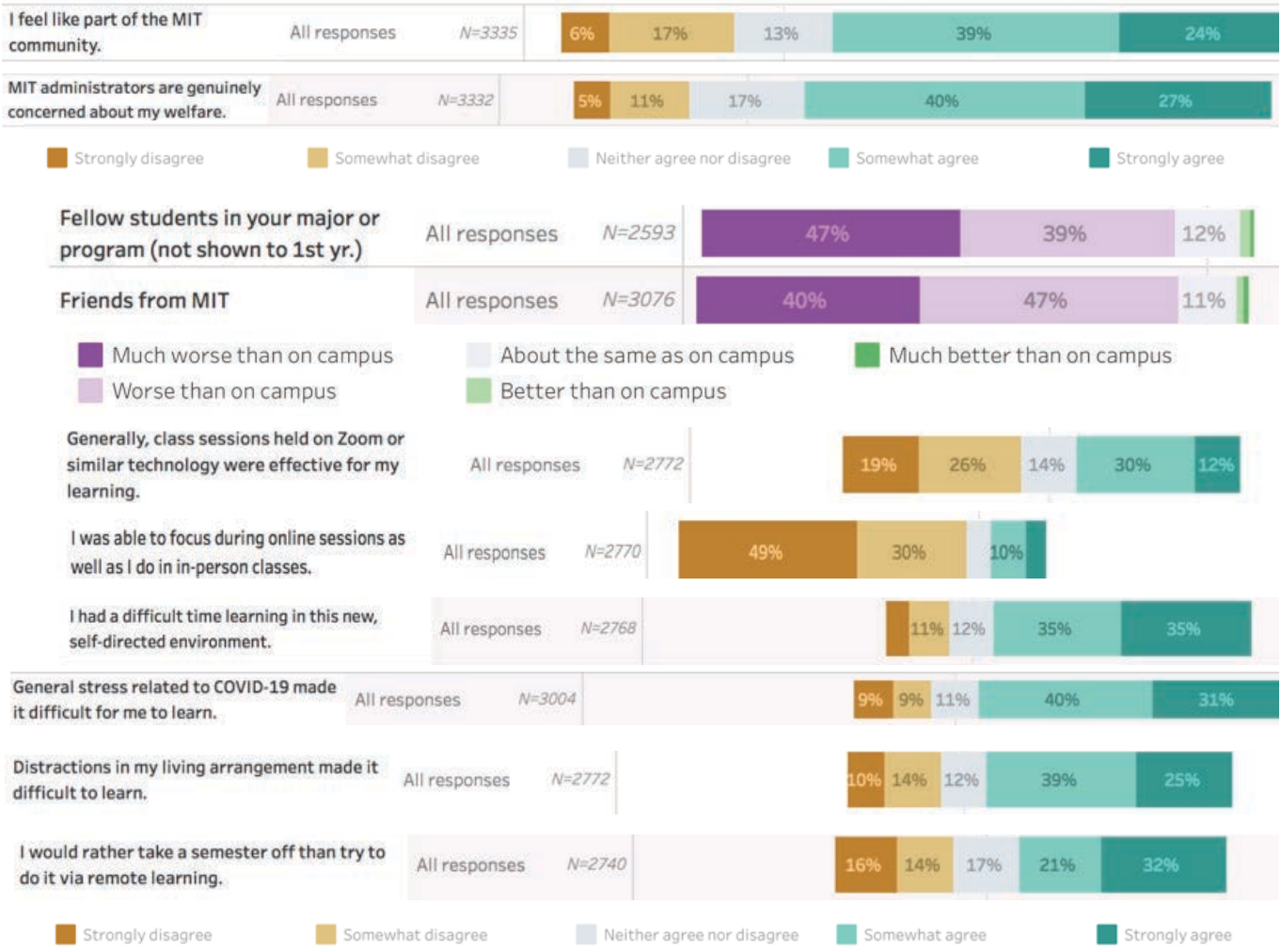
Teaching from home

Housing and family circumstances posed challenges for many faculty and students. Some noted that their home internet or computer equipment was not up to the task of teaching online, and in some cases that problem was exacerbated by their partner also working remotely or their children learning remotely at the same time. Some younger faculty members live in accommodations that are not conducive to teaching online. Said one, "I have no office space in my home because housing in the area is expensive for a junior faculty member. I chose to balance nearness to MIT campus against square footage in my home intending to use my office at MIT for most teaching activities." An instructor who lives alone spoke of having to spend all day in a small, cluttered apartment that led to a feeling of isolation.

Taking care of children while teaching at home posed a particularly challenging situation. A single mother found herself having to homeschool her children and take care of them throughout the day while teaching online. Another single parent of a young child noted, "some kind of child care would have made an enormous difference." Although providing childcare at home while teaching was difficult, one faculty member said, "No way I could have been a parent and a professor had I been required to be on campus in person. It would have forced me to take leave if I could not have taught remotely."

continued on next page

Moving Abruptly Online
Miyagawa and Perdue, from preceding page



Students

The IR student survey had a 30% response rate, with 3,342 students responding out of the 11,010 who were invited. Undergraduates had the highest response rate (39%), followed by Master's students (29%), and Doctoral students (22%).

Students generally were appreciative of the efforts MIT made to create online communities for learning and other activities, with 73% somewhat or strongly agreeing with the statement, "I feel like part of the MIT community."

Administrators are also seen in a positive light, with over two-thirds (67%) of students somewhat or strongly agreeing with the statement, "MIT administrators are genuinely concerned about my welfare," although 16% somewhat or strongly disagreed with the statement. Undergraduates reported lower levels of agreement, with 61% somewhat or strongly agreeing.

Although 84% agreed that they were supported by their family and friends, understandably, around 85% of the students reported that their engagement with fellow students in their major or program and with friends had become worse or much worse with the pandemic.

