



The Tech | V142 N32 *Year in Review*
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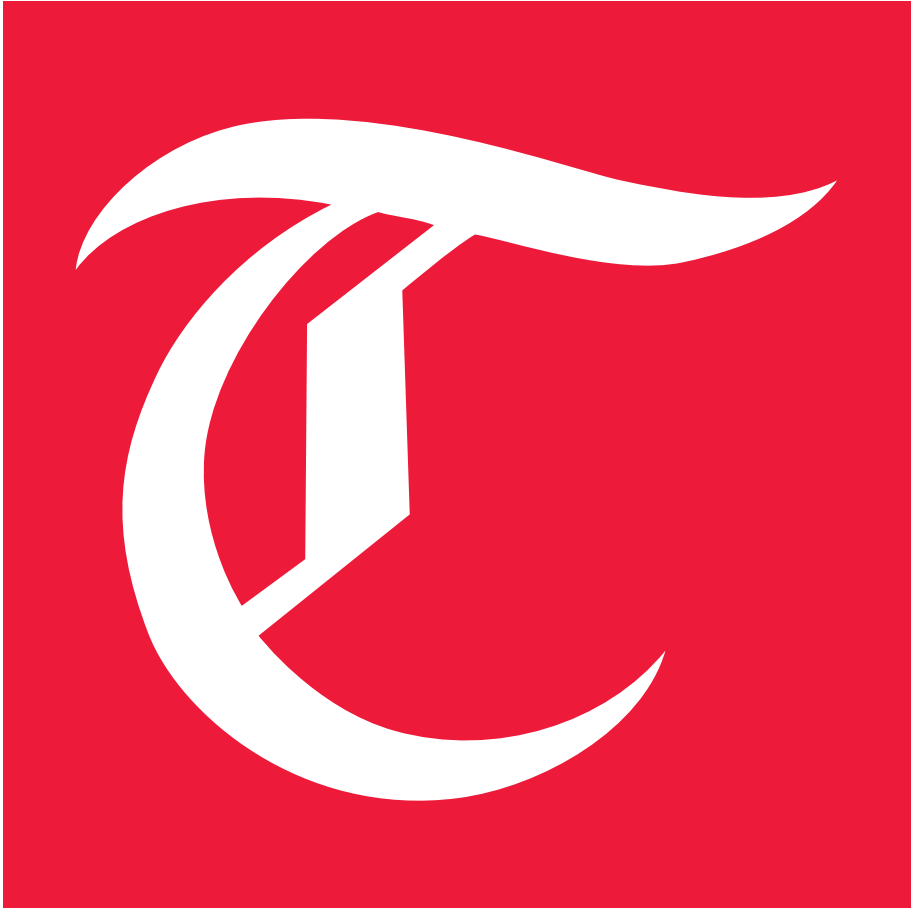
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2022

YEAR IN REVIEW

MMXXII



Dear readers,

MIT is a champion of progress. As well-intentioned as this ideal is, our community's voices are often left behind in the making of long-term policies. Institutional memory is too short, power too imbalanced, and money too alluring. Likewise, as in any major educational establishment, the bureaucracy is daunting and behaves more like a wall than a means forward. Reflecting on this past year, I see these norms being challenged head-on as we work incessantly to find our voice in the Institute and beyond. 2022 was a year of acknowledging and attempting to overcome barriers, hope and resilience, reunions, and transitions.

This year, barriers included the Building 7 turnstiles, card readers on every locked door, willful ignorance of the relationship of our Institute with the community to which it belongs. When COVID-era closed-campus policies initially seemed permanent, concerned students, faculty, and staff raised their voices to prove otherwise. Whether it be the student-produced *MIT: REGRESSIONS* or the long-overdue support to Indigenous peoples, our community took steps to acknowledge ignominious aspects of MIT's history.

The voices of our community also brought hope and resilience. The Russian invasion of Ukraine remains an ongoing crisis. Our hearts go out to our community members whose families and homes are affected by this conflict. Students, faculty, and staff continue to demonstrate an unwavering commitment to morality, justice, and human rights. Closer to campus, our graduate students unionized, marking a fundamental shift in the dynamic of student-workers and the MIT administration. Over these past few years, graduate students shared their stories with us at *The Tech*. These stories remind us that their work is inseparable from social justice and that more work remains to be done.

Still recovering from the pandemic's peak, 2022 also observed numerous reunions as we endeavored to restore a sense of normalcy. MIT's first in-person Commencement since 2019 saw not only a celebration of the Class of 2022 but also the return of alums from the Classes of 2020 and 2021. The Class of 2024 recreated their missed Orientation events. Burton Conner reopened its doors, having preserved its distinctive floor cultures through years of renovation. I hope that East Campus will be able to do the same upon its impending closure. These events underscore the unbreakable MIT spirit — the inseparable communities we build as past and present students.

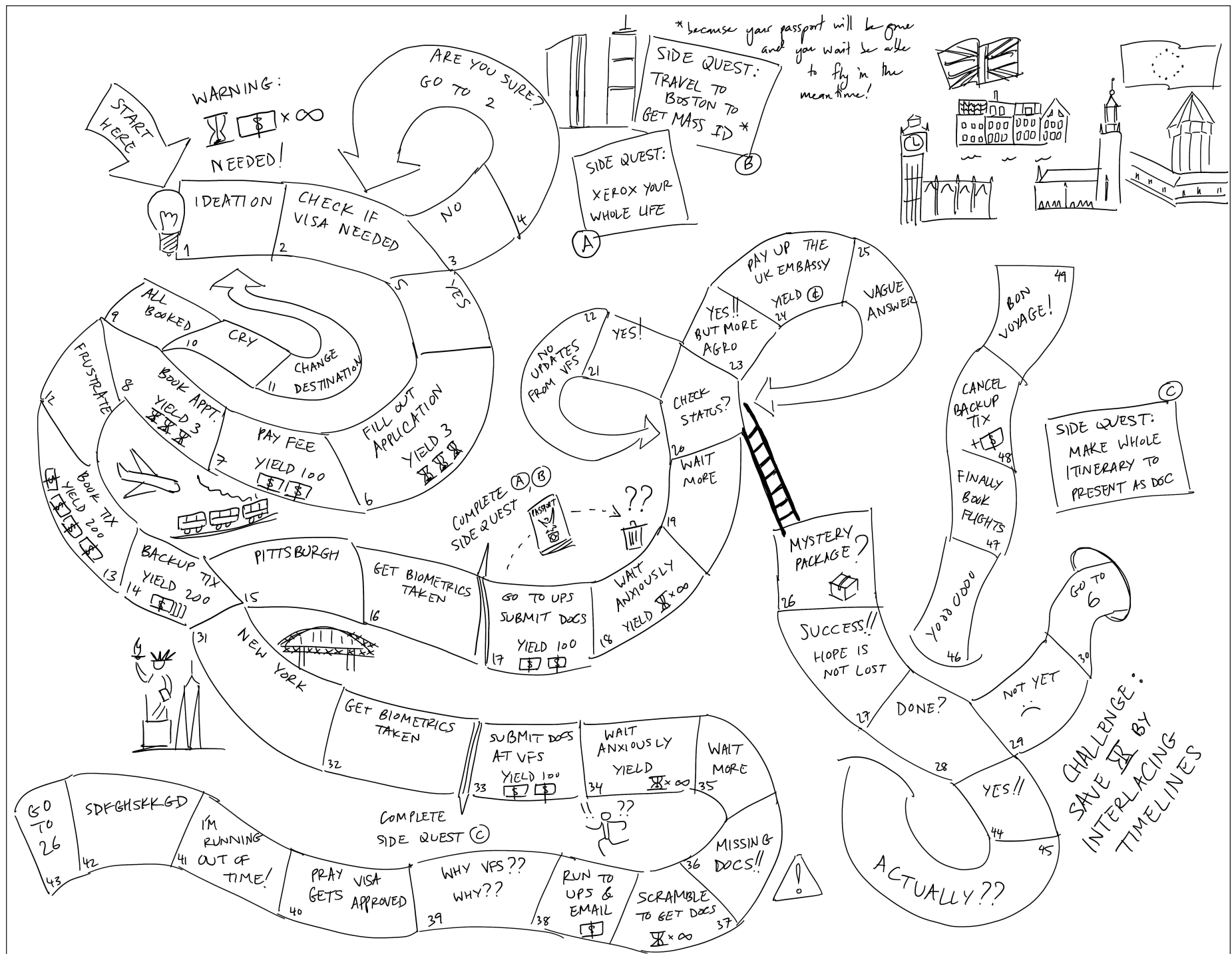
Finally, Volume 142 of *The Tech* oversaw a critical transitional moment for MIT's administration. Cynthia Barnhart PhD '88 returned to leadership as provost. Former President L. Rafael Reif stepped down after leading MIT for over a decade, ushering in Sally Kornbluth as MIT's next president.

I have had the immense privilege and honor to serve as editor in chief of *The Tech* as we sit at the cusp of Institute and global history. Fundamental to who we are as students of the sciences, engineering, and humanities, we will continue to question the world and its social structures. Starting my final semester at MIT is bittersweet. I will deeply miss the connections I have built these past few years, just as I am eager to embark on the next chapter of my life. Having joined *The Tech* my first semester, it has been a huge part of my life these past four years. My first editorial position as a news editor in 2020 witnessed one of the most tumultuous times in recent history for both MIT and the world. Having written, read, or edited hundreds of articles during my tenure, I have constantly strived to uphold our core belief in lifting the voices of everyone in our community. I hope to have served you well, and I am confident that our next editor in chief will continue to champion this belief.

And hey — if you see me around after graduation, don't be a stranger.

—Wenbo Wu '23
Volume 142 Editor in Chief





ARUN WONGPROMMOON—THE TECH

To get to go on a trip abroad, complete this game of *Bureaucracy*.

Passport, from Page R2

I had to take off during a work day in the first week of my internship. A lot of people don't realize you have to appear in person for an appointment to get a visa — they usually assume it's an online application that magically works out, but this isn't the case. The visa application process includes going to a DMV-ish office (sometimes the DMV itself) to get my fingerprints and photo taken. I'm lucky that I found an office within the same city that I was going to be living in for the summer. Some states have a single office to handle this.

- So, after
- \$135 for the U.K. visa application,
- bank statements,
- my student visa to prove I'm here legitimately,
- and \$120 more, apparently for this third party company VFS Global, to assist me with sending my documents to the U.K. Embassy in New York and back to Pittsburgh,

I dropped off my passport at a UPS store in Pittsburgh right after my biometric appointment in late May, and off it went. One ding of a notification from VFS Global came after Memorial Day weekend, to tell me my documents were now at U.K. Visas and Immigration.

And that was the last time I heard from VFS Global.

See, the visa application process is incredibly opaque and untrackable, even with these companies advertising trackability. Why can't I see any queue or updates regarding my most precious possession, my passport? Even concert tickets have this figured out way better — this is 2022, right?! This was the most information I had about how long the process was going to take:

Standard visitor visa applications are currently taking on average 6 weeks to process. We are working hard to process applications to get back to the 3-week service standard.

You should get a decision on your visa within 3 weeks once you attend your appointment at the visa application centre... [1]

I read this and was filled with anger. I wish it wasn't so hard to move this person that longs to travel from one place to another. After calming down, I told myself:

At least it isn't 124 days.

