

MIT Faculty Newsletter

<https://fni.mit.edu>

in this issue we offer an “Open Letter to Presidents Biden, Putin, and Zelensky: Pursue Diplomatic Solutions to Avoid Nuclear War” ([page 5](#)); “Graduate Student Unionization: A Positive Force for All at MIT” ([page 8](#)); and an “MITx Update for MIT Faculty: Fall 2022” ([page 11](#)).



Logo of the Air Force Nuclear Weapons Center

Never Mind the Firehose, You Can't Even Lead Them to Water

W. Craig Carter

I'M CO-TEACHING THIS SEMESTER and have been attending my co-instructor's lectures. I've been sitting behind the students and observing how they are engaging.

It's not pretty.

My rough estimates are that 30% skip the lectures. Of those that attend, 25% are focused on their cellphones, 25% are browsing social media on their laptops or tablets. I've seen a student playing a video game during a lecture; students behind that student were focused on that video game and not the lecturer. Hallway conversations consistently provide anecdotal evidence that this is widespread student-behavior. This suggests that over half of our admitted undergraduates are occupying seats that were denied others that would have longed to benefit from them.

[continued on page 7](#)

How Deep is Your Love of Free Expression?

Malick W. Ghachem

WHO AMONG US HAS NOT, at one point or another, entertained the heretical thought that MIT faculty meetings can sometimes seem like less than scintillating affairs? Let those without sin cast the first stone at colleagues who, no doubt under the pressure of long hours and many stressful responsibilities, have wondered whether our deliberations are all that consequential. After all, until a quite recent point in the Institute's history, very few of us (myself included) have ever even attended an Institute faculty meeting.

If bankruptcy happens gradually, then suddenly (as Hemingway put it), the shift towards more widespread participation in MIT faculty governance happened suddenly, then virtually. The turning point was the September 18, 2019 meeting held to discuss the turmoil over

[continued on page 6](#)

Editorial Avoiding Nuclear War

SIXTY YEARS AGO, THE Cuban Missile Crisis brought the world close to nuclear war. At present, threats by North Korea's Kim Jong-un, former US President Donald Trump, and most recently by Russia's Vladimir Putin to launch nuclear weapons have sharply increased fears that the world is headed once again toward such a disastrous path. In October, Ukrainian President Zelensky called for a NATO preemptive strike on Russia, and President Biden further ramped up the tension with talk of “nuclear Armageddon.”

Members of the MIT Faculty and administration have a long history of trying to educate colleagues and citizens of the dangers of nuclear war <https://www.science.org/doi/10.1126/science.aax1180>, and of the need to take diplomatic paths toward nuclear disarmament.

[continued on page 3](#)

contents

The MIT Faculty Newsletter Editorial Board

Robert Berwick (Vice-Chair)

Electrical Engineering & Computer Science

Nazli Choucri

Political Science

Christopher Cummins

Chemistry

Sally Haslanger

Linguistics and Philosophy

Jonathan A. King (Chair)

Biology

Helen Elaine Lee

Comparative Media Studies/Writing

Cesar McDowell (Secretary)

Urban Studies and Planning

Fred Moavenzadeh

Civil & Environmental Engineering/Engineering Systems

Ruth Perry

Literature Section

Nasser Rabbat

Architecture

Balakrishnan Rajagopal

Urban Studies and Planning

Robert P. Redwine

Physics

Warren Seering

Mechanical Engineering

David Lewis

Managing Editor

*Editorial Subcommittee for this issue

Vol. XXXV No. 2

November/December 2022

	01	Never Mind the Firehose, You Can't Even Lead Them to Water	W. Craig Carter
	01	How Deep is Your Love of Free Expression?	Malick W. Ghachem
Editorial	01	Avoiding Nuclear War	
	05	Open Letter to Presidents Biden, Putin, and Zelensky: Pursue Diplomatic Solutions to Avoid Nuclear War	
	08	Graduate Student Unionization: A Positive Force for All at MIT	Rahul Jayaraman, Angela Lee, Arrow Minster
	11	MITx Update for MIT Faculty: Fall 2022	Christopher Capozzola
Numbers	12	Estimated Global Nuclear Warhead Inventories, 2022	

Photo Credit: Page 1: Wikimedia Commons

Address

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

Website

<https://fnl.mit.edu>

Telephone 617-253-7303

Fax 617-253-0458

Email fnl@mit.edu

Subscriptions

\$15/year on campus

\$25/year off campus

Avoiding Nuclear War
continued from page 1

With the emergence of the Cold War after the end of World War II, leaders in both the Soviet Union and the US recognized that the accelerating nuclear arms race endangered their own nation's security, and that claims of an effective defense against nuclear weapons attacks were groundless. Nonetheless, the US and the USSR proceeded to amass insane numbers of nuclear weapons on bombers, submarines, and in fixed silos, under the shibboleth of Mutually Assured Destruction. Luckily for all of us, Jack Kennedy and Nikita Khrushchev saw the light and pulled back from the brink of nuclear war; they negotiated a secret deal in which the Soviet Union agreed to remove its missiles from Cuba if the US would promise not to invade that island and to remove its missiles from Turkey (on the Soviet border), a promise which it kept six months later. MIT President Jerome Wiesner was Kennedy's Science Advisor and an ardent advocate of nuclear disarmament.

In June 1963, JFK delivered an historic speech at American University calling for active steps toward nuclear disarmament, ushering in a period of *détente* in relations between the super powers. The US, UK, and USSR signed the limited test ban treaty in Moscow in August 1963: "A Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space, and Under Water." Meanwhile, the Strategic Arms Limitation Talks (SALT I) led to the Anti-Ballistic Missile (ABM) Treaty of 1972, which limited the deployment of missile defense systems in each nuclear country to its national capital and one ICBM site. The ground-breaking SALT I treaty was signed in 1972 by Richard Nixon, certainly no pacifist, and Leonid Brezhnev. The treaty restricted the number of nuclear missile silos and submarine-launched missile tubes for a five-year period.