Most students had adequate hardware, software, and internet access for online classes. They were split on their reaction to the Zoom lectures, with 42% of respondents agreeing (somewhat or strongly) with the statement, "Generally, class sessions held on Zoom or similar technology were effective for my learning" while 45% disagreed with that statement. (The other 14% chose Neither agree nor disagree.)

Seventy-seven percent of the students agreed that the amount of content covered in remote learning was reasonable, and 88% agreed that the Emergency Grading policy eased the stress of the second half of the semester.

On the other hand, there were clear dissatisfactions with online learning itself, with students' views diverging from that of the faculty. When asked about the statement, "I was able to focus during online sessions as well as I do in in-person classes," 79% disagreed or strongly disagreed.

continued on next page

Moving Abruptly Online
Miyagawa and Perdue, from preceding page

Furthermore, 70% agreed with the statement, "I had a difficult time learning in this new, self-directed environment," which contrasts sharply with the faculty survey in which 80% were pleased or very pleased with the student learning achieved.

We attribute the difficulty the students had to a number of factors. The largest reported impact on their ability to learn was general stress related to Covid-19, with 71% of respondents agreeing that this stress made it difficult to learn.

Also, just as the faculty had to learn to teach online, students had to learn to learn online; but unlike the faculty, who had access to workshops and informal sessions with colleagues in which they exchanged tips for online teaching, students were mostly left to themselves to figure out how to learn in this new environment. Forty-four percent agreed that lack of access to campus support services made it difficult to learn. Learning while being at home was also a factor, as 64% of the respondents agreed that distractions in their living arrangement made it difficult for them to learn.

There was sufficient dissatisfaction that 53% of the students felt that they would rather take a semester off than do it via remote learning.

We attribute the difficulty the students had to a number of factors. The largest reported impact on their ability to learn was general stress related to Covid-19, with 71% of respondents agreeing that this stress made it difficult to learn.

In closing

The sudden transition to online teaching has spurred the faculty to undertake innovations and to question practices long taken for granted, such as noninteractive lectures and high-stakes exams. As an instructor remarked, "In the long run, it's been absolutely great for our teaching." Although the majority expressed enthusiasm, others did not feel that it worked so well. Teaching effectively online not only requires innovation and creativity, but the place for teaching – the home – also must meet certain basic requirements. This has exposed vulnerabilities among those who don't have the necessary housing, and family situations that forced already overextended faculty members to take on additional burden. The students appreciated the nimbleness with which MIT moved to make it possible for them to learn online, as well as the care that the Institute leadership and the faculty showed. However, having to learn online brought challenges caused by being outside the safe learning environment of the classroom, with some struggling with home situations that impeded learning, and many inadequately prepared to learn online, all the while living under the stress of the pandemic.

This work was in part supported by a generous grant from the Michelson 20MM Foundation. Parts of this article are excerpted from an article in *Inside Higher Ed* by Miyagawa and Perdue.

Shigeru Miyagawa is Senior Associate Dean for Open Learning and Professor of Linguistics *(miyagawa@mit.edu);*
Meghan Perdue is Digital Learning Fellow in the School of Humanities, Arts, and Social Sciences *(mperdue@mit.edu).*

Help us help you. We are a group of MIT Sloan Students trying to better understand your impressions of MIT Medical's services. Please fill out this anonymous, short (~3 min) survey. We are interested in your perceptions and experiences whether or not you have used MIT Medical before. Though many norms and processes have changed due to the pandemic, please answer these questions as though this was a normal year. Participate here.

Teach Talk

Teaching Under Covid: Losses Outweigh Gains

David Geltner
Alan Jasanoff
Caroline Jones

COVID HAS PRESENTED ALL walks of life with unique and unprecedented challenges. But there can be some silver linings. Now near the conclusion of our fall semester after a spring of dizzying turnarounds, what can we say, "big picture," about how remote online teaching is going at MIT?

Here's a view assembled from experiences the three of us have had. Importantly, we don't claim to be broadly representative, but perhaps our report from the trenches presents an informative sampling of diverse experiences with 100% remote online teaching and learning.

One of our subjects is a synchronously conducted graduate seminar with neither quantitative nor hands-on components,[1] while the others are traditional "MIT type" courses that have used disparate styles to convey basic, largely quantitative material using lectures and problem sets.[2] These three subjects have been able to reach students prohibited from being on campus, whether by Covid or visa snafus – and they are in multiple time zones that span the planet. Because they lack laboratory or studio elements, these classes encompass the general types of subject material and styles of teaching that can probably best lend themselves to online remote learning. With that in mind, considering them points to some general strengths and limitations of the educational environment we now work within.

Some good news? . . .

One of us (Geltner) had some prior experience with online teaching that enabled him, by investing the better part of the summer, to convert his subject to an entirely "flipped classroom" approach, that is, material presented asynchronously in lecture videos and other media, with live classes only for engagement and interaction/discussion, review of the problem sets, and consolidation of the learning.[3] Some learning scientists consider this flipped teaching approach to be most effective for online remote learning where lecturing is involved.[4] With support from those experts (e.g., coaching from MIT Open Learning), Geltner redeveloped and uploaded his entire 12-unit course electronically and has been using a wide range of the really very impressive tools and capabilities of the MITx platform.[5] This format is going very well. Geltner is teaching as much (maybe even slightly more) material than he has traditionally been able to assign (now in pre-recorded lectures and various other modalities), and all the evidence so far suggests that among the 47 mostly graduate students (including some mid-career), learning and, importantly, retention, is at least as good, maybe even slightly better than with his traditional in-person teaching. And students seem to be generally pretty satisfied with the combination of stored lectures and online live engagement. The asynchronous delivery mixes up the type of learning experience (reading, videos, exercises, self-administered immediate-feedback quizzes, online discussion forums), breaks it up into bite-size chunks, and gives the students flexibility in management of their time.