What could I do other than praying that my passport would come back soon, just so that I could repeat this whole process for the Schengen visa? There was no time to waste, though — I started my application for the Schengen visa right after I sent off my passport, *before* my passport came back to me, and booked an appointment, playing with the risk that I might not have my passport in time for the appointment. The Schengen Area visa has to be applied for through the main country of destination, so I filled out Switzerland's four page application, paid 80 euros...

For a *Schengen visa*, the *entire U.S.* has *four* offices to handle biometrics.

So, I had to go from Pittsburgh to New York so that I could put my fingers on this funky machine, just to turn around and go back.

The New York consulate's first available date for the Switzerland visa was ... September 1. That would be after the start of my trip. And I had already paid 80 euros just to see that I couldn't do it. What kind of terrible user interface is this — where I couldn't even see available appointment dates until after I paid for the application?!

> "Contingency plan: search up every fuck-
ing country in the EU's application process
and appointment dates for New York... Man-
ually... Sorry I'm spamming, I'm fuming"

Indeed I was. I actually did consider going instead to San Francisco ... or Washington, D.C. ... or even Atlanta ... but because I couldn't see available appointment dates unless I paid for the application (which doesn't transfer between the countries' offices, by the way). I didn't want to risk throwing my money down the drain. I looked at Danish embassies instead, which allowed me to see appointment dates before applying (see, it isn't too hard to not suck) and found out that there were availabilities for July 1 in Washington DC and July 15 in New York. Because I couldn't be sure that my passport was going to come back to me on July 1, four weeks after I sent in my passport, I went for the New York one instead. I paid 80 euros a second time.

If you're getting confused about the whole process so far, I'd like to say you're not alone.

I was confused at first too, before complaining, giving up, then following along and untangling all the logistics. I interlaced two visa application processes together because I just didn't have enough time: a few months is still a few months short for this extreme bureaucracy. If you'd like guidance on the process *and* see more illustratively why it got me frustrated, see the simplified timeline in the form of a Candy Land board accompanying this article.

Without my passport, I couldn't travel by plane. This meant, assuming first and foremost that I got my passport back before July 15, either I would take the train from New York on the way back, or, to solve this problem in the long run, apply to get a Massachusetts state ID so I could fly back, which would require travel to Boston. Possibly by train because of this mess. So I did the reasonable thing... and booked both flights and trains to Boston, juggling my PTO days for this feat of logistics.

By late June, my anxiety was rising. Time was ticking. *Where* was my passport?

> "idk why i got myself into this labyrinth of two visas, one mass id and several out-of-state trips ;-;"

Miraculously, on the 23rd, a mysterious UPS delivery notice appeared on my front door. It was truly amazing news, despite the fact that I had to wait another day to catch the UPS driver! All my trains could now be canceled. June 30, Boston, for the Mass ID. It took two weeks for the ID to arrive, leaving three days to spare before I had to fly to New York for the Denmark biometrics appointment. Again: four pages of application, recently taken photos, my U.S. student visa for legitimacy, three months of bank statements, proof of enrollment in MIT, detailed itinerary, hotel and flight bookings, and travel insurance certificate of coverage. That was a mouthful — the Schengen asked for so much. As you may notice, there's another Catch-22 situation here: hotel and flight bookings are needed to apply for a visa, and the visa is needed before you can fly to the country and sleep in a hotel. Ridiculous, right?! For this, one can either purchase cancelable flights and hotels, or go use a sketchy dummy ticket service that costs a hundred dollars and “guarantees acceptance by Schengen visa.”

Oh, VFS Global “assists” the Denmark visa application process as well. My Denmark biometric appointment was at VFS headquarters, where employees also went through my documents and sent them to the Danish consulate for me. \$65 for a one way delivery of my passport back to Pittsburgh, since I went all the way to New York myself already. What’s the grand total now? Four hundred and eighty dollars. One ding of a notification from VFS, and my passport went away into the unknown again.

Almost three weeks later, August 4, is the date this article was written. My anxiety has risen, yet again, because my passport has essentially gone missing for all this time. Yesterday, the Danish consulate called me to ask for additional documents, because I missed some.

> "bruh. BRUH. I NEED TO SEND MORE DOCUMENTS WITHIN THE NEXT 2-3 DAYS, ONE OF WHICH I BROUGHT TO NEW YORK BUT SOME WORKER SAID I DON'T NEED TO SEND IT IN. I'M LIKE. UGH"

I scrambled, during work, to regather additional documents, get a FedEx shipping label, go home for one original document, and go to FedEx before it closed at 7 p.m. I was not successful, so I bussed to the main FedEx ship center of Pittsburgh, which closed at 8:30 p.m. Success. Small win. My documents were delivered this morning, and the Danish consulate sent me an email:

The documents were received by email and by Fedex. There are no other requests for further information at this time. The application will continue processing.

I have one week left in Pittsburgh before I go on the trip I started planning half a year ago, and I'm *still* waiting for my passport. This whole trip can still fall through. Last Catch-22, for those wondering if I could start earlier: I'm close to hitting the limit for the earliest time to apply for a visa. Most countries only allow visa applications for trips three or six months in advance.

Take your guess if I made it to the U.K. and Europe.

*Originally published in Volume 142,
Issue 19 on September 21, 2022.*

Giant

By Paige Bright
CAMPUS LIFE EDITOR

“Dance like nobody’s watching; love like you’ve never been hurt. Sing like nobody’s listening; live like it’s heaven on earth.”

In high school, I started to feel comfortable taking up space for myself. I didn't want to feel so small, and I was confident enough to make it happen. I became known at a local coffee shop; I got a job as a math tutor; I talked, and listened, and talked, and listened to anyone who would give me advice. "Why'd you decide to work here?" "Can I audit your class?" "What's your name?" My world slowly expanded around me. If everyone is watching, you better believe I am going to be seen.

And everyone was watching.

The first week of college, after struggling through a pset, I went to office hours. The problem I asked about was named after a well-known German mathematician I had never heard of. When I tried to say his name,

CURSED THOUGHTS
To You. Yes.
Living out my new year

To You. Yes. You.

By Ana Reyes Sánchez But I don't say "I love you

SENIOR EDITOR

I sat up in bed and cried, because it's my last first day. I thought about how much I'll miss you and how close and far you are and how you, too, have that power to recontextualize things for me.

I'm scared, but more ashamed that our situation seems like an insurmountable hurdle. It's not easy for me to hear how I'm loved, when circumstances necessitate that I won't be able to feel it.

You said parallels, you said narratives. About the playlist and the spreadsheet and the dumplings we'd planned for today and how we're living our lasts this semester.

It is my last first day, and I am looking to the future and knowing that I will be lonely without you.

Today is my last first day, and I went to get coffee with you, but we ended up eating tortas in an alleyway instead. I wanted to share something that belonged to me, but you picked up the bill. I'll get it next time; the days are so short; one more round of coffee.

My life is so full of love now; I'm terrified to watch it go.



the syllables fell out of my mouth to form a weird amalgamation of sound. And everyone laughed. Or at least, that's what it felt like. I was a bit embarrassed, but almost instantaneously I embraced this. I became the pset partner who wasn't afraid of asking the dumb questions.

So why have I been feeling so *large*? Specifically in classrooms. One moment I'm just taking notes, and the next I feel like a giant. It started last semester (albeit, the first semester I had on campus) in 18.101.

There were at *most* 10 students who would regularly attend lectures. And yet, I was constantly looking over my shoulder to make sure I wasn't blocking someone's view.

I found it difficult to do anything last spring. Between classes being online and not knowing many people on campus, I

You.

r's resolutions

I won't be gone, because I don't want to be gone, but I don't brush my teeth every night with Ruth anymore. And we don't make breakfast together the way we always say we will. And we drive each other crazy, sometimes, and I'm sorry.

But it's me, it's me, it's me; I will do better
in the morning.

- the blanket covering me,
- the plushie at the head of my bed,
- the bags of things that once belonged to you but will belong to the kids,
- the trenchcoat hanging over my chair,
- the pride flag you gave me after that sum-



On one such exploring day, I took two pieces of fresh white Hagoromo chalk, went to 4-159, and wrote "Dr. Paige Bright."

I like creating moments like this. Moments that, one day, will create a perfect little movie montage that overlooks all the pain and suffering I went through to get to where I am. They make me feel less small. Even if I don't know exactly where I am headed in the expanse of the cosmos, I would like to think that moments like this get me there. The moments I stumble across, however, are even more impactful — like the first time I walked down the hallway between Building 4 and Building 2.

I keep thinking about what you said in that Zoom room: *"while you all are experiencing so many lasts, I'm getting many of my firsts."* And I said thank you, right? For sharing those firsts with me?

I keep making a list of last-first things:

You told me — last sister week, as we sat in the philosophy lounge — that I remind you of your older sister. And yesterday you sent me a snapchat of your window frozen over, and I thought, *oh sweetie, how'd you forget to close your window? Put on a sweater.*

You looked very cute, laying in the snow tunnel in those pictures. I'll post it on instagram, I promise, even if you don't read these words. You are spectacular, and intimidating because of it, and I will do my part to bully you more this semester.

Eventually, there will be a last “hello” message. Ruth told me, weeks ago, that you used to text her at 2 a.m., but you’ve stopped doing that since last semester started. And I tried to stop myself from the thought that I’ve been having lately: *you will suffer when I’m gone, but eventually you will replace me.*



For this smallest fraction of a second, I saw the Wall and thought “there are so few people here who aren’t men. Why should I be among them?” As if being transgender makes me less of a woman.

Promptly after telling us to dance like no one's watching, my teacher played the scene from *Napoleon Dynamite* in which the titular character dances in front of a huge auditorium. I sat there, letting the irony sink in. Everyone was watching. Everyone could see him. At its core, the quote acknowledges the fact that people will watch: so how would you like to be perceived?

Nonetheless, if everyone's watching, I am going to be seen.

*Originally published in Volume 142,
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I wrote this in the end-of-year letter (the one I posted in the-most-ridiculous-place-with-the-most-ridiculous-name): I don't remember a lot of our lasts the way I remember our firsts. Maybe it was because so many lasts have been taken from us. We all know how loving ends, and I'm so scared about the mandarins. That "one-dimensional" day, I was scared to eat it. When I finally did, it was a little tangy, a little dry, and delicious. *I ate the plums that were in the ice box; at lunchtime I bought a huge orange — the size of it made us all laugh; leave something of sweetness and substance in the mouth of the world.*

You told us we were family in the math lounge and I didn't know how to respond because you're always so genuine in your existence and I often feel scared. You remind me of Ash and me, sometimes, the way that we used to be together when I was in high school. Don't lose those traits in the shuffle of life, please.

We walked to Toscanini's in the freezing cold, even though they didn't have anything warm like you promised. And I listened to you talk, even though it was a little bit windy and hard to hear. We'll get McDonald's later and recreate some moments, I promise.

To You, Page R5

To You, from Page R4

We still have chayotes to make in the fridge; I want to prepare them for you the same way my mom does for me. We'll heat up Nesquik and drink it together. I still think that I was right for keeping that guava jam, both because I still have some for us to share and also because it's a memory, kiddo, not a jam. There's a limited number of guavas now that my neighbor has cut down the tree, but I'll still share future ones with you.

We're going to spend so much time this semester in your narratively circular New House single. Believe me, I have already blocked out the hours to make more pancakes and drink more oat milk on the fuzziest rug in the world.