President Reagan – with his denunciation of the USSR as the evil empire, proposals for Star Wars missile defense

programs, and increased Pentagon spending – seemed intent on pulling out of these agreements. Influenced in part by the Nuclear Weapons Freeze Campaign, Reagan reversed course. Despite continuing Cold War conflicts, Gorbachev and Reagan signed the Intermediate-Range Nuclear Forces (INF) Treaty. Its implementation eliminated, by 1991, major portions of the two countries' arsenals, including 2,692 ground-launched, mid-range nuclear missiles (with ranges from about 300 to 3,400 miles). It also included comprehensive verification measures.

Meanwhile, the development of nuclear weapons by additional states led to calls for an international framework to halt proliferation. Under the aegis of the United Nations, three countries – the USSR, UK and US – signed the [Treaty on the Nonproliferation of Nuclear Weapons](#) (NPT) on July 1, 1968, which limited the spread of nuclear weapons and committed the nuclear powers to pursue general disarmament. Today, 190 countries are party to the NPT, making it the most widely adhered-to arms control agreement. Only India, Israel, North Korea, Pakistan, and South Sudan remain outside the treaty – the first four of which possess nuclear weapons.

President Obama called for a return of the US to leadership in nuclear disarmament. In April 2010, Obama and Russian President Medvedev signed a new strategic arms reduction agreement to replace the first START treaty, which expired in 2009. The so-called New START treaty called for a 30 percent reduction of deployed warheads and reduced caps on intercontinental ballistic missile launchers, submarine-based ballistic missile launchers, and heavy bombers equipped for nuclear weapons. Both the US Senate and the Russian Parliament ratified New START, and it went into force in February 2011.

The US Reverses Course and Pulls Out of Active Treaties

Sadly, after a period in which the treaties did indeed reduce the world nuclear armaments, the US reversed course. In

2001, President George W. Bush announced US withdrawal from the ABM Treaty, effectively ending the agreement. More recently, then-President Trump withdrew from the Intermediate Nuclear Weapons (INF) Treaty and the Open Skies program. The INF treaty limited deployment of nuclear weapons, particularly in Europe, and was an important determinant of national security for Russia and its NATO-affiliated adversaries. The Open Skies policy allowed each nation to fly over the other's territory to monitor large facilities and thereby increase confidence in treaty compliance.

Currently, nations throughout the world are pressing to reduce the danger of nuclear war by promoting the recent Treaty on the Prohibition of Nuclear Weapons. The war in Ukraine has sharply raised the need for reining in, rather than intensifying, the risk of the use of nuclear weapons. As of the recent anniversary of the signing of the Treaty on the Prohibition of Nuclear Weapons, 91 nations had signed the Treaty and 68 had formally ratified with the United Nations. Sadly, the nations deploying nuclear weapons have not signed, but the international pressure is mounting.

Though little publicized within the US, there are five nuclear-weapon-free zones (NWFZ) throughout the world, regions in which member countries commit themselves not to manufacture, acquire, test, or possess nuclear weapons. Four of them span the entire Southern Hemisphere. The five regions currently covered under NWFZ agreements include: Latin America (the 1967 Treaty of Tlatelolco), the South Pacific (the 1985 Treaty of Rarotonga), Southeast Asia (the 1995 Treaty of Bangkok), Africa (the 1996 Treaty of Pelindaba), and Central Asia (the 2006 Treaty of Semipalatinsk).

Who Benefits from the US Withdrawal from Nuclear Weapons Treaties?

Much of the manufacture and maintenance of nuclear weapons is carried out by a small number of private corpora-

[continued on next page](#)

Avoiding Nuclear War

continued from preceding page

tions. This is a unique and uniquely profitable business. The contracts cannot be outsourced to Chinese, Mexican, Indonesian, or other foreign corporations, and the market is guaranteed with no competition, since all the products will be purchased by the US government. The corporate leaders of the largest weapons contractors earn more than \$20,000,000 annually, thanks to US taxpayers and Congressional appropriators.

In response to Obama's call for pursuing nuclear disarmament, the defense industry and Pentagon advocates of continued nuclear weapon development put forward a program for upgrading and modernizing all three legs of the Nuclear Triad over the next 25 years – the fixed land-based Intercontinental Ballistic Missiles (ICBM), submarine-launched missiles, and bombs and missiles carried on long-range aircraft. The overall budget is estimated to be in the range of two trillion dollars. The new weapons delivery system the Government is pursuing will result in contracts with price tags in the tens of billions of dollars. The initial contracts already approach \$50 billion this year. This lucrative business depends on continuation of the nuclear arms race.

The ICBM force of 400 giant Minuteman III missiles is the most dangerous of the three legs of the Nuclear Triad. The missiles are in fixed known positions. If an attack is detected, they can't be moved. US policy is to fire rather than lose them. Once launched, they can't be reversed. They serve no national secu-

rity purpose, but rather actively decrease national security.

The industry and its extensive lobbying apparatus actively support replacing them with a new generation of ICBMs, just as vulnerable, just as destabilizing. The Air Force has been awarding contracts which will total close to \$100 billion for a new generation of land-based missiles. Many of these taxpayer-funded contracts will go to a few corporations, such as Boeing, Lockheed-Martin, Raytheon, and other nuclear weapons contractors.

The Dangers of Upgrading Nuclear Weapons Systems

The upgraded nuclear weapons, whether fixed in silos, on submarines, or carried by bombers, are all described as more reliable, more accurate, and more lethal than their predecessors. From the point of view of potential adversaries such as Russia or China, they resemble weapons designed for a first strike – to eliminate the opponent's deterrent force. One consequence is that adversaries then decide that their nuclear forces need upgrading too. A new nuclear arms race can only increase the chance of an inadvertent or intended nuclear exchange.