Some bad news . . .

In Jones's graduate Methods seminar, by contrast, it has been a struggle to compose the kind of community that was taken for granted in the usual intimate classroom (equipped with a blackboard for spontaneous insights, and a projector for pre-planned content presentations). Zoom-zombihood was a real threat after any given 50-minute timespan, whether the student was coming from 10 pm in Dubai or 5 am in California. So, Jones broke the seminar block into "solidarity cohorts" of five, each of which met for a half hour to frame their thoughts about difficult concepts, before the group of all 17 participants could join to share in discussion. (The professor, note, is "on point" for all of these slots.) This mechanism helped, but students needed many

continued on next page

1 Colloquially known as "HTC Methods," the subject 4.661 rotates among faculty in the History, Theory, and Criticism (HTC) section of the Department of Architecture. It currently has 17 graduate students enrolled, primarily from the Architecture Department; 12 are PhD candidates and 5 enrolled at the Master's degree level.

2 Geltner is teaching 11.431/15.426, "Introduction to Real Estate Finance & Investment," with 47 students from Sloan, the Center for Real Estate, the Department of Urban Studies, Harvard cross-registrants, and a smattering of MIT undergrads; Jasanoff is teaching 20.420, "Principles of Molecular Bioengineering," a required class for first-year graduate students in Biological Engineering, jointly led by Professor Ernest Fraenkel.

3 Presumably at least somewhat less investment would be required going forward.

4 To this point, we thank Krishna Rajagopal for pointing out the World Economic Forum summary found here: https://www.weforum.org/agenda/2020/07/returning-to-the-classroom-will-be-a-chance-to-rethink-its-purpose/

5 See MIT Open Learning's helpful resource edited by Jim Goodell and Aaron Kessler at this URL: https://openlearning.mit.edu/mit-faculty/residential-digital-innovations/science-remote-learning.

Teaching Under Covid
Geltner et al., from preceding page

more visits to office hours than usual, to achieve the kind of confidence in their learning that usually begins to swell after mid-semester, as they approach their research topic for a final scholarly paper.

Jasanoff's graduate core class faces related problems. Lectures in this course have used PowerPoint in the past, and the transition to Zoom has been friendly to this medium. Discussion during remote classes has been remarkably robust, abetted by smart and articulate students. Below the surface, however, things are less well. In normal times, successful lecturing involves taking the temperature of the room, probing the class as a whole with didactic questions and remedying quizzical looks with supplementary lessons. As with many challenging science classes, a major part of student success in Jasanoff's course also has to do with multipolar interactions peripheral to the classroom itself. These include the impromptu Q&A entertained before and after lectures, the free-form exchanges of traditional office hours, and the intensive interplay that takes place among students themselves, often at late-night homework sessions. All of these crucial in-person ingredients are severely attenuated in the remote learning format, despite efforts to compensate using Zoom recitations and other meet-ups. The loss of traditional interactions thus makes it far more difficult to tailor educational content to diverse backgrounds, placing unnatural burdens on teachers and trainees alike.

The crucial problem: What's missing . . .

And there's more bad news. All three of us agree that the new formats are not nearly as much fun as good old in-person classroom teaching and on-campus interaction. We speak for ourselves, but we feel sure this is true for the students too. When we speak of "fun" here, we don't mean frivolous or superficial fun. What we mean is intellectual fun – the shared adventure of a flash of insight, somewhere in the room, the "light-bulb moments," the opportunities for students to jump up and add something to the blackboard, or for faculty suddenly to think of a new way of framing an explanation. Sure, there are some of these spontaneous events that burst into the Zoom chat – a life-saving feature that builds community in this parallel online stream of comments, appreciation, questions, and added references. But these flashes are noticeably fewer than in typical in-person teaching, and harder to build on from the chat. How often does it happen, even after 30 years teaching, that when we are giving a lecture in person we'll have an insight in mid-sentence . . . "Gosh, I never looked at it that way before . . . ." The energy of anticipation in the room, the slight performance anxiety of the "stand and deliver," the affection that builds for and among students, our continuous work to reframe existing knowledge to accommodate emerging research, science, and scholarship – these are surely elements of why the teacher, too, finds moments of real inspiration in the classroom. Whether responding extemporaneously to a question asked spontaneously by a student, or having one's inherited and honed approach challenged by an incisive student mounting a blackboard critique – we find our development as intellectuals is stunted in online exchange.

Why is it that online teaching/learning falls short in these ways? Part of the reason is surely that we are simply not at our most engaged when we are online. Without the physical classroom, we lack the heightened state of arousal motivated by the presence of other people and the many social stimuli that impinge on us, usually below the radar of our consciousness. In three-dimensional space, others invite our gaze with theirs and convey the salience of classroom discourse through facial expressions and body language we are hardwired to attend to.[6] Such stimuli rarely make it through the Zoom interface. The energy of the classroom likely owes itself in part to the strangeness of the classroom space itself – and the fact that we dissociate it from areas for deskwork or domestic activities that mingle readily during the Covid era. Like the social environment provided by our peers, the three-dimensional topography we traverse every time we enter the classroom primes us physiologically for thinking and learning, for staying sharp and giving our best. When we go online, we lose these cues and instead receive a plethora of electronic distractors that work further against the pedagogical mission.

Our hope for the future . . .

As MIT contemplates the post-Covid campus, we want to offer our impassioned testimony about the costs to group learning experiences and "intellectual fun" we have felt in the virtualized classroom. These features are the essence of the MIT experience. Indeed, they are the essence of the college campus experience everywhere, the core of the research university, and the dream of Socratic pedagogy since "the groves of academe." At least for our courses, which include lecture/problem set and seminar formats, online teaching can do much of the job of transferring specialized information, historical knowledge, and tools of thought.