Favorite memories are so strange. You could have never guessed the significance of that day walking back in the rain, or why I gave you my coat. You left before you saw me shivering in the rain, thinking of how glad I was that you were warm. But you're right, of course, that it's the insignificance of that moment that makes it linger. I can't remember if I told you, especially with everything that's happened, but my New Year's resolution just meant I wanted to linger with you. I'm sorry; I still want to hold your hand this semester, even though I know I won't be able to.

"Hasta la Raíz" is playing and I'm remembering the *Song Exploder* episode I watched with Ruth and how one day we won't be family — shouldn't be, when I'm an alum — but you will still have cast your roots in me. It's been hard watching the gap I'm going to

leave in you, but I hope you manage to fill them with light anyway. *A secret hidden in plain sight*, I wrote two years ago, *let's love so much that we light up the world*. The email's still probably somewhere in the drive, if you want to read it.

It's my last-first day and I've been on the T for three hours now. I'm trying to live in memories and hope for the future and remain in the present moment; impossibly I think I might actually be doing it, but not enough — never as much as I want to.

You told me to take the T across the river and I finally listened. And these are spoilers, but I already messaged most of them to you anyway.

I realized, first, that you must hear "Kendall/MIT" so often. Do you ever think about getting off there? Did you used to have the instinct? Has it been a while since you considered it an option?

And then we passed the stop and I waited with a playlist in my hand and I felt more than saw the light coming into the cabin. The song changed to dodie's "Arms Unfolding" and, stupidly I thought, emerging: *it was once dark but then it was light*.

The river was frozen over and the surface dusty. I could only think, *G*d I hope you see it too*. I thought about that Hozier song. I probably still don't understand it quite right, but listening to it makes me think of you.

I imagined when you saw the river the first-last time, it was probably moving and the waves glistened. And it was too bright to look at directly and maybe that made it hard

to see. Difficult to look at, in the same way that love is for us, but substantive.

And I think you probably thought I was thinking of someone else, but I could only think about how I hope you see it often. I want to watch it with you, but we will have all the time in the world.

Thank you for sharing that with me.

I got back to New House late because I stayed a bit longer talking to you. It feels unfair to write it here before everything has been said, so I won't write it yet. But I will work on not saying "kid," especially because that care is not gone — it won't be if I can help it.

When I got back home we messed up the recipe for dumplings and I played Tracy Chapman in the kitchen and I sang along to it a little, *did you hear me?* And you cracked my back the way we've been trying to do for a semester. It hurt but not physically. It hurt because it was last-first and because I don't think you'll understand this article, even though it's for you.

And I almost cried, a couple of times really. The last-first of which was when you laid your head down on my arm like you do when you don't know how to comfort me but still want to be there. Thank you for staying. I'm so proud of you, kiddo. I love you so much; I say that in many ways, but in words less often.

The dumplings tasted really good even though the shrimp was precooked and we had to improvise. That's often how cooking goes for us. Don't forget me next semester when you're figuring out what to eat in the midst of classes and pssets and meetings and

stress.

I sent you a video of the dumplings and our kid trying them. I'm trying to make sure this isn't the end. Maybe our lives are running in parallel, but that's how the narratives work, love, each two inches to the left of the other. I want to delete that word "love" because we don't speak like that to each other. But I'm leaking out to you — for you. I just want to say that I believe what I heard in those songs, and I'm oddly looking forward to our individual office hours tomorrow because it's the last-first step towards something.

I finished the dumplings and started writing these paragraphs, but got interrupted because we ended up on the floor of my room swapping stories from the past week.

It was a type of fun I haven't had in a while. I tried not to think about how last-first it felt because I want to have so many more of those moments. I thought about how you put up my fairy lights last semester, and how I can still see us there, balancing on the corner of a chair. But then I was in the present and we were giggling about my boss and I threw my body back into a full laugh.

And now, I'm in my room writing this and wondering if anyone other than you will understand these words, but also whether you will understand them yourself. But my stomach is full from the dumplings we shared and my bones are full of so much light they're going to burst along the cracks.

I think, I will fall asleep happy tonight.

Originally published in Volume 142, Issue 1 on February 3, 2022.

WENBO'S WALKS

Wind, rewind

All I want is a normal week

By Wenbo Wu
EDITOR IN CHIEF

Driving slowly through the hills feels like being told to calm down and breathe: the temporary high, the hiccup, and the everlasting descent. I wake in the mornings, a ray of sun dancing through the windows onto my sheets, forming a weighted blanket of air. Sitting up, the iridescent covers shed from my chest, but the weight remains.

I've been silent for a semester now. "How are you?" It's amazing how much you hear when you have nothing to say. "I'm well." "That's great!" "Maybe we should hang out?" I'm wound up, programmed to say these few phrases for an eternity. Maybe I'll actually hang out, but more likely than not I'm glued to my bed, unable to find the activation energy to even get up. Why don't I have more to say?

After all, I TA'd my first class; I got my driver's license; I ate all-you-can-eat sushi for the first time. But I also had my first mid-exam tunnel vision; I started speaking to the ghost in the passenger seat; I ate a tub of ice cream Tuesday night and refused to eat more than 800 calories per day the following week.

But you see, static is everywhere. Some days, I can't even look at people without the fog creeping in. There's shame in making eye contact. Everyone is disappointed in me. Once I'm far enough south, even FM 98.7 playing softly on the radio fades to silence. People laugh, crack a few jokes, open a cold Diet Coke, and show teeth when I greet them over the fire.

The sun sinks below the rooftops, cloaking us in a fluorescent golden hour.



WENBO WU—THE TECH

I'm wound up, programmed to say the same old phrases over and over again.

I look at you. I feel the physical fabric of space between us, but I'm not really there. I'm a thousand feet in the air, piloting a pale reflection of myself, going through the motions during the week, and rewinding on the weekends.

Today is a roller coaster, and nothing will get in my way. Two minutes to get

dressed, another five to get ready, and a ten-minute timer ticking down to class. To-dos, to-dos, and more to-dos. From now on, I resolve to make one such list every day. I promise to be doing something every waking minute, checking things off: one, two, three, pset, class, pset, lab, class, club, socialize, Chinese, and maybe, just maybe, sleep. Breathe.

A hundred reminders go off on my phone. Wow, the Stud food tastes incredible today. I tend to each notification in succession. "We should ride the commuter rail to Cohasset and just run around in the parking lot." "Has sparkling water ever tasted this good to anyone before? Okay, me neither."

My vision is 20/20 behind these glasses. I notice every blade of grass. I finally use that BlueBikes subscription for the first time in months. The garlic sizzling on the pan smells like home. I eat some spinach, snack on carrots and hummus. And as the old saying goes, "fitness isn't just a hobby, it's a lifestyle."

When I step outside, I can hear the birds harmonize. This mountain is silent; the echo of our voices is impeccable. I'm going to make sure everyone sees what I'm made of. The air is thin up on that hill, but my will to ascend is stronger than the weight of the atmosphere above me. I make a joke. My friends laugh, smile, and, just maybe, crack open a Diet Coke over the kindling.

The sunset shows its opalescent colors, and like magic, silence falls. Time slows as I gaze at you. I'm firmly rooted to the ground, but my spirits are a thousand feet high. I laugh, jot down a few more notes to finish the pset due a week from now, and breathe a sigh of relief as I rewind through the highlights of the week.

And sometimes, it's just a week. A normal, uneventful week. No abysmal lows or insurmountable highs. That's all I've ever wanted, and that's all I'll ever need. This simple desire for monotony still feels like a gift when it dawns.

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Got a lot on your mind?

Share some thoughts with us!

Write for Campus Life. join@tech.mit.edu

OPEN LETTER

Ukraine is fighting the war that we should be fighting

The following letter is adapted from the speech given at the MIT Vigil Rally that took place March 3.

In the past week, the world has seen heroic images of Ukrainian resistance against Russian invasion. Students picking up arms to defend their homeland; civilians forming human walls to stop the enemy's advance; Ukrainians abroad organizing awareness and fundraising campaigns; Ukrainian President Volodymyr Zelensky standing his ground, unwavering on the front lines in Kyiv. Ukrainians' efforts have been portrayed as an act of self-defense, of patriotically defending their country against foreign invaders. What we need to realize is that Ukraine is not just fighting for itself — it is fighting for the freedom of people around the world.

Just a few hours after Russia invaded Ukraine, China sent a sortie of warplanes into Taiwanese airspace. North Korea fired yet another ballistic missile. The governments of Venezuela and Myanmar are continuing their human rights abuses. These incidents contin-

ue to happen because Russia is empowering these countries. The Ukrainian army is fighting, right now, not just to defend their homeland and their people but to defend us, to defend our freedom, and to defend democracies around the world.

In 2014, Russia annexed Crimea, and the world watched in silence: even the sacrifices of the Euromaidan protests were not sufficient for us to act. In 2019, when China killed democracy in Hong Kong and in 2020, when Belarus brutally cracked down on peaceful protesters calling for fair elections, the world stayed silent. All these events, directly or indirectly, have contributed to the war in Ukraine today. Putin is sending troops to Ukraine through Crimea and Belarus; and it is because we, as democracies, failed to act in the eight years leading up to this war that now the Ukrainian people are suffering.

This war is not just about Ukraine. It is not just about Taiwan, South Korea, or some other far-away democracy that stands as the next domino to fall after Ukraine. Any country could be next. Any home, any family could wake up to the sounds of shelling and missile strikes. On March 2, Russia sent warplanes into the airspaces of Sweden and Japan. If the war in Ukraine isn't proof enough, this further demonstrates that being an ally of the free world — even being part of NATO — is

not a guarantee of safety. Even in the U.S., there are people waging a war of misinformation; there are Americans supporting Putin unapologetically; there is the looming threat of authoritarianism trying to take over. This is what we are fighting against.

The current situation is not one in which we are trying to help Ukraine fight their war. It is one where brave Ukrainians are fighting our war, the war that we should be fighting in the first place. Ukrainians are fighting and dying to protect the ideals that we claim to uphold: freedom, liberty, democracy. Why is it that we are not fighting with them?

The free world has been large on words and small on actions in the past eight years. While a general atmosphere of appeasement certainly played a role, it has also been frustratingly vague when it comes to “how to help.” For governments, traditional diplomacy seemed to have lost its viability. For individuals, there have been very few options beyond “raising awareness” via social media. This time, however, the movement supporting Ukraine seems to have succeeded where previous attempts have failed.

Ukraine is remarkably adept at resisting their foe in this modern, digital age. Their proficiency spans all levels, from the highest echelons of government to each and every individual. President Zelensky, who

won the 2019 election with a mostly virtual campaign, has forged an online persona of staunch, unwavering resistance. The Ukrainian Army has mastered the modern art of crowdfunding, which it has been practicing since 2014. Perhaps most awe-inspiring is the fortitude of individual Ukrainians, from those resisting the invasion on the front lines to those helping abroad. We see many displays of this courage here at MIT — Ukrainian members of our community who, despite bearing the pain, anger, and incessant dread of war, stood up and organized a massive ongoing campaign to offer us a chance to help.

Our Ukrainian friends are doing so much to tell us exactly how we can help. They are swallowing back tears to publicly recount the atrocities committed against their families. They are resisting the urge to fly home and pick up a rifle, so that they might be able to find some help for their country abroad. They are mustering the tenacity to not constantly check the news and their messages, but instead focus on creating an entire support campaign from scratch. They are doing this for our sake, so that this time, unlike our past blunders, we actually have a chance to pull our weight in our own fight. Donate to support Ukraine — the National Bank of Ukraine has already made it as easy as clicking a few buttons, and the MIT Ukrainian community has made it even simpler. Pick up your phone. Call your representative. Demand MIT to act now.