However, even if the weapons are never used, their \$2 trillion price tag will undermine the civilian economy. The lives lost from inadequate health care and pandemic responses, from inadequate housing, from polluted water, will not be included in the National Defense Authorization Act (NDAA) costs. But as Dr. Martin Luther King Jr. first pointed out, the bombs dropped abroad eventually take their toll at home. Thus, a few months

ago, Congress tacked on \$40 billion to the 2023 NDAA, bringing it up to well over \$800 billion, more than 50% of the entire Congressional discretionary budget. But they couldn't find \$5 billion for ensuring universal vaccination and protection from Covid-19. In fact, the weapons budgets are a major factor in the growth of economic inequality in the US, since taxes from hundreds of millions of low- and middle-income Americans are transferred to contracts whose benefits are reaped by a tiny fraction of the population.

Given the implicit and explicit threats traded by world leaders about the possible use of nuclear weapons, readers might doubt the availability of a path to continued negotiation. In fact, the Biden administration has insisted they are open to talks on extending the New START treaty, and Kremlin spokesperson Dmitry Peskov has said that such negotiations are long overdue (*Boston Globe*, August 3, 2022, p. A3).

As indicated at the beginning of this editorial, MIT Faculty members have a long and important history of working to reduce or eliminate the dangers of nuclear war. This remains a critical issue for all of us. This issue of the *MIT Faculty Newsletter* includes an open letter from MIT faculty and others to Presidents Biden, Putin, and Zelensky ([next page](#)) calling on them to advance negotiations for a cease-fire in Ukraine, and to rejoin the INF and Open Skies treaties. We hope you will consider signing at: <https://fnl.mit.edu/sign-open-letter-to-presidents-biden-putin-and-zelensky>.

**Editorial Board of the
MIT Faculty Newsletter**

Open Letter to Presidents Biden, Putin, and Zelensky: Pursue Diplomatic Solutions to Avoid Nuclear War

Please sign this letter from college and university faculty and staffs.

SIXTY YEARS AGO, THE Cuban Missile Crisis brought the world close to nuclear war. At present, threats to launch nuclear weapons by North Korea's Kim Jong-un, former US President Donald Trump, and most recently by Russia's President Vladimir Putin have sharply increased fears that the world is headed once again toward such a disastrous path. In October, Ukrainian President Zelensky called for a NATO preemptive strike on Russia and President Biden further ramped up the tension with talk of "nuclear Armageddon."

The tragic loss of life in Ukraine is not limited to Ukrainians and Russians, but is embroiling the world population in an economic downturn, increasing food insecurity and famine, and diverting desperately needed national resources from productive civilian to destructive military ends.

After the acute Cuban danger, university faculty and staff were important

voices in pulling back from the brink of nuclear confrontation and its possible catastrophic outcome, and of taking diplomatic paths toward nuclear disarmament. In June 1963, JFK delivered an historic speech at American University calling for active steps toward nuclear disarmament and ushering in a period of *détente* in relations between the super powers. MIT President Jerome Wiesner was Kennedy's Science Advisor and an ardent advocate of nuclear disarmament. He mobilized support from physicist colleagues at MIT, Princeton, Cornell, and other universities.

The US, UK, and USSR signed the limited test ban treaty in Moscow in August 1963: "A Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space, and Under Water." Meanwhile, the Strategic Arms Limitation Talks (SALT I) led to the Anti-Ballistic Missile (ABM) Treaty of 1972, which limited the deployment of missile defense systems in each nuclear country to its national capital and one ICBM site. The

ground-breaking SALT I treaty was signed in 1972 by Richard Nixon, certainly no pacifist, and by Leonid Brezhnev.

Influenced in part by the Nuclear Weapons Freeze Campaign, and despite continuing Cold War conflicts, Gorbachev and Reagan signed the Intermediate-Range Nuclear Forces (INF) Treaty. Its implementation eliminated, by 1991, major portions of the two countries' arsenals, including 2,692 ground-launched, mid-range nuclear missiles.

The war in Ukraine has sharply raised the need for reining in, rather than intensifying, the risk of the use of nuclear weapons. Avoiding nuclear war requires diplomatic solutions to the Ukraine crisis.

We call upon you, as the leaders of the most involved nations, to initiate bilateral and multilateral talks aimed at rapidly negotiating a ceasefire, and then actively pursuing the difficult but necessary steps to effective peace treaties.

[Select [this link](#) to sign the letter online.]

Signatories (Institutions for identification only):

Prof. Robert Redwine, Dept. of Physics, MIT, Cambridge MA 02139

Prof. Jonathan King, Dept. of Biology, MIT, Cambridge, MA 02139

Prof. Balakrishnan Rajagopal, Dept. of Urban Studies and Planning, MIT, Cambridge, MA 02139

Prof. Valentine M. Moghadam, Sociology and International Affairs, Northeastern University, Boston, MA 02115

Prof. David Goldenberg, Dept. of Chemistry, University of Utah, Salt Lake City, UT

Prof. Edward Loechler, Dept. of Biochemistry, Boston University, Boston, MA

Prof. Gary R. Goldstein, Dept. of Physics and Astronomy, Tufts University, Medford, MA 02155

Prof. Robert Pollin, Dept. of Economics, Univ. of Mass, Amherst, MA

Prof. Suzanne Scarlata, Dept. of Biochemistry, Worcester Polytechnic Institute, Worcester, MA

Prof. Peter C. Kahn, Dept. of Biochemistry & Microbiology, Rutgers University, New Brunswick, NJ 08901

Prof. Robert Berwick, Dept. of Computer Science, MIT, Cambridge, MA 02139

Bradley W. Filippone, Francis L. Moseley Professor of Physics, California Institute of Technology