But we expect everyone teaching these types of all-online subjects would agree with us that they miss out on the sort of enriching interpersonal interactions that lured us all to MIT in the first place; and they fall desperately short in the "spark department," which is where creativity and innovation happen. College is not, or should not be, just "cookbook" learning. It is a shared endeavor that benefits from all of the physical and social resources of the university. In these difficult times, our fervent hope is that the Institute will find imaginative ways to marshal its resources to the fullest, ensuring that our faculty and students can soon recover what is most special about an MIT education.

6 Notably, staff have also shared with us that they experience "an unexpected incapacity" when it comes to taking notes from committee meetings on Zoom. A task that seemed routine "in real life" seems unaccountably difficult when sorting what is important in the flattened interface of the screen.

David Geltner is Professor of Real Estate & Finance, Department of Urban Studies and Planning, Director of Research, Center for Real Estate *(dgeltner@mit.edu);*
Alan Jasanoff is a Professor in the Department of Biological Engineering *(jasanoff@mit.edu);*
Caroline Jones is a Professor in the Department of Architecture *(cajones@mit.edu).*

The Problem with Philanthropy

Sally Haslanger

CHARITABLE GIVING IS ONE of the few things in the world that seems to be wholly good. Philanthropy, often characterised as private action for the public good, appears to earn the original meaning of the term: love of humanity. What could be a better example of virtue?

There's no question that individual giving to worthy causes provides important relief from state failures to promote justice and well-being. Philanthropy can also provide key support to resistance movements. Yet since wealthy foundations such as the Gates Foundation and Gates Trust hold assets that surpass most countries, there is reason to be concerned about the political significance of large-scale philanthropy.

Large-scale philanthropy is an exercise of power that is fundamentally undemocratic. Since charitable giving brings tax benefits, large-scale philanthropy can undermine the people's will in favour of the donor's own values. In effect, taxpayers subsidise the freedom of the rich to realise their own idiosyncratic vision of what is good while simultaneously depriving democratically chosen programmes of valuable public funds. (See Reich 2018.)

The structure of philanthropy around the world is increasingly a manifestation of plutocracy – government by the wealthy. Rewarding large-scale philanthropy through tax-relief and other subsidies gives the rich even more power than their wealth already provides to create a society that furthers their interests at the expense of others.

In fact, the decline of democracy and the rise of vast wealth disparities produces a looping effect: through funding political campaigns and legislative lobbying along with media management of public opinion, the rich can influence the government to protect the institutions and practices that enable them to accumulate even greater wealth. Wealth begets power and power begets wealth. And the cycle continues.

Of course, not all large-scale philanthropy is the same. Donations to the arts, research, education and poverty relief would seem to be more benign forms of generosity. However, we should hesitate before drawing broad conclusions. Let's consider the role of philanthropy in the academic world.

With the decline of US governmental support for higher education, colleges and universities rely increasingly on big donors. . . . However, there are serious problems with academic plutocracy that involve burnishing reputations, neglecting research in the public interest, and marginalizing humanistic and artistic endeavours.

With the decline of US governmental support for higher education, colleges and universities rely increasingly on big donors. Science is expensive and the money has to come from somewhere, so research is often paid for by the super-rich. However, there are serious problems with academic plutocracy that involve burnishing reputations, neglecting research in the public interest, and marginalizing humanistic and artistic endeavours.

To adapt Balzac, behind many great fortunes there are great crimes. It is difficult to hold the wealthy accountable for ethically questionable actions in any case, and large-scale philanthropy can make them untouchable. For example, the notable academic philanthropist, Steven Schwarzman, CEO of Blackstone, has an estimated net worth of $19.2bn. He recently gave $300m to MIT and £150m to Oxford. Schwarzman benefited personally from the sub-prime mortgage crisis which caused millions to default on their home loans.

Jeffrey Epstein was a major donor to scientific research and contributed millions to Harvard and MIT, with the hope, among other things, to "seed the human race with his DNA." He was also a level three sex offender, and although he never made it to trial for additional allegations, he was plausibly engaged in long-term sex trafficking. The Koch brothers donate money to universities across the US and are also known for their misinformation campaigns about climate change and efforts to repeal social security and minimum wage. And the Kingdom of Saudi Arabia is responsible for untold human rights violations, including the torture of feminist activists and the murder of journalist Jamal Khashoggi. Yet this does not stop universities from accepting donations from the Crown Prince.

continued on next page

The Problem with Philanthropy
Haslanger, from preceding page

Some argue that there is no problem in accepting large donations from the super-wealthy because there is no such thing as "dirty money", or that using bad money for good is the best thing we can do to offset the bad actions that generated it. But burnishing the reputation of donors can prevent them from being held responsible for the "great crimes" that produced their money, or legitimise illicit practices through association with prestigious, well-respected institutions like universities. But as Theodore Roosevelt said of Rockefeller: "No amount of charities in spending such fortunes can compensate in any way for the misconduct in acquiring them."

Moreover, gift exchange is reciprocal, whether this is intentional or not. Although gifts do not require immediate compensation, the point of gifts is to create or sustain relationships, and such relationships involve reciprocity of some kind. When academic institutions enter into dependence relationships with bad actors, they are vulnerable to influence in ways that are at odds with the ideals of academic integrity. This has been shown to be the case for Harvard's relationship with Jeffrey Epstein.

Corporations also donate to higher education through sponsored research. This is not exactly "philanthropy" because there are explicit agreements between researchers and industry that specify the nature of the project and its goals, the timing, funding, and so on. A substantial portion of scientific research would not be possible without such sponsorships. And there is no doubt that such research is often useful for a variety of applications beyond the intended corporate use.