MIT as an institution has valued the critical importance of ethics in science and the significance of science in ethics. It is time for us to once again stand up for these values and ensure that our actions reflect our beliefs. MIT should continue to publicly support its Ukrainian community. The administration should disclose its ties with Russian oligarchs, Russian oil, and reconsider the ethical implications of their investments. We should also leverage our political influence as an institution to amplify the voices of our Ukrainian community, and do our best to support Ukrainian students both financially and academically. Only in such a way can we, as an academic institution, live up to our commitment towards ethics and our responsibility towards society.

I am so proud of my Ukrainian friends for organizing this powerful, coordinated effort. They are doing so much just to offer us the chance to help, handed to us on a silver platter. Now, it is up to each and every one of us to act for Ukraine, and to defend ourselves.

Слава Україні!

Yu-Chi (Jacky) Cheng '23

*Originally published in Volume 142,
Issue 5 on March 17, 2022.*



COURTESY OF SOFIA SHYROKA

Protestors gather in Boston against the war in Ukraine, March 6.

GUEST COLUMN

Free expression and academic freedom on campus are worth fighting for

MIT must recommit to the values of open discussion and dissent

By The Board of MIT Free Speech Alliance

Anybody connected with MIT has likely heard of the “Abbot Affair” by now. Dorian Abbot, a geophysicist from the University of Chicago, was invited to give the prestigious John Carlson Lecture, an annual public event of the MIT Department of Earth, Atmospheric and Planetary Sciences. Though it is unrelated to his research or lecture topic, Abbot is an outspoken advocate for “Merit, Fairness, and Equality” (MFE), in opposition to the “Diversity, Equity, and Inclusion” (DEI) initiatives that are now the norm on many campuses, including at MIT. Abbot has made many controversial statements in the public square in his defense of MFE. After an uproar both internal to MIT’s campus and on social media about allowing Abbot to speak, the department canceled this year’s Carlson Lecture and invited Abbot to instead give an internal colloquium to the department.

Whatever your views are on DEI or MFE and whatever you think of Abbot's public comments, this cancellation is a clear sign that academic freedom at MIT is in peril. That many find Abbot's comments in favor of MFE offensive (including some members of the MIT Free Speech Alliance) is entirely to the point — protections of academic freedom ring hollow if they only apply to speech that offends no one. The fact that Abbot was an invited guest rather than

a member of the MIT community and the fact that he was offered an alternative (less prestigious and less public) opportunity to speak about his research do not justify the cancellation of his original talk. With this decision, based purely on Abbot's sincerely held ideological perspective outside his scientific contributions, the MIT administration has signaled loud and clear that diverse perspectives on important topics of the day are not welcome on campus. That in fact, even someone who speaks on a purely scientific topic must be vetted for their political views.

Why should we care about academic freedom and free expression on campus? Those who feel that free expression is an outdated concept have very short memories. The movement to protect free expression on campus was, until recently, the purview of the left, and was intimately tied in with the anti-Vietnam War movement and the civil rights movement of the 1960s. The freedom to express unpopular, even upsetting or offensive, speech is crucial both to progressive social change and to the academic process. As individuals, it is deeply hypocritical to only stand up for the right to express our own views and not those we disagree with — freedom “for me but not for thee.” That is why the American Civil Liberties Union (ACLU) went to bat for a group of actual Nazis in the famous Skokie case in the late 1970s. They understood that limiting the fundamental right to free expression will inevitably silence

the oppressed. As former president of the ACLU Nadine Strossen put it in her book *Hate*, such restrictions “are predictably enforced to suppress unpopular speakers and ideas, and too often they even are enforced to stifle speech of the vulnerable, marginalized minority groups they are designed to protect.” These words were specific to the legal protection of the First Amendment, but as Strossen makes clear, can be applied to free expression on campus as well. Specifically, the academic freedom of faculty to challenge the establishment is fundamental to the role that an academic institution like MIT must play in testing, debating, and discussing a diverse range of ideas about the important topics of the day, of which DEI clearly qualifies. As she writes, “In light of the enormous power of private universities... either to facilitate or stifle the free exchange of ideas and information... except in unusual circumstances, [private universities] should permit all expression that the First Amendment shields from government censorship.”

If the only person harmed by the Abbot Affair were Abbot himself, this would be a relatively small concern; Abbot has weathered this just fine. But an administration that signals a lack of strong support for free expression on campus stifles speech across the board — in classrooms, research laboratories, dorm rooms, and the public square. This is not idle speculation; a recent Heterodox Academy survey

of American college students suggests that over 60% of students in 2020 (up from 55% in 2019) felt the climate on their campus prevented them from saying what they believe. A recent poll by the Foundation for Individual Rights in Education (FIRE) suggests the situation for students at MIT may be even worse. And a recent informal poll of MIT faculty found close to 80% of respondents expressing concern about their free expression.

MIT has recently convened an Ad Hoc Working Group on Free Expression. We encourage the members of this Working Group to carefully examine the history of academic freedom and free expression on campus. We urge them to bring back a recommendation for MIT to rededicate itself to the core principles that have spurred robust debate, and ensured that campus life is full of diverse perspectives and a healthy ecosystem of ideas, within a campus culture that values discussion and dissent. As a concrete suggestion, we urge MIT to explicitly adopt the Chicago Principles defending free speech at universities. And we urge everyone in the MIT community who cares about free speech, viewpoint diversity, and academic freedom to join the MIT Free Speech Alliance.

This article was written by Melanie Soderstrom '98, Eric Rasmusen '84, and Jim Rutt '75 (President) on behalf of the MIT Free Speech Alliance.

*Originally published in Volume 142,
Issue 2 on February 17, 2022.*

GUEST COLUMN

On Love, Truth, and Justice at MIT

Truth-telling is a foundation to Love MIT well

By Ufuoma Ovienmhada

These remarks were originally prepared for MIT's 48th Annual Martin Luther King Celebration Luncheon held on Feb. 10, 2022.

I Love MIT. Those are three words that I would usually *never* string together into a sentence.

Yet, at this moment, I find myself at the two-and-a-half year mark of dedicating my labor to MIT as the former president of the Black Graduate Student Association (BGSA) and as a student representative on not one but two different institutional committees working on diversity, equity, and inclusion (DEI) and public safety, respectively. I've organized events on these topics. I've been in dozens of meetings with President Reif, Institute Community Equity Officer John Dozier, Chancellor Nobles, and others whom I all respect. In reflecting on the theme for this event, I honed in on the words "truth" and "love." I found quotes from the late feminist author bell hooks that read, "The heart of justice is truth-telling," and "There can be no love without justice." She uses a definition of Love from M. Scott Peck: "the will to extend one's self for the purpose of nurturing one's own or another's spiritual growth." With these definitions in mind, I was forced to admit that through these labors, I *am* committed to the spiritual, *and* moral, and *ethical* growth of MIT. And thus I *do*, in fact, Love MIT. It's an agape love, an ongoing, unconditional concern for the well-being of MIT, the community inside it, and those it impacts.

Ruminating further on “truth” and

"love," I came to the conclusion that to Love well, we must be willing to tell the truth. MIT's own value statement writes that we must be willing to "speak plainly about failings in our systems." So, it is in this spirit that I convey three inconvenient truths about the chasm between Martin Luther King Jr.'s values and MIT's actions.

Truth number one: The truth is MIT is an institute of higher learning and a global leader in research with a well-intentioned community, BUT, quoting MIT professor Ed Bertschinger (who was the first institute community equity officer), MIT is also comprised of a board of trustees known as “The Corporation” with its own agenda and internal politics that resists any change that would redress severe power imbalances. In my experiences working with senior administration, I’ve often been one of less than a handful of students on 25-30 person committees, despite students making up nearly half of the MIT population. My peers and I have fought for increased decision-making power as committee co-chairs, but even in the case where we do have a student as a co-chair, we are not privy to relevant documents nor do we have decision-making power or influence on meeting times. Martin Luther King Jr. dreamed of an integration that was not merely a “romantic mixing of colors” but a “real sharing of power and responsibility.” At MIT, we aren’t sharing nearly enough power or responsibility.

Truth number two: The truth is MIT released its boldest Climate Action Plan in 2021, BUT it is still a shareholder in fossil fuels that continue to produce climate

change impacts disproportionately affecting Black, brown and indigenous people. I'm Nigerian by heritage. Since 2010, the Shell oil company, which MIT has received donations from, has leaked over 17.5 million liters of oil into the Niger Delta region, where my mother grew up — that's roughly seven Olympic-size swimming pools of oil. This is personal, and this is just a snapshot of the global devastation caused by fossil fuels. How can MIT hope to achieve its mission to "make a better world" while actively engaging with companies that poison the water and land in communities all over the world? This is an overt complicity in unbridled capitalism, which King despised and believed has "outlived its usefulness."

Truth number three: The truth is MIT does have a model of working with graduate students that has produced some positive change, BUT this model often moves at a snail's pace to accommodate those with the most privilege or ignores inconvenient truths and inconvenient recommendations. I'll offer the example of the yet-to-be-completed five year Strategic Action Plan to address DEI for the years 2021-2026. Wait ... isn't it 2022? The pace of change and mistreatment student leaders have experienced using existing MIT models have left over 2500 grad workers with the conviction that we need a graduate student union to secure legally-binding, lasting change. On Feb. 1, the chancellor and provost sent out an email communicating MIT's stance, that they believe "MIT's long-standing partnership with graduate students is a better path forward than unionization." To that, I will paraphrase King, who was enthusiastically

pro-union. In fact, he was assassinated at a labor union-organizing campaign. He says “our needs are identical with labor’s needs. That is why the labor-baiter is virtually always a twin-headed creature spewing anti-Negro epithets from one mouth and anti-labor propaganda from the other mouth.” As anti-negro epithets may not be as common today, I’ll summarize the core of King’s stance in a different way — rhetoric that is not enthusiastically pro-labor union cannot be enthusiastically anti-racist.

These three truths may seem unrelated, but they are all connected through issues of capital and hierarchy. The truth is, the bottleneck to progress at MIT is not a lack of knowledge or resources; it is an administration infatuated with wealth and intoxicated by power. It's an aversion to truth-telling, and a scarcity of agape love; it's power without love, which, in King's words, is "reckless and abusive."

I Love MIT. Those are three words that I would usually never string together into a sentence. But, I *am* committed to the spiritual, *and* moral, *and* ethical growth of MIT. I'm practicing my love by telling these inconvenient truths. If you Love MIT too, to Love well, we must be willing to tell the truth, then take palpable measures to bend the arc of MIT's history towards justice.

Ufuoma Ovienmahda is a fourth-year graduate student-worker in AeroAstro and served as a co-President of the BGSA for two-and-a-half years.

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GUEST COLUMN

Fossil fuel companies fall short on climate pledges

Federal hearings reveal that the fossil fuel industry is still misleading the public about its role in climate change

By Lauren Higgins

Hearings held by the House Committee on Oversight and Reform in September reveal the failures of fossil fuel companies to live up to their pledges on reducing their environmental impact — and why we still have work to do.