Prof. Douglas H. Beck, Dept. of Physics, University of Illinois at Urbana-Champaign

Ricardo Alarcon, President's Professor of Physics, Arizona State University

Christopher Cummins, Henry Dreyfus Prof. of Chemistry, MIT, Cambridge, MA

Prof. Daniel Holz, Dept. of Astronomy & Astrophysics, Univ. of Chicago, Chicago, IL

Prof. Richard G. Milner, Dept. of Physics, MIT, Cambridge, MA

Ruth Perry, Ann Fetter Friedlaender Professor of Humanities, Emeritus, MIT, Cambridge, MA

Prof. Helen Elaine Lee, Comparative Media Studies/Writing, MIT, Cambridge, MA

Prof. Ceasar McDowell, Dept. of Urban Studies and Planning, MIT, Cambridge, MA

Prof. Stuart Newman, New York Medical College, Valhalla, NY

Prof. Alan Robock, Dept. of Environmental Sciences, Rutgers University, New Brunswick, NJ

**How Deep is Your Love
of Free Expression?**

Ghachem, from page 1

the Epstein affair. It continued under the extraordinary circumstances of the Covid lockdown. The protracted negotiations over MIT's Free Expression Statement this semester provide further evidence that there is a hunger for more meaningful engagement in faculty governance – with or without a Faculty Senate.

But it is fair to wonder whether this relatively newfound willingness to engage is driven primarily by highly visible controversies like the Epstein and Carlson Lecture affairs. Over the course of the fall 2022 semester, no less than half a dozen faculty meetings will have been consumed by the unwieldy business of large numbers of faculty trying to do a group edit of a complicated document in real time. (If the Continental Congress could do it in 1776, so can we – although they did not have quite as many chefs in the kitchen as do we.) Will our engagement with free expression persist even after the statement is finalized, hopefully in time for Santa to deliver it to everyone's inbox before 2022 is out?

If not, then there will be more than a grain of truth to the suggestion that even our well-attended meetings of the past few months have not necessarily been time well spent. Adopting a free expression statement was only one of 10 recommendations contained in the FEWG report. No matter how long we continue to debate it, the statement will never fully live up to the inflated expectations people seem to have of it. Unless the faculty have concluded that the other nine recommendations are without merit, it seems reasonable to infer that many of us are still engaged in relitigating the Carlson Lecture controversy by other means. And so long as that is the case, we cannot say that we have truly learned the lessons of that experience.

The draft statement that the Free Expression Working Group (FEWG) produced did a good job of expressing the consensus at which a diverse group of 12 professors was able to arrive on a difficult

and controversial set of issues. And the faculty meetings of this past semester, under the able leadership of our faculty officers, have made a good document better. When read in conjunction with the FEWG final report, the statement ready and waiting to emerge from the cradle of our contentiousness is unquestionably superior to the much-ballyhooed Chicago Principles on Free Expression. But it is not

A statement has the virtue of announcing that the MIT faculty are committed to the abstract value of robust, open-minded debate against the backdrop of a collegial and respectful learning environment. The hard work of bringing the spirit of free expression to bear upon teaching, research, and administration is a different matter altogether.

perfect. And it will not give us an algorithm for automatically resolving the ambiguities and conflicts that arise when human beings open their mouths and allow sounds to be emitted therefrom.

That is why the FEWG report outlined nine other recommendations informed by our understanding of the history, law, and politics of free expression and academic freedom as well as community feedback. A statement has the virtue of announcing that the MIT faculty are committed to the abstract value of robust, open-minded debate against the backdrop of a collegial and respectful learning environment. The hard work of bringing the spirit of free expression to bear upon teaching, research, and administration is a different matter altogether. For this purpose, we will need at least two additional resources. The first is a willingness to reconsider one's position or approach when someone else registers a valid objection. The second is a commitment to and understanding of the pedagogical dimension and context of free expression.

On the first point: it is impossible to change one's mind unless you are willing to enter into conversation with people who see things differently than you. My own experience as a member of the FEWG is the best example I can give. At the outset, I believed that our free expres-

sion debate (including the FEWG itself) was essentially a rightwing movement to bludgeon MIT for embracing DEI and allegedly forsaking "merit" (that loaded buzzword of our institutional identity). I still think that our free speech deliberations are connected at many levels to the issue of race and the unseen privileges of whiteness. But, through my interactions with colleagues on the working group, I

learned to see the Carlson Lecture controversy as an invitation to think about diversity, equity, and inclusion in the broadest terms possible.

And that means accepting that the academic debate over DEI policies (which are not the same thing as diversity per se) must do a better job of incorporating the perspectives of good-faith critics of those policies, most notably with respect to the issue of transparency. The failure to do so must be held partly responsible for the imminent cancellation of diversity as a factor in college admissions – a development that will hinder our ability to maintain a climate of bona fide free expression on our campus for years to come. Sooner or later, principled libertarian critics of diversity policies will come face to face with this irony. In the meantime, let us hope that MIT as a community will be able to respond to the Supreme Court's ruling in June with a sense of our shared interest in diversity, regardless of whether we understand that interest in terms of racial justice or free expression. We will have to conform to the letter of the forthcoming decision. But we are not powerless to invoke the First Amendment and academic freedom as a basis for insisting that university experts rather than unelected judges are best equipped to determine how to engineer academic excellence.

[continued on next page](#)

How Deep is Your Love of Free Expression?