However, even if not philanthropy, such arrangements are at risk of fostering academic plutocracy. Corporations contribute millions to labs in order to promote and guide research that improves their product and enhances their likelihood of making a profit. Some would argue that this is an important part of what research universities are for. But it is also clear that this funding model incentivises research on certain topics and not others, promoting certain ends and not others.

Although all inquiry is value-laden, there is little oversight or reflection concerning which values are guiding research. Scientific inquiry and engineering projects that address systematic injustice and the needs of the poor and marginalised do not have the same access to corporate funding. And those who have ethical scruples about the funder or the product are left with difficult choices: sign up or give up.

It is also a common complaint among those in the arts, humanities, social sciences, and even those engaged in purely theoretical science, that universities have been "corporatised". This means, among other things, that disciplines unable to attract large donors are often perceived as "luxuries" and have lost power in the academy. As a result, we are seeing significant reductions in funding for the humanities and even cuts to liberal arts programmes.

The corporatisation of the university also means that senior administrative posts are often filled by those who are effective in attracting "big money" and organising the institution to be maximally efficient – not in producing knowledge, but in sustaining itself financially. University administrators' focus on finances is the predictable result of a structural problem: the state's relinquishment of its responsibilities to higher education.

Treating universities as places where corporations can outsource their research and development has profound social consequences. Education in the arts, humanities and social sciences allows for deep reflection on democratic values; it expands our horizons by exposing us to different points of view; it provides historical self-understanding; and it gives us the skills to communicate creatively across differences.

Unlike a corporation, a university is a place that supports the simultaneous pursuit of scientific and critical inquiry: the interaction between different disciplines, including natural and social science, law, medicine, liberal arts and creative arts, promotes objectivity. In short, academic plutocracy – governance by the wealthy and those who must court the wealthy – undermines democracy and the pursuit of knowledge.

In the US at least, there is little hope for changes at the federal or state level to address these problems. We need more discussion of what might be done. There should be greater transparency, accountability, and oversight for research projects that depend on philanthropic or corporate funding. For example, universities should, in collaboration with researchers, articulate clear ethical guidelines for acceptance of gifts and sponsorships and institute measures to uphold these guidelines. Greater democratic self-governance could make universities more responsive to public concerns. And new funding models could redirect a percentage of donations to research in the public interest that does not attract the attention of corporations and large-scale philanthropists.

None of these suggestions would solve the problems completely. Money will always play a role in determining what science does, just as monied interests will always play a role in what public institutions and services are offered. But the stakes are high for the academy and for democracy generally. The question is whether power ought to lie in the hands of a few rich individuals and corporations or, if not, how we should better organize the collective pursuit of knowledge. Clearly, the wealthy are already in charge. Their philanthropy needs to be checked and the state must fulfil its responsibilities to the public.

Note: This article was originally published as part of the *New Statesman's* philosophy column: *Agora*. You can find a link to the original publication here.

Sally Haslanger is the Ford Professor of Philosophy and Women's & Gender Studies *(shaslang@mit.edu).*

In Memoriam

Angelika Amon

Tyler E. Jacks

The following is a resolution presented at the November 18, 2020 Institute Faculty Meeting.

IT IS WITH DEEP SADNESS that we record today a memorial resolution marking the passing of Professor Angelika Amon, our valued colleague, a groundbreaking researcher, an inspiring mentor, and a friend. Angelika passed away on October 29, 2020 at the age of 53, following a two-and-a-half-year battle with ovarian cancer. Described by many as a force of nature and a scientist's scientist, Angelika brought unmatched passion and integrity to everything she did. In addition to her many achievements in biomedical research, Angelika was a gifted and dedicated teacher and a beloved mentor. She was also an outspoken advocate for equality and justice. Although her life was too short, Angelika's legacy will last long into the future.

Angelika Amon made profound contributions to our understanding of the fundamental biology of the cell, deciphering the regulatory networks that govern cell growth and division in yeast, mice, and human cells, and shedding light on age-old questions at the heart of the cell cycle and the causes and consequences of chromosome mis-segregation. Her studies determined that carrying even a single extra chromosome significantly impacts the physiology of the cell, disrupting important processes such as protein folding and cellular homeostasis. She likewise showed that the presence of an extra chromosome sets off a cascade of negative effects within cells that may underlie some of the health problems associated specifically with Down syndrome. Still other work from the Amon lab has shed light on the relationship between how cells grow, divide, and age. Among other insights, this work has revealed that once cells reach a certain large size, they lose the ability to proliferate and are unable to reenter the cell cycle. This can result in senescence, an irreversible form of cell cycle arrest, and tissue aging. Her body of work illuminates important relationships between deep cell biological investigation and our understanding of human disease, and exemplifies the importance of discovery research in the broader scientific enterprise.

Born in 1967, Angelika grew up in Vienna, Austria. Playing outside all day with her three younger siblings, she developed an early love of biology and animals. She said that she could not remember a time when she was not interested in biology, initially wanting to become a zoologist. But in high school, she saw an old black-and-white film from the 1950s about chromosome segregation in the lily, and found the moment that the sister chromatids split apart breathtaking. She knew then that she wanted to study the inner-workings of the cell and decided to focus on genetics at the University of Vienna in Austria.

Angelika continued her doctoral work there under Professor Kim Nasmyth at the Institute for Molecular Pathology, earning her PhD in 1993 and making her first sig-

continued on next page

In Memoriam: Angelika Amon
Jacks, from preceding page

nificant contributions to our understanding of cell cycle dynamics.