The hearings follow a year-long investigation by the Committee regarding the role of the fossil fuel industry in driving climate change. Before the hearings, the Committee released a memo documenting internal emails and guidance from several Big Oil companies — including BP, Chevron, Exxon Mobil, and Shell — that demonstrate their campaign to mislead the public while they fall short of reaching their climate goals.

These contradictions should come as no surprise, as they continue a long tradition of Big Oil companies lying to the public about their role in worsening the climate crisis.

Among the discoveries revealed in the memo, these companies made it clear that they are “devoted to a long-term fossil fuel future” and instructed employees to use intentionally misleading language when broaching the topic of climate change. For example, “Exxon and Chevron sought to

water down statements by the industry-led Oil and Gas Climate Initiative (OGCI) to “remove language that potentially commits members to enhanced climate-related governance, strategy, risk management, and performance metrics and targets” in an apparent effort to avoid binding themselves to any climate commitments, despite each publicly stating the opposite. Additionally, internal messaging guidance from Shell “calls on employees to emphasize that net-zero emissions is ‘a collective ambition for the world’ rather than a ‘Shell goal or target,’” directly contradicting their own publicized climate target. These contradictions should come as no surprise, as they continue a long tradition of Big Oil companies lying to the public about their role in worsening the climate crisis.

“My Committee’s investigation leaves no doubt that, in the words of one company official, Big Oil is ‘gaslighting’ the public,” said Rep. Carolyn B. Maloney, the Chairwoman of the Committee on Oversight and Reform. “These companies claim they are part of the solution to climate change, but internal documents reveal that they are continuing with business as usual.”

Following the investigation and the release of the memo, the Committee held a hearing to examine the adequacy of the companies' climate pledges and to hear testimony from survivors of climate change-induced severe weather events.

Testimony from Raya Salter, Esq., founder and executive director of the Energy Justice Law and Policy Center and member of the New York State Climate Action Council, emphasizes the failure of fossil fuel companies to hold true to their climate pledges. Salter states that “the fossil

fuel company commitments are just frankly disingenuous. The fossil fuel lobby combats climate action on every single level — global, national, state, and regional.” Her statement supports the findings revealed in the memo, reinforcing the fact that Big Oil companies are lying about their climate commitments and failing to act on the issue of climate change.

While the effects of climate change grow worse each year, fossil fuel companies continue to profit off of the crisis that they helped create.

The hearing also sought to emphasize that marginalized communities throughout the U.S. — particularly low-income communities and communities of color — bear the brunt of climate change and feel the strongest effects of the inaction of the fossil fuel industry. At the hearing, Dr. Isabella M. Weber, Assistant Professor of Economics at University of Massachusetts Amherst, stated, “Low-income households are clearly the ones that are hit hardest by the energy price explosion. They are the ones that have the least means to weatherize their homes. Black and Brown communities face, on top of this, discrimination in the housing market, which means that they typically end up living in homes that are less well insulated or less energy efficient.” Another witness, Jasmin Sanchez, a survivor of Hurricane Sandy and public housing resident, stated, “Climate justice is a racial justice issue. Sandy showed the inequities in our

city. If you didn't have a car, you couldn't leave. If you didn't have financial means, you couldn't relocate ... I, along with many of my neighbors, were in survival mode." Sanchez's testimony demonstrates that the effects of climate change aren't something far off in the distance — they are happening right here, right now, to real people. And the fossil fuel industry is intentionally making the climate crisis worse and harming the communities most at risk.

These recent hearings made clear that the fossil fuel industry has not only fallen short of its climate pledges but has also spread misinformation and misled the public on its actions while continuing to contribute to the climate crisis and perpetuate violence against marginalized communities. Despite this, Big Oil companies continue to post record-breaking profits, with BP, Chevron, Exxon Mobil, Shell, and TotalEnergies producing a combined profit of \$51 billion in the second quarter of 2022. While the effects of climate change grow worse each year, fossil fuel companies continue to profit off of the crisis that they helped create.

So, why should we as MIT students care? The answer is simple: the MIT Corporation's refusal to divest from the fossil fuel industry means that as these companies profit off of the climate crisis, so does MIT. If MIT wants to uphold its values and take responsibility for tackling the climate crisis, it must divest from the fossil fuel industry.

Lauren Higgins is a first-year undergraduate student and a member of MIT Divest.

*Originally published in Volume 142,
Issue 26 on November 9, 2022.*

```
File Edit Options Buffers Tools Im-Python Python Help
from new_skills import *

def learnMarketableJobSkills():
    return linux, OSX, javascript, applescript, perl, python, PHP

if self.interest == True:
    print "E-mail join@tech.mit.edu"

----:----F1 joinTechno.py (Python)--L1--Top-----
```


In browsing last year's issues of *The Tech*, I was confronted less and less with an onslaught of revised COVID policies, statistics, and health recommendations, and more with refreshingly diverse examples of student engagement and activism.

The Graduate Student Union's herculean efforts to obtain recognition culminated in a landslide election victory; MIT Divest pursued a lawsuit with the Massachusetts Attorney General's office, complete with sit-in protests; and student advocates fighting for relief in Ukraine championed a cause of utmost importance to the campus and larger community.

On the lighter but equally moving side, this year saw a return to public campus and 24/7 Banana Lounge access, beloved traditions like the aquarium trip — adapted for the Class of 2024 — and the awe-inspiring MIT: Regressions, a sweeping documentary of our past that motivates us to reflect on our vision for the future.

It would be disingenuous to say the pandemic's effects are obsolete: student groups and their leaders have struggled to generate pre-2020 levels of enthusiasm and involvement; and relics of the pandemic — such as closed campus and turnstiles

— persisted through this year.

But it is wonderful and humbling to realize that the student activism of the past three years is not merely a symptom of the COVID-era, but an enduring quality inherent to MIT student leaders, and something here to stay.

As the news editor for Volume 142, I've had the privilege to write about, read about, and edit these stories of passion for change, and I'm honored to have shared them with all of you.

— Srinidhi Narayanan '24
Volume 142 News Editor

LEGEND

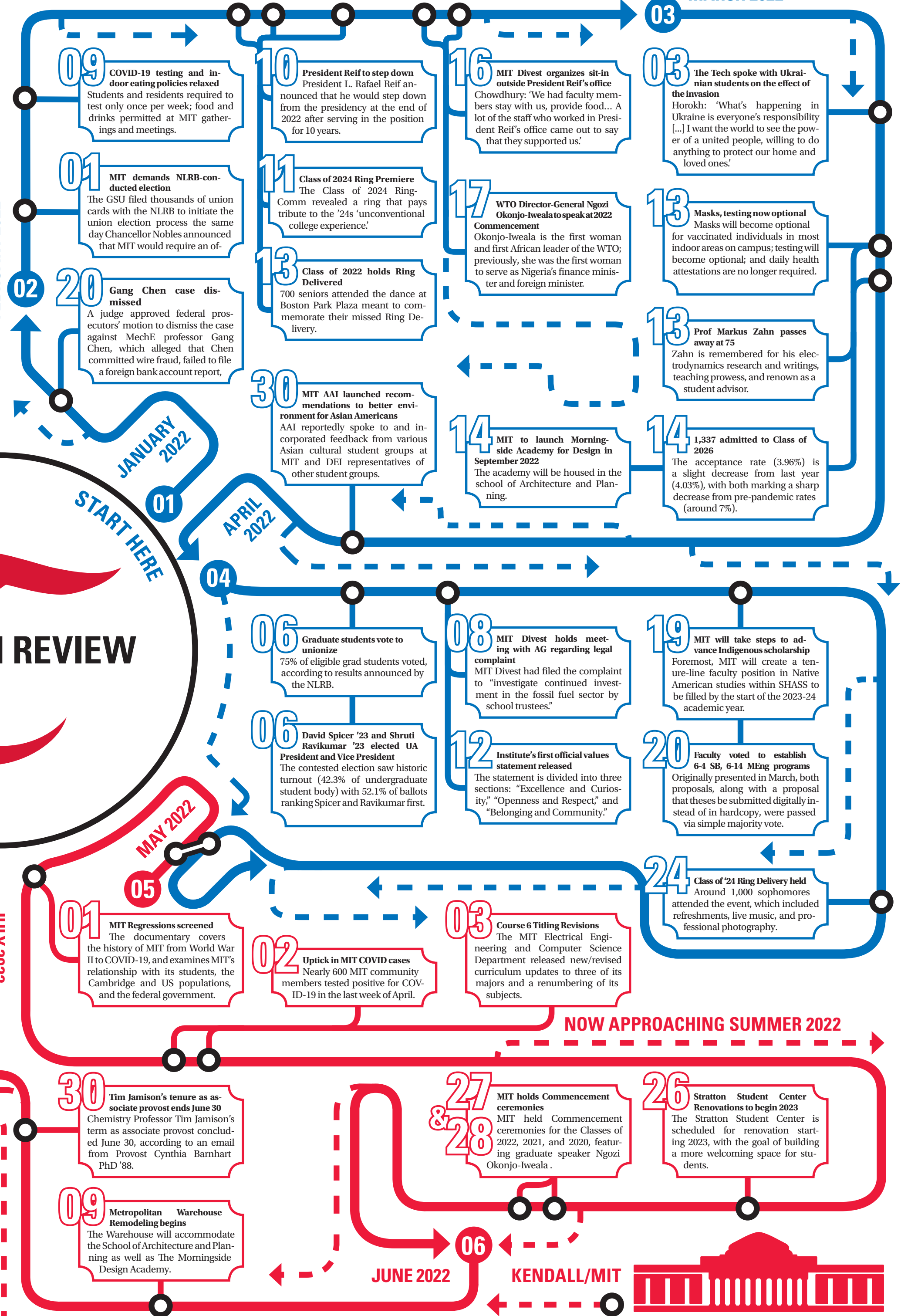
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FEBRUARY 2022 — FEBRUARY 2023





On Need, from Page R12

instinct should be to reach out, clarify the problem, and provide whatever help is possible. In the four years since I first applied for aid, I never heard a voice or made eye contact with a financial aid officer. What impact does it have on students to explain their stories again and again to a faceless email address hiding a rotating cast of financial aid officers? I have no idea how many people read my emails. Did I owe them my story? Imagine if it had been different. Imagine if when I first presented the difficulty of reaching out to a noncustodial parent, SFS responded with compassion and a phone call. Imagine if they provided all of the relevant information to resolve the problems with my application from the outset, so the process didn't stretch over months. Imagine if I hadn't been required to reach out to Leanne in the first place.

While little scholarly literature addresses the question of noncustodial parents and college financial aid, Ohio State University professor Kaprea Johnson advises college counselors to consider “the time since (or if) there was contact between the student and parent; if a parent has a history of mental illness, drug or alcohol abuse, or incarceration; or if the whereabouts of the parent are unknown.” [1] MIT makes the first step toward this with the College Board waiver form, but that document does not include directions for students who have had contact in the past, but not in a long time (eight years now in my case, greater than a third of my lifetime). It also establishes the high barrier of legal documentation and third-party documentation for proof of hardship.

Johnson's article continues that universi-

ties should recognize that noncustodial parents may not be willing to pay toward their child's education "despite the institution's assumption that he or she will." The whole financial aid system is built on this assumption, based on out-dated ideas that an American family includes two parents who feel responsibility to provide for their children. If SFS's goal and mandate is to ensure that cost of attendance will never be a barrier for a qualified student to study at MIT, it is senseless to exclude those students who must take greater personal responsibility for paying for college through no fault of their own.