Ghachem, from preceding page

The second resource we will need is a willingness to think harder about what it is that we are doing as instructors in the classroom. Recommendation Seven of the FEWG Report puts it this way:

We recommend that the faculty explore ways of infusing into the curriculum in all departments and for all students opportunities to advance expression (i.e., present and defend ideas, active listening, etc.). We must recognize that learning to engage in dialogue concerning controversial matters is a developmental skill that can be taught, improved, and encouraged. We should not assume that all students arrive on campus equally prepared to engage in productive dialogue about controversial issues. It is certainly part of MIT's mission to prepare our students to develop such skills. To

advance this goal, the Subcommittee on the Communication Requirement could be asked to identify and encourage pedagogical practices that enhance student skills involving the exchange of challenging ideas.

How many of us would be willing to devote six or more consecutive Institute faculty meetings to working out the answer to this challenge? (To paraphrase the Bee Gees: how deep is our love of free expression?) Long after memories of the Carlson Lecture affair have faded, and the *Wall Street Journal* editorial page and FOX News have moved on to the next targets in the culture wars, we will still find ourselves in a classroom of students waiting to be taught. This, and not the politically cathected scene of an empty guest lecture hall in the aftermath of a cancelled invitation, is the primary arena for the work of free expression.

The classroom has a quiet drama all its own, particularly as the students are not the only ones being taught at a place like

MIT. When a class goes well for me, it is usually because I have learned something interesting and important from my students, and not necessarily the other way around. If I find myself wishing that this happened even more often, it may be because I am standing in the way at times, saying more than I should, and listening less than I ought. Learning how to ask students the questions that will encourage them to speak to one another is, for me, the biggest challenge in teaching. The task of figuring out how to implement Recommendation Seven is a job for the faculty as a whole, under the leadership of our faculty officers and with the advice of the Faculty Policy Committee. But a good starting point is to observe that we cannot educate students in new ways of thinking if we are unable to imagine ourselves in the same spirit. ■

Malick W. Ghachem is an Associate Professor of History, and served as a member of the Ad Hoc Working Group on Free Expression (mghachem@mit.edu).

Never Mind the Firehose, You Can't Even Lead Them to Water

Carter, from page 1

It's a red herring – and in this case, inaccurate and unfair – to blame the lecturer's abilities. The lectures are clear and engaging. Blaming the students' insouciance on the subject material misses the point: in this case, the material is foundational for their major. It is also clear that students are not reading background material. As a result, the lectures become our only means to deliver education.

It is understandable that some faculty don't police this behavior themselves. End-of-term student evaluations are typically the only means to evaluate the instructor. For pre-tenure faculty, a few negative evaluations can have serious consequences. For post-tenure faculty, negative evaluations can make the difference between a 1% or a 3% salary increase (or, -7.2% and -4.2%, depending on how one

counts). If there is to be a remedy, it needs to be institutional.

Personally, I cherish the topics that I (try to) teach. I put time and care into my preparation. I try to engage with my students. It is dispiriting – *depressing even* – to have that passion sucked away by TikTok, video games, and text messages. I firmly believe that I am not alone at MIT and that this is an epidemic across many universities. I have sympathy for Columbia Professor Maitland Jones' [statements about the lack of student engagement](#).

Personally, I cherish the topics that I (try to) teach. I put time and care into my preparation. I try to engage with my students. It is dispiriting – *depressing even* – to have that passion sucked away by TikTok, video games, and text messages.

There are technological fixes that range from severe to draconian. Perhaps faculty could opt to have cell signals switched off; or routers placed in classrooms that can be configured to eliminate social media; or attendance automatically recorded. However, I am not sure such technological fixes are the right prescription: they treat the symptoms and not the disease.

I believe that the classroom behavior that I am observing defeats MIT's mission, and that our faculty should consider a remedy carefully. The sooner the better. ■

W. Craig Carter is Toyota Professor of Materials Science (ccarter@mit.edu).

Graduate Student Unionization: A Positive Force for All at MIT

Rahul Jayaraman
Angela Lee
Arrow Minster

IN APRIL 2022, MIT graduate workers¹ overwhelmingly voted for union representation. Since then, a supermajority of us grad workers have signed cards with the MIT Graduate Student Union (GSU). One of the key reasons that we, as graduate workers, voted to unionize was to have our voices heard, as the proliferation of working groups and committees created across MIT to solve various problems has proven ineffective at addressing our major concerns and reasonable requests. Union representation will guarantee not only that our voices are heard by the MIT administration, but also that we are working as equals with the administration in making decisions that affect our working conditions and well-being.

MIT prides itself on its highly decentralized environment, which has allowed departments, labs, and centers (DLCs) to thrive with significant discretion and flexibility. However, the utter lack of campus-wide standards and procedure means that many graduate workers fall through the cracks. Such a lack of standardization often results in our peers being subject to ambiguous or impossible expectations and difficult working conditions. *This is why we need a union contract.* In bargaining directly with MIT, we are aiming to formalize the good things that are already happening in DLCs throughout the Institute, while also raising the floor of support and stability for graduate workers who are struggling or facing issues in their workplace.

We understand that supervising unionized employees may be new for many faculty, and that supervisors may have numerous questions about the

¹ We refer to ourselves as “graduate workers” throughout this article because we are advocating for protections as part of our research and teaching work.

process and what will change. Much of the guidance and communications to faculty from the MIT administration prior to the election were explicitly anti-union and served to scaremonger through the use of hypothetical situations that never came to pass at any of our peer institutions where graduate workers are also unionized (e.g., Harvard, the University of California system, etc.). Indeed, MIT faculty may well have been part of unions as graduate workers themselves. Given this, we seek to clarify that there are many things that our union *does not* stand for:

- We do not seek to restrict academic freedom or strictly circumscribe the extent of and limits to the student-advisor mentoring relationship. On the contrary, union representation at other universities has had [no negative effect on academic freedom and has improved some axes of student-faculty relations](#) (Table 3 in the linked paper).