Her doctoral work led to major discoveries about how one stage of the cell cycle sets up for the next. Her appreciation for the elegant genetics in Drosophila being done in Ruth Lehmann's lab at the Whitehead Institute led her to move to the United States in 1994 to pursue post-doctoral studies, where, unbeknownst to her at the time, she would make her permanent home. After Ruth's departure to New York, Angelika was awarded a prestigious Whitehead Fellowship, and she began the work that would be instrumental in establishing her as one of the world's leading geneticists: understanding how yeast cells progress through the cell cycle and partition their chromosomes.

In 1999, Angelika joined the faculty at MIT in the Department of Biology and the MIT Center for Cancer Research, the predecessor to the Koch Institute. A full professor since 2007, she also became the Kathleen and Curtis (1963) Marble Professor in Cancer Research, co-director of the Alana Down Syndrome Center at MIT, associate director of the Paul F. Glenn Center for Biology of Aging Research at MIT, a member of the Ludwig Center for Molecular Oncology at MIT, and an investigator of the Howard Hughes Medical Institute.

Her pathbreaking research has been recognized by many awards and honors, including the National Science Foundation Alan T. Waterman Award, the Paul Marks Prize for Cancer Research, the National Academy of Sciences Award in Molecular Biology, the Ernst Jung Prize for Medicine, and the Human Frontier Science Program Nakasone Award. Last year, she won the Breakthrough Prize in Life Sciences and the Vilcek Prize in Biomedical Science, and was named to the Carnegie Corporation of New York's annual list of Great Immigrants, Great Americans. She was also a member of the National Academy of Sciences and the American Academy of Arts and Sciences.

Angelika's astonishing intellect, deep curiosity, and infectious humor made her a sought-after and well-beloved teacher, mentor, and colleague. She was generous with her time and her sharp insights, developing a deep network of scientific collaboration and friendships. She took great delight in helping young scientists find their own "eureka moments," and has mentored more than 80 postdocs, graduate students, and undergraduates. Angelika was a fearless advocate for science and the rights of women and minorities and inspired others to fight as well. She was outspoken in her support of research and causes she believed strongly in. She was a role model for young female scientists and spent countless hours mentoring and guiding them in a male-dominated field. Every member of her lab was valued, and she took great care to listen and learn from all of them. Outside the lab, Angelika had a deep appreciation for music, politics, the New England Patriots, and all manner of scientific exploration.

Angelika's astonishing intellect, deep curiosity, and infectious humor made her a sought-after and well-beloved teacher, mentor, and colleague. She was generous with her time and her sharp insights, developing a deep network of scientific collaboration and friendships. . . . She was a role model for young female scientists and spent countless hours mentoring and guiding them in a male-dominated field.

Angelika is survived by her husband Johannes Weis, her two daughters Theresa and Clara Weis, and her three siblings and their families. Our thoughts go out to her family and loved ones, members of her lab, and, indeed, to all members of our community.

In honor of how much Angelika meant to us professionally and personally: Be it resolved that the Faculty of the Massachusetts Institute of Technology, at its meeting of November 18, 2020, records its profound sense of loss on the death of our beloved friend and colleague Angelika Amon, and expresses its deepest sympathy to her family.

Tyler E. Jacks is the David H. Koch Professor of Biology, Director, Koch Institute for Integrative Cancer and Chair, MIT Research Ramp Up Lightning Committee *(tjacks@mit.edu).*

LGBTQ+ Scientists and STEM

Timothy F. Jamison

I HOPE THIS FINDS YOU and yours well. I write with a fourfold purpose – to share with you a recent article in *Nature*, to offer a personal perspective, to highlight some important resources, and to facilitate connections among LGBTQ+ colleagues at MIT.

The article itself, "How LGBT+ scientists would like to be included and welcomed in STEM [science, technology, engineering and mathematics] workplaces," may be found here, and I would like to start by thanking George Barbastathis and Lorna Gibson for bringing it to my attention. I found it to be heart-wrenching, inspiring, and constructive, from the very first word of the article – "Invisible". It provides summaries of important studies whose data indicate a profound sense of marginalization of LGBTQ+ scientists. In fact, the data illustrate the troubling reality that exclusionary, offensive, or harassing behaviors are common experiences.

Even more moving in my view are the six personal accounts of experiences of LGBTQ+ scientists. For example, from Kaela Singleton, who is a postdoc in developmental neuroscience, is Black, uses she-series pronouns, and identifies as queer: "A professor once brought up my queerness in class as a deficit in my cognitive processing." I note the tragic irony of the comment vis-a-vis her chosen field of study. J.J. Eldridge (she/they), a professor of astrophysics who is transgender and identifies as non-binary, upon seeing an anti-trans article posted on the Facebook page of a conference they had organized: ". . .[I]t was the worst thing I've experienced – my entire self was being called into question." I encourage you to read these and the other four personal accounts in the article.

It provides summaries of important studies whose data indicate a profound sense of marginalization of LGBTQ+ scientists. In fact, the data illustrate the troubling reality that exclusionary, offensive, or harassing behaviors are common experiences.

I mentioned above that my impression of the article was also "inspiring" and "constructive." A wonderful example of both I found in the account provided by Sean Vidal Edgerton (he), who is gay, queer, and a virologist and scientific illustrator. He and his colleague Lauren Esposito are co-founders of 500 Queer Scientists, a website whose original primary aim was to raise awareness and now, about two years after its launch, features biographies and contact information of 1340 (as of this writing) LGBTQ+ scientists. In its own words, the impact and ongoing goal of this site is to "ensure the next STEM generation has LGBTQ+ role models; help the current generation recognize they're not alone; create opportunities for community connections and greater visibility within STEM."

That many at MIT may have had experiences comparable to those highlighted in the article saddens me. George (*gbarb@mit.edu*) and Lorna (*ljgibson@mit.edu*) have let me know that they are eager to hear from LGBTQ+ colleagues. The Institute Community Equity Office (ICEO) and Institute Harassment and Discrimination Response (IDHR) office are other important MIT resources. Please, of course, also feel free to contact me.