Furthermore, Johnson recommends that financial aid officers refer students in complex familial situations to mental health services on campus. When knots of stress took over my shoulders and I felt like other MIT students could never understand this situation, a direct referral to MIT Mental Health and Counseling to coach me through the application process would have been invaluable.

Recently, I walked into the SFS office to pick up a COVID-19 federal relief check. I asked the receptionist if there was a way to provide feedback to her office. She looked confused, so I rephrased the question. "Not that I know of," she replied. "You can always email us." This solidified my suspicions. SFS does not really see students, nor do they want to.

III. Full Need

The SFS Financial Aid Glossary states that full need “means that we meet 100% of your family’s demonstrated need through scholarships, grants, and student employment.”

Now, here comes the big reveal: I'm not on financial aid.

I have federal work study designation, but

no scholarships or grants for me this year. My family decided to withdraw our application. Instead of getting an MIT scholarship, we took out tens of thousands of dollars of loans under my name. Because I come from a financially stable background, I trust that they will be paid off. Or rather, my dad will pay them off. I already paid over \$30,000 toward my education and college expenses by choosing cheaper lifestyle options (no meal plans) and contributing earnings from campus jobs and internships. I'm graduating in seven semesters instead of the typical eight to save money. MIT made the same promise to me as it did to all other undergraduates: *need based, need blind, full need*.

They didn't deliver. I will be fine. My parents will be fine. But what about the students in my situation who are also reliving childhood trauma each time they are required to get back in touch with absent, neglectful, or abusive noncustodial parents? What if those students can't afford to give up? Does SFS believe that those students are deserving of aid? Regardless of my own financial situation, did my dad and I have to go through this bureaucratic downpour just to satisfy inane application requirements?

I'm writing this because I don't let this story out often. I'm writing this because I'm angry. I'm writing this because I am tired and graduating, and I love MIT too much to not work out our issues. I'm writing this because I can't let it happen to someone else.

So what happens next? To my fellow students reading this essay, I ask that you refrain from making assumptions about your classmates' financial situations, even when you find out their financial aid status. I can't be the only one here navigating a relationship (or lack thereof) with a coercive family member, while taking on personal financial

responsibility. The greater agents in this story, however, are the administrators with the power to change MIT SFS.

To them, I ask that SFS streamline their communication and recordkeeping process to prevent the misinformed volleys of questions and half-answers that characterized my email exchanges with them. They should rewrite the language around noncustodial parents to encourage students with unusual situations that don't include court documents to talk through their options with a financial aid officer. In fact, maybe they shouldn't make students prove their trauma with court documents to begin with. And they should also pick up the phone and respond promptly when you do call.

In addition, MIT should fund research on the experiences of students with noncustodial parents and how it affected their ability to pay for college. How many students did not apply or withdrew their applications because the burden of obtaining information from their noncustodial parent was too much or even compromised their safety? How many fewer families would be burdened with college debt if extra documents were not required in cases where there is no contact between student and noncustodial parent? MIT SFS should then change their policies accordingly and encourage their peer institutions to do the same. Only then can their promise of need based, need blind, and full need be more than a marketing slogan.

Editor's note: An exception was made to publish this piece under a pseudonym, in order to protect the identity of the author and to remove identifying information of those involved in the story.

*Originally published in Volume 142,
Issue 12 on February 17, 2022.*

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CORRECTIONS

In the previous issue of *The Tech* published last week, the photo was wrongly attributed to Colin Clark. In actuality, the photo was taken by Kate Lu.



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OPINION POLICY

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Dissents are the signed opinions of editorial board members choosing to publish their disagreement with the editorial.

Letters to the editor, columns, and editorial cartoons are written by individuals and represent the opinion of the author, not necessarily that of the newspaper. Electronic submissions are encouraged and should be sent to letters@tech.mit.edu. Hard copy submissions should be addressed to *The Tech*, P.O. Box 397029, Cambridge, Mass. 02139-7029, or sent by interdepartmental mail to Room W20-483. All submissions are due by noon four (4) calendar days before the date of publication.

Letters, columns, and cartoons must bear the authors' signatures, addresses, and phone numbers. Unsigned letters will not be accepted. *The Tech* reserves the right to edit or condense letters; shorter letters will be given higher priority. Once submitted,

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Guest columns are opinion articles submitted by members of the MIT or local community.

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ARTS IN REVIEW

2022 was a return to normalcy. Restaurants in Cambridge bounced back with sit-in dining, theaters teemed with new releases, and students at MIT returned to launching performances and other creative initiatives, from Shakespeare plays to a local summer program teaching game design.

The Tech's Arts department has continued to thrive, with our writers, new and old, covering everything from MIT Asian-American Initiative's second an-

nual zine release to the opening of Boston's much-anticipated Blue Ribbon Sushi. Our writers this year in particular enjoyed the return of Blue Man Group to stage and settling longstanding debates among Boston foodies — Tatte or Flour, Pepper Sky or Mae's.

— Mindy Long '23
 & Erika Yang '23
Volume 142 Arts Editors

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LIVE ENTERTAINMENT

Blue Man Group splashes into rhythm

A dazzling theatrical performance by three actors in bald caps and blue makeup



COURTESY OF CAROLINE TALBOT / THE BLUE MAN GROUP

A Blue Man bounds across the audience during a production in the Charles Playhouse.

By Ellie Montemayor
PRODUCTION EDITOR

A faint but heavy pounding noise can be heard on the southern edge of Boston's Theater District, an unmistakable sound that has shaken the walls of the century-old Charles Playhouse theater year-round for almost 30 years. A rave? Perhaps. Maybe just a loud bar? It's no surprise that a rowdy atmosphere is ever-present in one of the many cabaret-style nightlife attractions that the district presents. But distinct from the other venues in the area is the form of merriment that the theater presents — a startling but enticing mix of lighthearted music, laughter and surprises.

Ladies and gentlemen, we would like to take a moment for you to note the emergency exit signs. In the event of an emergency, please leave your chairs and make your way to the emergency exits. Again, please leave your chairs in the theater — they are bolted to the floor. Just consider the energy it would take to remove them, and they probably won't match your personal decor in any way.

As the theater sits in darkness at the beginning of the show for a nearly 10-minute opening routine, the pounding noise morphs into a rhythmic drumming beat. Then two. Then three. The opening performance continues adding elements, introducing the main features of the show — lights, paints, drums, and the audience itself — and its core theme: the determined inanity of three speechless so-called “Blue Men” as they navigate their way through the 90-minute runtime of the concert-play amalgamation that is the Blue Man Group.

The show merges together extended sequences of live instrumental techno and psychedelic rock with performance art involving paints and marshmallow sculptures, all cobbled together in a story-like structure as the three wide-eyed but resolute Blue Men take their childlike determination through a series of routines

that showcase and deconstruct the world through their eyes.

The set itself is visually and practically stunning, a tailored stage equipped with the many props that the characters interact with, from spinning paint canvases and three Blue Man-sized smartphone displays to their signature Drumbone, a paint drum and thongophone instrument.

Actor Kean Haunt, who has been playing a Blue Man since 2018, noted that the strangeness and resulting uniqueness of the show comes from the Blue Men's on-stage personas.

"The character doesn't speak. You have to be very expressive with just your body, and you get to really play with all of the implicit body language stuff that is active in everyday life and interactions. It really comes to the forefront in a Blue Man Group show when you're not able to use words and yet you have to carry along a story and make sure the audience is there with you, understanding what you're trying to put across," Haunt said.

Each production features three distinct actors in bald caps and blue makeup — the eponymous Blue Men — interacting with both each other and the audience in a multitude of ways. While the similarities in the ways their innocence manifests in the real world may suggest some inherent sameness in their personalities, each of the three personas is actually rooted in a different facet of the human experience.

"Throughout the show, as the pieces unfold and you watch how each individual handles the new information that's coming out, you start to recognize the little differences [between the characters]. ... We sometimes talk about if the Blue Men have each been handed different parts of the manual for being human. They've each been handed an incomplete copy," Haunt said.

Accordingly, the way the Blue Men fulfill the expectations set in these manuals lead them to their own individual personalities.

"Generally, the left Blue Man has the most information but being kind of mischievous inside, uses that to toy with the other ones a little bit ... The right Blue Man is a little bit more action-oriented, a little more courageous, more game to just try something ... The center Blue Man has the least information and is the guy in the middle trying to hold these two competing energies together," Haunt said.

From a storytelling perspective, the dynamic between the three naturally gives rise to their different hijinks. But from a technical perspective, the necessity of keeping a solid flow throughout the show and allowing the characters to realistically respond to their situations poses an interesting challenge to the three actors as they have to keep on the same pace with one another and remain within that dynamic as they respond to different obstacles, interruptions and situations that emerge during the show.

A balancing act then has to come with every show between maintaining the script and simultaneously being ready to abandon it at the slightest change.

The three silent Blue Men that star in the production are like a 21st-century Moe, Larry, and Curly, drawing inspiration from those kinds of silent-era slapstick-style comedy routines but also building on the concept. Even within the show itself, innovation has to take place continuously — a necessity to keep up with changing audiences as the worldwide performance group pushes past over three decades of production.

"The script of the show is very heavily annotated by every Blue Man who has come in and learned the role and then passed that onto another person. So, that's a really interesting thing that even if you're to write out, beat for beat, what's supposed to happen, there's a lot more beneath that," Haunt said.

Much of this show-by-show variation and improvisation as well as the more

overarching gradual alteration with the show's script comes from both the differing styles and dynamics that each Blue Man brings to the show and the unpredictability of the actors' interactions with their audiences. In the Boston group, there are six actors that rotate in and out of each production, with Haunt playing either the left or right Blue Man when performing.

A staple of the show's current production is the routine "The Match," which was developed in Boston — at around the time Haunt joined the Boston group — and later spread to the other productions.

[In 'The Match,' we] go out into the audience. There's this sort of weird couple of minutes where we're just walking around, taking in the people to try and find two people who we think would be good to play with. Then we bring them up, and we do this piece that's scripted but a lot can go wrong because the two audience members we get — they don't know the script. Sometimes, they have their own ideas," Haunt said.

This kind of joyous uncertainty and go-with-the-flow attitude drive the show at its very core and allow its nonsensical light-heartedness to take centerfold. The Blue Men, in all their innocence and curiosity, present another way of seeing the world through a kaleidoscopic lens.

"The Boston Blue Man Group has a reputation in the company as being a big family, and I think that has really proved true. People come in and are genuinely excited to do their jobs and put on a show and see what's gonna happen each night. I got into theater to hang out with my friends — that's kind of what's happening now, so it's been really great," Haunt said.

Originally published in Volume 142,
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MAGAZINE REVIEW

Forgotten no more: the Asian Americans of MIT

The Asian American experience is the sum of all Asian American experiences

Rooted: Solitude and Solidarity

By the MIT Asian American Initiative

Released Sept. 7, 2021

By **Mindy Long**
ARTS EDITOR

Overlooked. Whitewashed. Abused. Asian Americans have often been forgotten in the American fabric. With the start of the COVID-19 pandemic in 2019, however, they were suddenly thrust into the national spotlight: “Coughing while Asian’: living in fear as racism feeds off coronavirus panic.” “2 New York City doormen fired after failing to intervene during brutal assault on Asian American woman.” “8 Dead in Atlanta Spa Shootings, With Fears of Anti-Asian Bias.” It is no coincidence that the onset of the pandemic marked an increasing prevalence of Asian Americans in national media. Nor should it be surprising that the term “Asian American” is frequently accompanied by the word “violence.” Asian Americans have historically been victims of imperialism, their culture subject to appropriation, and their features the object of fetishization.