- Unionization is also not a front to shirk responsibilities. MIT graduate students are devoted to our community’s mission to lead the world in research and teaching, and we choose to attend the Institute for a reason. Union representation will enhance our ability to contribute to this mission by addressing key issues that us grad workers face in order to enable us to be the best researchers, teachers, and scholars we can be.

So, what do we, as the MIT GSU, stand for and how will our unionization affect faculty and other staff who supervise graduate workers? A fair contract would include establishing clear expectations, developing strong support, promoting respectful interactions, providing com-

prehensive resources, codifying current standards, and fostering academic freedom. We believe such a fair contract will help build and strengthen effective, creative, and trusting relationships between PIs/supervisors and their grad worker mentees, thereby continuing to enable the groundbreaking research discoveries that MIT is known for.

For example, when MIT begins providing comprehensive resources to all graduate students, not only will our quality of life improve, but MIT will also become more competitive in attracting the best researchers from across the globe. On this goal, the interests of graduate student workers and their supervisors, including faculty, are certainly fully aligned. Additionally, our union is deeply invested in benefits such as:

- Improving health care coverage and policies around short-term medical leave, in order to bring them in line with current standards for other MIT community members,
- Guaranteeing adequate health and safety provisions across Institute labs,
- Securing a respectful and equitable work environment for graduate workers,
- Improving pay in line with the cost of living in the greater Boston area,
- Guaranteeing safe, decent, and affordable on-campus housing,
- Assisting international students with difficult visa situations and exorbitant fees,

[continued on next page](#)

Graduate Student Unionization:
Jayaraman et al., from preceding page

- Guaranteeing transitional funding on an as-needed basis, and
- Minimizing the impact of tuition on graduate workers' ability to focus optimally on their research.

Previously, MIT placed the burden of devising and implementing such policies primarily on individual PIs and departments, which has led to an *ad hoc* approach to solutions that are often to the detriment of supervisors. For instance, graduate students who take medical leave under current policies also lose their access to health insurance and benefits. Well-meaning supervisors, working under MIT and department guidelines, are then forced to make a choice between their student's well-being and their lab/group's research output, and may often require a suffering student to continue working to, perhaps, fulfill the conditions of a grant. This approach benefits no one, and an Institute-wide solution to this problem – by guaranteeing paid medical leave with full benefits – will alleviate this issue while allowing individual

supervisors the flexibility to reallocate the grant toward the work of another graduate student. This effort is in line with our goal to remove barriers for graduate students to enable them to work effectively and to cultivate an environment where they will thrive, all while still advancing the Institute's research and teaching mission and fostering the intellectual freedom for which MIT is famous.

As we continue to negotiate our first contract with MIT, we hope to see the administration bargain in good faith and understand the issues that grad workers face on a daily basis. During our sessions, we have provided testimony from a wide array of grad students to underscore our need for a contract. The issues we describe in this article are not simply localized to one or a handful of DLCs; they pervade the Institute, and we need a way to address them that takes our voices and experiences into account. We reiterate that grad workers at the Institute have decided that unionization is the best way to achieve this, and that this choice be respected and celebrated, especially as part of the current nationwide wave of labor organizing.

We hope that the faculty, our supervisors, and other members of the MIT com-

munity will support us in our endeavors to make the graduate experience at MIT better for all and eliminate barriers holding back MIT from reaching its full potential as a world-class institution of research and education. It is our firm conviction that we share the same goals as faculty, PIs, and many other Institute community members, and we welcome you to stand with us in the fight for our contract and the protections therein that we justly deserve.

Frequently Asked Questions

What is the current status of negotiations between GSU and the MIT administration?

To date, we have had [eight bargaining sessions](#) with the MIT administration. We presented our [initial non-economic proposals](#) on September 17, and MIT presented us with their counterproposals to most articles on October 13. We responded to those counterproposals on October 26 and, as part of this presentation, provided testimonials from many of our colleagues to emphasize the necessity of a strong union contract. There were some clarifying discussions between us and the administration after these presen-

[continued on next page](#)



Graduate Student Unionization:

Jayaraman et al., from preceding page

tations, and further discussions during the subsequent session, on October 27.

We also met with the administration on November 17 and 18, and December 1 and 8. As with all negotiations, we are very close to reaching agreement on some issues (and have already signed a few tentative agreements), but there still remain large disagreements on others. We have further bargaining sessions scheduled on December 16; January 23; and February 1, 17, and 27.

Will I need to go through the union to create new appointments for graduate students or change these appointments? What control does the union have over appointments and work hours?

As part of our union contract, we are seeking fair and reasonable work expectations and compensation. We are not suddenly going to ask MIT to set our base stipend rates at six figures per year and shirk our responsibilities. Rather, as part of our contract, we would like to standardize Institute guidance around work expectations and how appointments are communicated and renewed; we are not looking to make our PIs' lives difficult or pursue an adversarial relationship with staff and faculty.

We want to establish a set of guidelines regarding how many hours per week grad workers are expected to work in order to ensure that they are able to achieve a good work-life balance and are less prone to burnout – which is all too common in academia. By standardizing expectations, grad workers will be able to put their best foot forward in regards to research and teaching while still having the time to rest and pursue their hobbies, as well as spend time with family and friends. We are not at all trying to limit the amount of time worked, as we are well aware that some grad workers like to work on the weekends, while others do not. We would simply like to arrive at a common understanding with our supervisors and the administration as to what a “typical workload” looks like, and

enshrine that definition in our contract. We are, after all, here to teach and research, and we want to perform these jobs to the best of our ability.

An additional goal is to streamline the process of appointment posting, notification, and reappointment. All too often, graduate students are left in limbo as their appointments are processed perilously close to the start of the semester, increasing anxiety over whether or not they will be paid in a timely fashion. In fact, appointments have often been yanked away from students at the last minute, leaving them scrambling for alternative sources of funding for that particular semester. By adding specific Institute-wide guidance around appointments in our contract, we hope to alleviate the associated stresses. However, the specifics of individual appointments (e.g., cost objects, etc.) will still be handled at the DLC or program level.