Timothy F. Jamison is Associate Provost and Robert R. Taylor Professor of Chemistry *(tfj@mit.edu).*

Does MIT Support DEI Education in STEM?
If so, creating DEI-M subjects could help

Jared D. Berezin

WE'RE INSPIRED TO OVERCOME our shortcomings as long as we're aware of them. When it comes to diversity, equity, and inclusion (DEI) at MIT, our longstanding shortcomings have gained newfound attention over the past six months. Students, staff, faculty, and administrators have hosted meaningful events, re-introduced previously ignored recommendations, put forth new demands, and the Institute has announced the beginnings of a DEI strategic plan.

Yet even in this moment of heightened Institute consciousness, a central question remains: will DEI education always be relegated to the margins of education at MIT?

When looking at the full listing of undergraduate subjects, we can be heartened by those that focus on issues of racial and social injustice in literature, history, media, and culture, as well as in management, philosophy, and urban planning. With a few exceptions, these subjects exist almost entirely in SHASS.

In contrast, DEI learning is nearly invisible in STEM (science, technology, engineering and mathematics) classrooms. Certainly, some technical instructors provide DEI-related lectures, assignments, or modules, but these are rare and often tangential to the primary focus of the subject. DEI learning opportunities in STEM occur primarily in the form of extracurricular workshops, events, committees, and working groups. These are asterisks clinging to work that is much more valued at MIT.

Outside of classrooms, systemic inequities are rarely at the forefront of departmental meeting agendas, hiring decisions, tenure priorities, and curriculum planning. For MIT students, teachers, and staff, DEI work is overwhelmingly extracurricular, voluntary, and segregated from the existing reward structures of the Institute.

Will MIT ever value the DEI labor of our community members, including our teachers and students? Will MIT ever prioritize DEI education across the curriculum, including within STEM majors?

When looking at the full listing of undergraduate subjects, we can be heartened by those that focus on issues of racial and social injustice in literature, history, media, and culture, as well as in management, philosophy, and urban planning. . . . In contrast, DEI learning is nearly invisible in STEM (science, technology, engineering and mathematics) classrooms.

A call for Diversity, Equity, and Inclusion in the Major (DEI-M) subjects

One possible way to center DEI education within the STEM curriculum would be to create a Diversity, Equity, and Inclusion in the Major (DEI-M) subject in every department. The DEI-M subject could focus on the historical, ongoing, and anticipated systemic injustices *within the specific discipline*. For example, a DEI-M subject in Course 22 could involve an examination of racial and gender oppression within nuclear science and engineering (NSE), both in academia and industry. The DEI-M subject might also explore how the products and technologies developed in the field impact marginalized communities, both positively and negatively.

The DEI-M subject could also review case studies of prior and current anti-racist and anti-misogynist activism within the particular field. The coursework could also be change-oriented, with assignments that ask students to generate research-based DEI interventions in academic and industry contexts. Ultimately, students in every major would have the opportunity to interrogate the DEI landscape of their chosen field, imagine what justice could look like in their profession, and consider how they might generate positive change.

Is DEI education necessary for STEM majors?

Some might argue that a STEM major does not need to understand DEI issues in order to be a "successful" computer scientist, or a "great" physicist, or an "innovative" chemist. This perspective suggests that learning about systemic injustices has no place within STEM education, because there is much more important technical work to be done. It's high time we expand our conceptions of "success," "greatness," and "innovation" for the sake of our students and future generations.

continued on next page

Does MIT Support DEI Education?
Berezin, from preceding page

While some STEM faculty might be excited to welcome a DEI-focused subject within their department, others might feel reluctant. Reactions might include: "There's no room in our curriculum for DEI stuff," "Don't they have HASS classes for this sort of thing?", and "Who would even teach this in our department?" These types of imagined responses are understandable. The inclusion of a DEI-M subject would require financial and human resources, as well as an expansion of the department's educational mission. The reticence to "make room for DEI stuff" may also stem from the desire to avoid the discomfort of sharing with students the oppression that exists within our own disciplines.

Fortunately, we have a model for successful curriculum integration at MIT: the Communication Requirement framework. Prior to the launch of the Communication Requirement, MIT students reported a lack of communication growth during their undergraduate years, and alumni reported their unpreparedness for the communication work expected of them in their professions. MIT responded to this knowledge gap by embedding communication instruction across the curriculum, including the development of communication-intensive (CI) subjects within STEM majors. Beginning with the class of 2005, undergraduates have been required to complete both CI-H and CI-M subjects, each of which contributes to their learning in different ways. The CI-M subjects serve a unique and targeted purpose – they are situated directly within the majors to engage students in the communication practices of their specific field. These subjects are typically taught by an instructional team with relevant areas of expertise.

We could learn from the success of this integrated model in the effort to embed DEI learning across MIT. Situating DEI-M subjects within the majors would make the content urgently relevant and readily transferable for students, while communicating a broader message that DEI teaching and learning is valued at MIT. Since each DEI-M subject would be tailored to a specific field, a teaching team with varied lived experiences and expertise rather than a single instructor would likely be needed. Assembling such an instructional team would require developing an effective hiring process and securing financial resources. The hiring process itself could be a team effort among MIT's officers for diversity, department heads, faculty, students, and ICEO John Dozier.

Fortunately, we have a model for successful curriculum integration at MIT: the Communication Requirement framework. . . . We could learn from the success of this integrated model in the effort to embed DEI learning across MIT. Situating DEI-M subjects within the majors would make the content urgently relevant and readily transferable for students, while communicating a broader message that DEI teaching and learning is valued at MIT.

Is MIT ready to center DEI education within the STEM curriculum?