At MIT, 19.7% of the student body identifies as Asian. In what way have these national events affected nearly 1 in every 5 students at MIT? MIT Asian American Initiative (AAI), a cultural club founded in 2020, asked students to respond to this question. Built around the theme of solitude and solidarity, the second volume of AAI’s 2021 zine, *Rooted*, features student-submitted writing, art, and photography. Though the entries “reflect our fear, anger, and grief stemming from anti-Asian racism,” many also explore the confusion of cultures the contributors grapple with today.

The zine begins with an uplifting poem, “Ascending” by Teresa Gao. A fallen bird, whom passersby take pity on, lifts its wings and flies, singing a song for itself and its victory. The bird could represent the Asian American community, forgotten but resilient, like a phoenix rising from the ashes. Personally, I believe “Ascending” would have better served as the ending of the zine, but opening the collection with an optimistic passage also has its merits.

The poems “My parents visit the grocery store on their first Halloween in America” by Cindy Xie and “A Statement for the Confused” by Afeefah Khazi-Syed highlight the struggles of first and second-generation immigrants and their dual identities — the native with the new and the native with the native itself. On the other end of the spectrum, “Fermented Soybeans: the gateway to cultural acceptance” by Alisa Hathaway

celebrates the writer’s reconciliation of her identity later in her life.

The joys of memory are explored in “As Thin as Smoke” by Fiona Duong, a short story about the author’s first memory of Vietnam. The ever-burning incense in her grandparents’ house will always remind her of the country. “The Walls I Knew” by Emily Huang and “Resonant When Struck” by Felix Li also center on childhood objects. The walls of a childhood room and the porcelain of family dinners are celebrated for their silent strength.

In addition to cultural identity, some of the pieces in *Rooted* highlight the mental struggles during quarantine. Interwoven in the zine are anonymous journal entries reflecting on a long-distance relationship begun right before MIT kicked its students off campus in March 2020 (“quaranTEEN love story”). Throughout quarantine, the author realizes that perhaps their feelings towards the other person in the relationship were not what they originally imagined were. This theme of gaining clarity through time and separation is prominent throughout the zine as many contributors cogitated on the nature of their lives and their surroundings during the virtual semesters.

My personal favorite is a series of illustrations, “Reverie of a Drink of Three” by Yiou Wang. The first two images depict two shadows running towards each other. When the shadows meet, a man stands between them. The shadows, then, belong to

a single man. It then becomes clear that the shadows themselves were not running — the man was. As he ran to chase his shadows, representations of who he was, the intersecting walls ahead of him forced him to stop and recognize both sides of himself. The work ends with the line, “two who crave to meet, finally meet.” The message of this piece can be interpreted as follows: everyone is the sum of all their identities. I also appreciated the title’s clever reference to an eighth-century Chinese poem, “月下獨酌” (“Drinking Alone Under the Moon”), which includes the lines, “舉杯邀明月，對影成三人。” (“Raising my cup, I invite the bright moon / and turn to my shadow. We are now three.”)

Rooted: Solitude and Solitary is a thought-provoking look into the lives of my peers who have grown up sideways, Asian at home but American outside. The scars and joys of language (“Do You Speak English?” and “Bastardized Tamil” by Neosha Narayanan), the duality of identity (“Between the Shores” by Kathryn Tso and “Learn How to Use Procreate for only \$9.99” by Alana Chandler), and the immigrant experience are only a fraction of the themes explored in *Rooted*. The only constant between the works is that there is no constant. The Asian American experience is the sum of Asian American experiences.

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OUR FAVORITE RESTAURANT REVIEWS FROM 2022

A Blue Ribbon takeover

A look at Blue Ribbon Sushi in Kenmore

Blue Ribbon Sushi

Japanese, \$\$\$

500a Commonwealth Ave.

Boston, MA 02215

Open every day

By **Teddy Schoenfeld**

In early 2021, three restaurants inside Hotel Commonwealth in Kenmore Square shut their doors. The loss of popular raw bar Island Creek Oyster Bar, seafood-focused brasserie Eastern Standard, and snazzy cocktail bar The Hawthorne was mourned by many, and locals have since yearned for suitable replacements. The area looks different now. The Kenmore Square Redevelopment Project, the construction of the Whoop headquarters, and the opening of the MGM Music Hall have transformed Kenmore from a ballpark neighborhood to a classy commercial, retail, and entertainment hub. Leading the culinary charge with the opening of three new restaurants, all in the vacated Hotel Commonwealth spaces, is New York’s Blue Ribbon Group.

Owned by brothers and restaurateurs Eric and Bruce Bromberg, the group is well known for Blue Ribbon Sushi, a cozy sushi bar concept with locations in New York, Los Angeles, Las Vegas, Miami, and, as of June 2022, Boston. Blue Ribbon Sushi Kenmore resides in the old Hawthorne location — in fact, the restaurant’s unassuming main entrance was formerly Hawthorne’s side door.

Self-described as the creators of “modern neighborhood restaurants,” Blue Ribbon has 20 establishments nationwide, 10 of which are in New York. One of many applicants for the Hotel Commonwealth spaces, Blue Ribbon was chosen in part because of their ability to cater to a wide customer base while maintaining exceptional quality and creativity. The group’s restaurant concepts are diverse: a gastro-bowling alley, an NYC fried chicken spot, and their original New York brasserie.

Although it’s been one of Boston’s hottest new restaurants since it opened this summer, Blue Ribbon Sushi’s exterior is modest. The entrance is unadorned and set back from the sidewalk. A staircase takes patrons to the below-ground dining room. Inside, businessmen in suits sit next to twenty-somethings in workout clothes. The decor is casually elegant; warm lighting complements sleek, dark wood

and upholstery. Although the restaurant lies just two blocks from Fenway Park, it feels a world away from the bricks of boozy Lansdowne Street.

Like the New York location, the menu has options for both tame and adventurous eaters. The a-la-carte nigiri options are plentiful, with fish flown in daily from both the Atlantic and Pacific Oceans, but there are appetizers, salads, and yakitori skewers as well. Maki selections range from the indulgent Blue Ribbon roll, with lobster, shiso and caviar, to a simple avocado and cucumber roll. Several steaks are also available, including an A5 Wagyu prepared Teppan style and offered in 2oz, 4oz, or 8oz portions.

Besides the regular menu, specials include ten different nigiri options as well as monkfish medallions prepared with lobster miso butter, turnips and green beans. The food offerings are accompanied by an extensive selection of sake, Japanese whisky, and an ambitious wine list, especially for a sushi bar.

The sushi was prepared with intense attention to detail — the rice was the perfect temperature, the fish garnished with appropriate amounts of wasabi and, in the case of the anago (saltwater eel), eel sauce. Memorable pieces included pillowy kaibashira (sea scallop), chu-toro (fatty tuna) that dissolved on my tongue, and buttery, savory Hokkaido uni (sea urchin), my favorite piece of the meal. I finished with a large botan ebi (spot prawn) and tamago (sweet egg omelet), a perfect substitute for dessert.

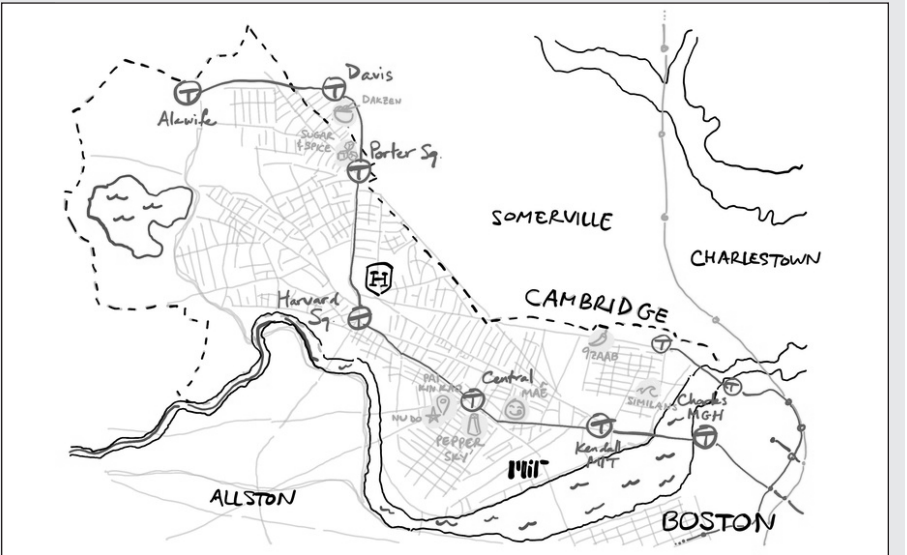
Although the other spaces are under construction, Eric Bromberg has said that the group’s focus is making sure Blue Ribbon Sushi gets off the ground. It seems to be doing just that — according to manager Liz Luce, it’s been packed since its opening in June 2022. Meanwhile, we know what’s coming to the other Hotel Commonwealth spaces — one will be occupied by Pescador, a seafood-focused “coastal grill” set to open this month, while the other is rumored to become a brasserie concept like the New York location.

True to its brand, Blue Ribbon struck a perfect balance: the fish was excellent, the menu was creative (albeit a bit pricey), and the restaurant seemed as appropriate for a casual weekday lunch as it would have been for a celebratory dinner. Although locals will always mourn the losses of ICOB, Eastern Standard and The Hawthorne, Blue Ribbon Sushi is the perfect first step to filling their vacancies.

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A tour of Cambridge’s Thai food scene

Missing home less and becoming more proud of my home country



ARUN WONGPROMMOON—THE TECH

A map to accompany your Thai food tour around Cambridge.

By **Arun Wongprommoon**
PRODUCTION EDITOR

Being an international student quite literally from the other side of the world, I find myself missing the life I take for granted at home: the sights of the energetic morning market overwhelmed with scents from streetside stalls, the oil grilling and frying pork-on-a-stick, corn cobs, meatballs and dumplings, and the aromatic stir-frys paired with rice; the thunderous cacophony of cars and buses carrying the population of Bangkok, a city that never sleeps, to home, work, bars; the smell of an imminent rainstorm ready to feed the hungry tropical trees.

Attending college in the United States threw me into an entirely new society, and I spent months disoriented by the smallest details of “normal life” here. Amidst such an upturn, the one thing that provided a slight remedy for my homesickness was food — I was relieved to see a surprising number of Thai restaurants in the greater Boston area. Over the years though, the culture shock subsided. I’ve grown more comfortable in Cambridge, and now I’m proud to call Boston my second home. When I do miss the bustle of Bangkok, I always find myself wandering to a local Thai restaurant, in search of the spices and tastes of home.

Thai food got a foothold in U.S. society following a diplomatic ploy. Dubbed Thailand: Kitchen of the World, Thai diplomats hoped to attract people to Thailand and boost tourism by impressing restaurant-goers in the states. The Thai Ministry of Commerce crafted three different formulas to take a piece of the country abroad, each one detailing ingredients, logistics, and everything else one would need to know about establishing a restaurant. While I’m not sure if any of the Thai restaurants here actually use these formulas, it is nearly impossible to meticulously replicate a Thai restaurant in Cambridge, as it requires not only the most skillful chefs, but also the best artists and designers to decorate the interior and exterior, lay out the silverware, choose the materials, furniture, and so on.