Aren't MIT's existing policies and procedures enough for graduate students?

Grad workers have found that existing MIT offices, such as the Institute Discrimination and Harassment Response (IDHR) office, are often inadequate to address the problems that they face during their time at MIT. The IDHR processes are often slow, and they may push complainants toward an inadequate or premature resolution that often has the consequence of protecting predatory members of our community and implicitly condoning their behavior. Time and again, graduate workers have been pushed out of their programs – that they worked so hard to gain admittance to – by inadequate and inefficient processes that fall far short of satisfactorily addressing workplace issues. MIT offices, despite a veneer of impartiality, *are still answerable to MIT and seek to protect its interests.*

To address this, we are seeking a neutral grievance procedure that gives both grad workers and faculty a fair shake. Any violations of the contract can be addressed through this procedure, and disagreements – if they reach a par-

ticular level – can be arbitrated using a neutral mediator. We believe this will remove some of the burden off existing Institute offices and allow graduate workers to pursue their research and teaching with the knowledge that if issues do arise, there exists a neutral process to redress them.

Will this change my relationship with students?

We do not believe that the ratification of a union contract will fundamentally change the “apprenticeship” model of graduate school that most programs operate under. Faculty, staff, and their mentees will still have wide latitude to set the parameters of their mentoring relationship, among other things. Indeed, [a study](#) across five universities where graduate students are unionized showed that faculty at those schools believe that “[grad union] bargaining does not interfere with their ability to advise, instruct, and mentor their students.”

Will students go on strike regularly?

We believe that a strike is an absolute last resort action. In fact, we view it as kind of a “nuclear” option, only to be exercised if we believe there has been a fundamental breakdown in the good faith negotiations between us and the MIT administration. If an overwhelming majority of graduate workers do authorize a strike, we would urge faculty, staff, and community members to understand that there are key issue(s) that we have not been able to resolve during collective bargaining with the administration, and we hope they will stand in solidarity with us as we fight for the working conditions and contract that we deserve. ■

Rahul Jayaraman is a PhD candidate in Physics and the GSU Bargaining Committee Representative for Physics and Nuclear Science & Engineering (rjayaram@mit.edu).

Angela Lee is a PhD candidate in Chemistry and an MIT GSU Member.

Arrow Minster is a PhD candidate in Sloan and the GSU Bargaining Committee Representative for Sloan.

All are writing on behalf of the entire MIT GSU Bargaining Committee.

MITx Update for MIT Faculty: Fall 2022

Christopher Capozzola

NOVEMBER 16, 2022 MARKED one year since the sale of edX, the nonprofit organization launched by MIT and Harvard in 2012 to provide an open online platform for university courses, to 2U, a publicly traded education technology company. Open Learning leadership want to update you on what's happened since.

Two streams of work came out of the [initial announcement](#) of the sale: help in establishing a new nonprofit from the proceeds, and strategy and implementation for MITx, including creating an alternative platform for online courses separate from edX.

Continued progress and new platform at MITx

In June 2021, with the announcement of the intended purchase, MIT leadership committed to establish a new platform for massive online open courses (MOOCs), as an MIT-specific, nonprofit alternative to edX. Currently called MITx Online, it launched in beta in early fall 2021 with J-PAL's Data, Economics, and Development Policy courses. One year later, [MITx Online](#) is hosting roughly 10% of all active MITx courses.

Following the announcement of the MITx Online platform and in the context of recommendations from Task Force 2021 and Beyond, in September 2021 then-Provost Martin Schmidt commissioned an [Ad Hoc Committee on MITx and MITx Online](#). The committee was charged with "making recommendations for how the online education opportunities offered by MITx and MITx Online should contribute to MIT's mission and for how the new portal for online education and educational resources at MIT should be structured to enable these contributions." The committee delivered its [report](#) in February, and members of the committee have continued to work with

the MITx team and the MITx Faculty Advisory Committee (FAC) on exploring their recommendations. Some of those in progress include:

- Taking a learner-focused approach to presenting courses and topics
- A portal with a robust search
- Organizing courses by field of study with guided pathways for learners
- Potential new program formats
- Investigation of credential options at MIT and peer institutions

Development of MITx Online continues; e-commerce functionality launched this fall, with the ability to issue learner certificates and process payments. Current work focuses on adding features and functionality.

Irrespective of platform, all MITx courses are produced the same way: MIT faculty and instructors design them in dialogue with their home departments, and the MITx FAC approves them based on faculty proposals submitted in response to the annual grant cycle. Likewise, all MITx courses can be found in a single stream on the [Open Learning website](#) and remain free for learners around the world and here on our campus. MITx continues to have remarkable global reach, respect, and impact. Since its launch in 2012, MITx has developed over 250 courses, with 12 million enrollments and six million unique learners, and has awarded more than 300,000 certificates.

Work on the new nonprofit

The net proceeds from the \$800 million transaction with 2U funded a nonprofit organization, also run by MIT and Harvard. Currently operating under the working name of the Center for Reimagining Learning (tCRIL), the nonprofit focuses on addressing long-

standing inequities in education by making learning effective, accessible, and relevant to a diverse array of learners and institutions. This work will include support for innovation in and expansion of digital technologies (including [Open edX](#), the open source learning software technology on which MITx has been built), as well as support for the communities that help create transformative learning outcomes. In September 2021, then-Provost Schmidt commissioned a [Non-Profit Entity Working Group](#), led by then-Chancellor Cynthia Barnhart and Chair of the Faculty Lily Tsai.