Improving the systemic injustices underlying our school and society, including those within the disciplines we teach, requires an all-hands-on-deck commitment. Embedding this difficult work within all majors, and rewarding students, teachers, and staff for their DEI labor would represent a turning point in the purpose and scope of technical education at MIT.

Imagine scrolling through the MIT subject listings and seeing a DEI-M subject in every department. Imagine seeing justice woven into the fabric of technical learning at MIT. Every student could leave the Institute ready "to work wisely, creatively, and effectively for the betterment of humankind," as the MIT mission urges. We could provide thousands of undergraduates the opportunity to critically examine their chosen field, and incorporate justice as part of, rather than separate from, their technical work.

To develop an inclusive curriculum, however, our Institute leaders would need to believe that there is a role for DEI education within STEM, and that such an endeavor would be worth the trouble and investment. I think an experiment that attempts to embed DEI learning within the STEM curriculum – whether through DEI-M subjects or some other explicit approach – is certainly worth a try, and I hope you do too.

If you support embedding DEI learning within STEM education at MIT you can add your name and ideas to this form, which will be shared with MIT leadership in the coming weeks.

Jared D. Berezin is a Lecturer II, Writing, Rhetoric, and Professional Communication (WRAP) in the Department of Comparative Media Studies/Writing *(berezin@mit.edu).*

MIT Volpe Construction Plan Will Damage Faculty Housing Initiative

WE ARE WRITING TO BRING to your attention an issue that has deeply troubled us. For the many years we have been at MIT there has been concern about the lack of opportunities for students and faculty to develop out-of-class social and intellectual exchanges. The faculty, living at some distance from the campus due to the availability and the cost of housing in Cambridge, made this aspiration difficult to achieve.

But, an initiative started under the leadership of president emeritus Paul Gray, led a group of MIT faculty and staff to develop a residential project close to the campus that would help bring older and younger members of our community closer together. After many trials and difficulties due to the recession of 2008, a suitable location was found at 303 Third Street in Cambridge, adjacent to the campus and facing on to a sun-filled open space at the Volpe Transportation Center.

Although the recession compromised the full realization of the initial intent, many of us persisted in buying our homes at 303 Third Street. Many of the condominium units remained as rental units and a large proportion of the renters currently are MIT students or are affiliated with MIT.

In 2016, MIT's Investment Management Company (MITIMCo) acquired our neighbor, the 14-acre Volpe Transportation Center site. The City of Cambridge undertook a series of studies, along with MIT and community members, regarding how best to develop this property. The following year MIT sought and received zoning changes that significantly increased the development rights on the Volpe site. Four of the 14 acres were set aside for a new Volpe Transportation Center building. The remaining 10 acres were to be developed 60% for commercial buildings and 40% for residential buildings. The development was also required to provide 25% of the site for public open space.

MITIMCo's architect produced four suggested site plans for the development. Only one of the plans did not do serious damage to our homes which face the site. We expressed our preference for the least destructive of the plans and shortly thereafter, in 2017, MIT suspended further discussions about the planning of the remaining site, explaining that they were

MITIMCo's architect produced four suggested site plans for the development. Only one of the plans did not do serious damage to our homes which face the site.

Current MITIMCo Proposal

continued on next page

MIT Volpe Construction Plan
continued from preceding page

going to focus on construction of the new Volpe building.

For three years we have waited patiently for a revival of discussions. Then, suddenly in the last few weeks, MITIMCo announced a plan that would place a 250-foot-high building in very close proximity and broadside across the full length of our 85-foot-high building, which is fewer than 40 feet away. The result will be that we will no longer have the light, air, and sunshine that has made our homes habitable and enjoyable. The Investment Management Company has several other development choices for the site that do not do the harm their current plan would impose on us and the MIT student families that live in our building. These options meet the development criteria established by the City and are consistent with MIT's desire for a reasonable economic return.

We seek your assistance and support to convey to the MIT authorities responsible for the Investment Management Company to have them refrain from doing irreparable damage to our homes and to destroy the years of effort that went into fulfilling Paul Gray's and our dream of creating an island of MIT civility in Kendall Square.

We would be grateful if you could express your support for preserving our homes and the initiative it represents by writing to MIT President Rafael Reif (*reif@mit.edu*), Denis Bovin '69, Chair of the MIT Investment Management Company (*bovin@alum.mit.edu*), and Diane Greene, Chair of the MIT Corporation (*dgreene@mit.edu*).

If you would like more information, or to contact the authors, please write: Bob Simha (*simha@mit.edu*).

Rosemary Booth
Prof. Jack Dennis, Department of Electrical Engineering and Computer Science
Martha Goodway '57, Materials Science, Smithsonian Institution
Prof. David Litster, Department of Physics
Gerald O'Leary, BS '63, MS & EE '65, Lincoln Lab
Prof. Bjorn Poonen, Department of Mathematics
Roger Roach, Whitehead Institute
O. Robert Simha '57, Department of Urban Studies and Planning
Jane Sanford Stabile
Lawrence Stabile '74, Electrical Engineering and Computer Science

The Final Commencement

Richard Stanley

THE HEAT WAVE MERCIFULLY departed New England just one day preceding the 246th commencement ceremony of the Massachusetts Institute of Technology. The usual opening pomp was absent. MIT's President expressed her profound sadness and regret that the Class of 2115 would be MIT's final graduating class.

After the ceremony this august institution would close its doors forever. The eighteen students solemnly received their diplomas in the 108-degree heat. It went without saying that all of them majored in environmental engineering.

Richard Stanley is a Professor Emeritus in the Department of Mathematics *(rstan@math.mit.edu).*

Note: This is a flash fiction story that will appear in the anthology *81 Words*. All stories in this anthology have exactly 81 words.