In short, a restaurant is more than the food it serves — it is also the ambiance that is inevitably served as another side dish. Despite that note, the Thai restaurants I’ve tasted here are surprisingly authentic. I’ve been able to converse in Thai with Thai restaurant owners, waiters, and waitresses, which is always a good sign of authenticity, because outside of Massachusetts there have been times when I have embarrassed myself.

Thai Food, Page R16

SCIENCE IN REVIEW

At an institution where students live and breathe science in their classes and research, it's both appropriate and remarkable that some still find time to write about it when the school day ends. In 2022, science coverage in *The Tech* resumed slowly but surely as the department continued to regrow following the pandemic.

Over the course of the year, our writers explored a breadth of research — in and out of MIT — that promises to expand our understanding of the world around us. We spotlighted complex work in the Department of Civil and Environmental Engineering aiming to model the properties of biological materials, from human tissues to adhesives. A survey of nuclear thermal propulsion technologies — and their potential to

transform the landscape of space exploration — gave us a glimpse into the future of astronautics. And an exploration of the policy-oriented problem-solving in MIT's Blueprint Labs highlighted the impact of data-driven, interdisciplinary research in spaces like healthcare and education.

We thank the researchers who shared their science with us and the readers who tagged along. In the coming year, we hope this department will continue to showcase just how far science and technology can take us, from layers of tissues to planets in our solar system.

— Laura Schmidt-Hong '23
Volume 142 Science Editor

STATE OF SCIENCE

Nuclear thermal propulsion for space exploration

The history and future of astronautic nuclear technology

By Codrin Paul Oneci

Over the past few years, organizations and companies including NASA, the U.S. Department of Energy, SpaceX, and the International Atomic Energy Agency have expressed interest in using nuclear technologies to make space exploration more efficient and economical. In particular, nuclear thermal propulsion (NTP) is emerging as a potentially key technology for transporting large masses from Earth to various positions in the solar system, while surface power systems using nuclear reactors could be used to provide energy to the first human inhabitants of Mars.

NTP is not a new technology: it was largely developed in the 1960s during the Space Race, culminating in the successful development of the Nuclear Engine for Rocket Vehicle Application (NERVA). The principle behind all NTP systems is the same: nuclear fission is used to heat helium or hydrogen to temperatures of about 2,200–2,800 Kelvin, accelerating these gasses to produce thrust. In the case of NERVA, the design was similar to that of a miniaturized nuclear fission reactor, containing components made of graphite and beryllium oxide and a liquid hydrogen-based coolant in the rocket propellant. These atoms, which have a low atomic mass, are used in thermal propulsion because they have the highest associated specific impulse — the ratio between the exhaust velocity of the particles and the gravitational field intensity at sea level. Essentially, higher specific impulses result in higher thrust and better mass efficiency: for the same thrust, the propulsion system mass is lower.

In 1973, NERVA was capable of generating significant amounts of aggregated power of exhaust particles, with a specific impulse more than double that of chemical rockets and a particle exhaust velocity close to 8,000 meters per second, almost double the particle velocity in chemical engines. NERVA had a thrust comparable to that of chemical rockets, but the main advantages of the technology were its high specific impulse and energy density. For maneuvers involving large specific transfer impulses, such as Earth-Mars missions, the maximum allowed mass of a spacecraft is the primary technical constraint, and at that point NTP results in higher economic efficiency for reaching the same transfer objective.

The operating parameters and performance of NERVA are considered state-of-the-art even in modern-day designs and illustrate the benefits of nuclear propulsion over chemical rockets: more compact energy sources and higher particle exhaust velocities. While the large size of NTP systems and inherent radioactive nature of ejected matter makes them unusable on

Earth, they are a strong option in space conditions.

However, after the success of the Apollo program and immediate public image benefits of its success in the Space Race, the United States government decided not to invest further in these projects. Politicians were no longer interested in investing in a program relevant for a manned mission to Mars, and although the technology had been developed and was ready to use, there was no public interest in continuing research in the field or making commercial use of it. Research and development of NTP was stagnant between the end of the Space Race and the 2010s.

Today, 50 years later, the landscape of space exploration is very different, as both China and Russia are willing to spend national resources to achieve strategic superiority in astronautics and the development of space systems, including preparation for the economic exploitation of space and resources in it. Economic competition over the last decade has also generated more interest in the field, and organizations and companies across both the U.S. and Europe have decided to invest more in it, with positive effects on the development, both physical and conceptual, of many technologies — including NTP.

Given the fact that NERVA weighed about 18 tons and Starship, the largest spacecraft currently produced by SpaceX, is capable of lifting more than 100 tons of payload to low earth orbit, it is evident for many specialists that we are currently capable of transporting such large propulsion systems in a single trip. Moreover, there exists the possibility of actually assembling large space structures while in the Earth's orbit, or in nearly constant gravitational potential regions — space where the gravitational field intensity is close to zero, with almost no gravity observed.

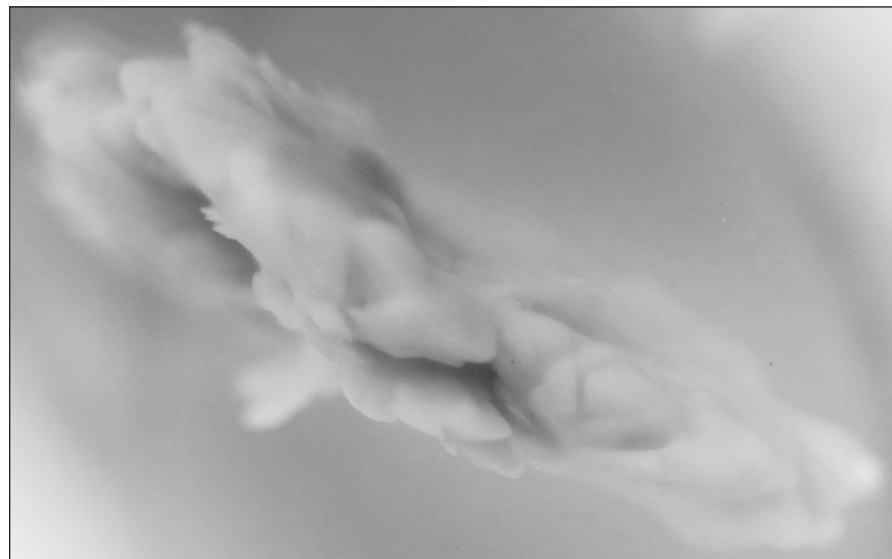
Until we see NTP systems running in space, we may first witness the deployment of other nuclear technologies, like nuclear electric propulsion systems, which complement current work by NASA to miniaturize high-power nuclear systems for space missions. Using electromagnetic fields to accelerate ions, these systems produce less thrust than NERVA but are a step towards using nuclear technology in space and physically experimenting with propulsion systems that one day may be used on spacecraft heading to distant objects in the solar system. It is just a matter of time — and increasing economic competition between nations — until we will see such systems being used in transporting equipment and humans to Mars in order to make humanity a multiplanetary species.

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LAB SPOTLIGHT

Discovering nature's properties through nonlinear mechanics

The Cohen Mechanics Group's quest to model the mechanics of biological materials



COURTESY OF THE COHEN MECHANICS GROUP

A fracture is made using the VCCE method in PDMS, a silicon-based polymer that the Cohen mechanics Group often uses to simulate tissue.

By Alayo Oloko

Have you ever wondered how biological materials like skin and muscle grow? Or why these materials behave the way they do?

These important questions are what researchers in the field of nonlinear solid mechanics seek to answer. The Cohen Mechanics Group headed by Dr. Tal Cohen, a researcher and associate professor of civil and mechanical engineering, was founded in 2016 in the Department of Civil and Environmental Engineering with the aim of first developing, then testing, theories in this field.

According to Cohen, if you were to compress a material and measure its displacement in response to that load, you could then graph the relationship between the two. For sufficiently small forces, the relationship could be simplified to a linear curve — a straight line, for which the slope is the stiffness of the material. This linearization is extremely useful for engineers in predicting the behavior of structures. However, this model doesn't always apply in the real world, especially with softer materials that can undergo large deformations when a force is exerted on them. The study of non-linear solid mechanics goes further by subjecting materials to extreme stress or strain to observe their properties and behavior. Examining these extremes enables a more complete understanding of these materials.

The applications of this field are widespread, from creating stronger buildings to studying the nature of brain injuries. While these two examples seem vastly different, they are both the subject of the Cohen Mechanics Group's work.

Over its five-year existence, the group has gained many new insights in the field. One that Cohen is particularly proud of is the lab's development of the volume-controlled cavity expansion (VCCE) method. In the VCCE method, water is injected into a chosen material like biological tissue. By controlling the volume of injected water and measuring pressure, stiffness and other material properties can be locally measured in the tissue. Prior to the development of this method, measuring these quantities in biological tissue was difficult depending on its size and shape, as well as the fact that tissue behaves differently inside or outside the body.

Many potential applications of the VCCE method have emerged, especially within healthcare. Hannah Varner, a mechanical engineering PhD student leading the VCCE effort in the Cohen Mechanics Group, is currently applying the method to model the properties of blood clots. Another major potential application is in guiding the surgical removal of cancerous tissue. When surgeons perform these operations, they often have to rely on the relative fitness of tissue to decide what to remove. The drawback of this approach is that it relies on human intuition. The VCCE method could

provide quantifiable material properties of diseases that would make locating and removing cancerous cells more precise, improving the way that cancer is treated. Recently, the Cohen Mechanics Group has been working with local doctors to explore implementations of the VCCE method in a healthcare setting.

Another subject the group studies is how organisms grow. Rather than using the typical approach of reverse engineering a biological system and guessing at a correct model, the group breaks the system down into what Cohen describes as “the basic mechanisms that generate growth.” The group creates models synthesizing those mechanisms together. These models guide their understanding of how organisms will grow, which can provide insight that can be used in the design of objects from non-biological materials.

Cohen emphasized how curiosity drives the group's members. "Everything we do starts with some curiosity due to observing something," she said. The group is "constantly encountering more and more phenomena to understand."

That strong curiosity, along with the interdisciplinary nature of the group's research, is displayed through the range of projects the group's ten members are currently undertaking. Speaking to these students, including Hanna Varner mentioned above, provides interesting insight into their projects. Tara Venkatadri, a fourth-year aerospace engineering major, has been working to better understand interfacial failure of adhesives and the effects of torsion on them. Mrityunjay Kothari, a postdoctoral associate with a PhD in solid mechanics, is studying biofilms — gathering of bacteria that grow everywhere from our teeth to the bottom of ships — and examining how they grow in different settings. Chockalingam Senthilnathan, an aerospace engineering PhD student is studying how shear shocks travel through the brain and can cause much more damage than previously thought. Though these projects may seem drastically different, they are rooted in the same fundamental questions. As Cohen described it, “we have different projects that are pulling along different directions, but we also collaborate a lot within the group, and things essentially merge.”

The Cohen Mechanics group has accomplished much in the five years since its founding, and with its many ongoing projects, it promises to continue producing interesting and insightful research. As the group looks towards the future, they hope to see their work applied in various fields and for their research to help others to better understand the world around us. As Cohen stated, solid mechanics “applies to so many things. That’s what’s so exciting about solid mechanics: it’s just in everything and everywhere.” Thus, there is no telling what the group might discover next.

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