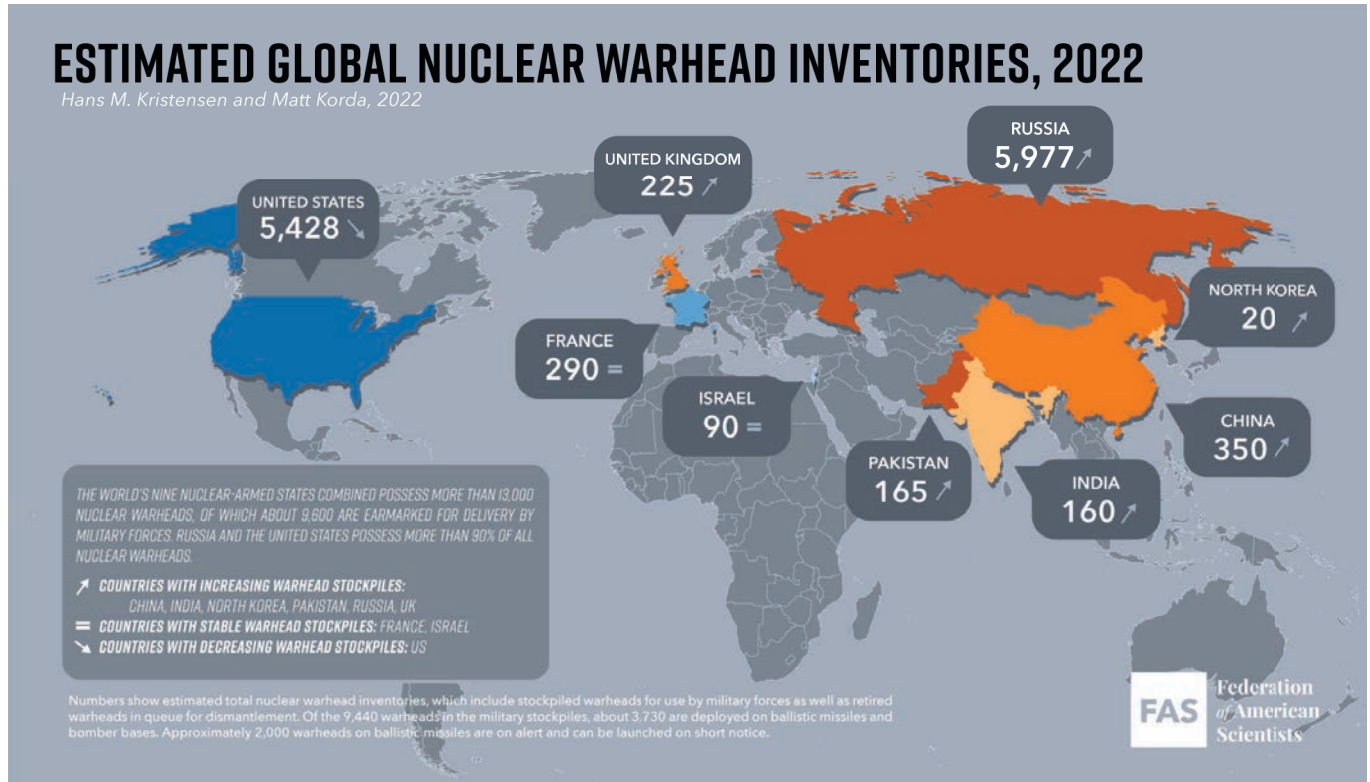
Jointly overseen by MIT and Harvard, tCRIL has begun developing a governance structure. The eight-person board is chaired by MIT Provost Cynthia Barnhart and Harvard Provost Alan Garber. Other MIT appointees include Vice President for Open Learning Eric Grimson, Executive Vice President and Treasurer Glen Shor, and Alan Spoon, a member of the MIT Corporation. The board has established a Technical Oversight Committee for the Open edX project; membership and additional information can be found on the Open edX website. The governance board is also leading the search for tCRIL's CEO, which is in the final stages.

One year later, the mission of MIT Open Learning remains the same: to transform teaching and learning at MIT and around the globe through the innovative use of digital technologies. We encourage faculty participation in MITx by developing courses, teaching with them in your residential MIT classes, and sharing your views through the MITx Faculty Advisory Committee, which [includes members](#) from all five Schools of MIT. ■

Christopher Capozzola is Professor of History and Senior Associate Dean for Open Learning (capozzol@mit.edu).

Numbers

Estimated Global Nuclear Warhead Inventories, 2022



Despite progress in reducing nuclear weapon arsenals since the Cold War, the world's combined inventory of nuclear warheads remains at a very high level: nine countries possessed roughly 12,700 warheads as of early-2022.

Approximately 90 percent of all nuclear warheads are owned by Russia and the United States, who each have around 4,000 warheads in their military stockpiles; no other nuclear-armed state sees a need for more than a few hundred nuclear weapons for national security.

Globally, the overall inventory of nuclear weapons is declining, but the pace of reductions is slowing compared with the past 30 years. Moreover, these reductions are happening only because the United States and Russia are still dismantling previously retired warheads.

In contrast to the overall inventory of nuclear weapons, the number of warheads in global military stockpiles – which comprises warheads assigned to operational forces – is increasing once again. The United States is still reducing its nuclear stockpile slowly. France and Israel have relatively stable inventories. But China, India, North Korea, Pakistan, and the United Kingdom, as well as possibly Russia, are all thought to be increasing their stockpiles (see map).

Of the world's 12,700 nuclear warheads, more than 9,400 are in the military stockpiles for use by missiles, aircraft, ships, and submarines. The remaining warheads have been retired but are still relatively intact and are awaiting dismantlement. Of the 9,440 warheads in the military stockpiles, some 3,730 are deployed with operational forces (on missiles or bomber bases). Of those, approximately 2,000 US, Russian, British, and French warheads are on high alert, ready for use on short notice.

Source: Federation of American Scientists