



AI @ MIT

Life and learning with large
language models

See page 8 for *The Tech's* special look at AI at the Institute

Four MIT students are 2026 Rhodes Scholars *Scholars look forward to Oxford*

By Sabine Chu

ASSOCIATE NEWS EDITOR

For the second year in a row, four MIT students and alumni have been named Rhodes Scholars-Elect. Vivian Chinoda '25, Alice Hall '26, Sofia Lara '26, and Sophia Wang '24, the recipients of this prestigious award, will pursue their diverse interests through postgraduate studies at Oxford University starting in fall 2026.

Kim Benard, the Associate Dean and Director of Distinguished Fellowships and Academic Excellence, wrote to *The Tech* that this year's winners demonstrated a commitment to combining technical innovation with "policy, leadership, and entrepreneurial dissemination." Throughout the application process, Benard has aided applicants, finalists, and ultimately, the Rhodes Scholars-Elect. She is supported by the Distinguished Fellowships team at the Career Advising and Professional Development Center, along with Professors Nancy Kanwisher and Taylor Perron of the Presidential Committee on Distinguished Fellowships.

Chinoda, who graduated this spring with a degree in business analytics (Course 15-2), plans to pursue dual masters degrees in social data science and public policy at Oxford. She says that taking Professor Kari-lyn Crockett's course Making Public Policy sparked a long-term passion for evidence-based policymaking, and that Oxford was one of the few universities that suited Chinoda's interdis-

iplinary approach. She believes that the Rhodes Scholarship will allow her to be "sharpened by others" and "do the same in return."

Hall, a chemical engineering (Course 10B) major and the current president of the Undergraduate Association, hopes to ultimately address climate change through international action. At Oxford, she will earn a DPhil in engineering with a concentration in sustainable heating and cooling techniques. Hall emphasized the support she has received from communities across the Institute. "I am so grateful that MIT makes it so easy to have such unique experiences," she said.

Lara, who is majoring in biological engineering (Course 20), cited her background as a "Latina from the San Fernando Valley" in California in shaping her approach to equitable precision medicine for women's health. She will earn a DPhil in clinical medicine as a Rhodes Scholar. Lara advised future applicants to aim for "greatness and mastery in all that you do" without losing sight of their ethical commitments.

Benard wrote, "Our goal is to help students try to be their best selves," and all Scholars-Elect who wrote to *The Tech* credited Benard for her deep commitment to all applicants. Lara highlighted Benard's emphasis on "authentically" and "unapologetically" communicating one's values. Hall, who called Benard "my rock," said, "When I was finally able to call her with the good news, I think I told her this was her award."

Federal funding cuts disrupt students' graduate school plans *Students apply to more programs or not apply at all*



VIVIAN HIR—THE TECH

Killian Court on Monday, Nov. 17, 2025.

By Sabine Chu

ASSOCIATE NEWS EDITOR

Since the beginning of 2025, funding cuts across federal agencies like the National Institutes of Health (NIH) and National Science Foundation (NSF) have caused universities, including MIT, to reduce the size of many graduate programs. Accordingly, undergraduate students have been forced to take a changed admissions landscape into account when forming their postgraduate plans.

Sophie Fan '26, a mechanical engineering (Course 2) major, seriously considered applying to master's and PhD programs that start in fall 2026. However, she ultimately decided not to apply to either, citing

funding cuts as a primary reason. Fan, who would have pursued either academia or industry roles after graduate school, has instead chosen to enter industry immediately after graduation. She said that although she has not ruled out applying to graduate school in future cycles, funding availability would be a major consideration in her decision.

Others are still applying for postgraduate programs but are updating their strategies to account for the new environment. Ben Osborn '26, a mathematics (Course 18) major, has wanted to go into academia since high school. To increase their chances, Osborn is applying to 15-18 mathematics PhD programs this fall — many more than the typical 10.

Isabella Pérez '26, a biological engineering (Course 20) major, also applied to more universities due to funding cuts. Although geography was a major factor in her choice of schools, cuts have made her consider schools in less popular locations. Pérez added that graduate school feels like the only viable postgraduate option; because of her focus on research at MIT, she believes it would be "incredibly difficult to find a job if I don't get into grad school."

Wayne Zhao '24 graduated from MIT with a degree in Course 18. He wrote that although he and his advisors suspect funding cuts will affect his applications, "more official support resources at MIT are completely blocked for me."

Younger students ineligible to apply this cycle have also been affected. Mohamed Abdelmeguid '28, a double major in artificial intelligence (Course 6-4) and mathematical economics (Course 14-2), intends to pursue a PhD focused on developmental economics after MIT. He fears that by the time he applies, universities will "admit [only] a fraction" of previous program sizes. Abdelmeguid wrote that he hopes cuts will not affect his UROP funding next semester.

Daniz Sattarli '27, a chemical engineering (Course 10) major, wrote, "Getting an industry internship was already hard as an international student; now it is almost impossible." Sattarli hopes that graduate school will allow her to pursue interesting research, improve her job prospects, and stay in the United States. Regarding other paths, she admitted, "Honestly, no idea."

WEATHER FORECAST

Weather Systems	Weather Fronts	Precipitation Symbols	Other Symbols
<div>H</div> High Pressure	<div>---</div> Trough	<div>☁</div> Snow	<div>☁</div> Fog
<div>L</div> Low Pressure	<div>—▲—</div> Warm Front	<div>☔</div> Rain	<div>☁⚡</div> Thunderstorm
<div>🌀</div> Hurricane	<div>—▲—▲—</div> Cold Front	<div>☔</div> Light	<div>☁</div> Haze
	<div>—▲—▲—▲—</div> Stationary Front	<div>☔*</div> Moderate	
		<div>☔*</div> Heavy	

Compiled by MIT Meteorology Staff and The Tech

Rain clears out for a sunny and brisk Thanksgiving holiday

By Conrad Straden
METEOROLOGIST

As we approach Thanksgiving, a low-pressure disturbance moves through the region. Steady rain breaks out late Tuesday evening and continues overnight. Wednesday there may be a few breaks in the rain, but it remains wet the entire day. Temperatures will be quite mild in the upper 50s. A cold front then pushes through Wednesday night returning temperatures back to normal. Thanksgiving Day will be a classic mid 40s sunny November day with a gentle breeze. It will be a pleasant day to spend outside with the family before the feast. Friday will be similar, but a little cooler as the west wind picks up. The weekend features more of the same before we return to a more unsettled pattern next week.

NOVEMBER 25
SITUATION FOR NOON (ET)
Extended Forecast
Today: Cloudy. High around 50°F (10°C). Southwest winds 5-10 mph.
Tonight: Rain. Low around 47°F (8°C). South winds 7-12 mph.
Wednesday: Rain. High around 58°F (14°C) and overnight low around 40°F (4°C). South winds 3-8 mph, gusting to 15 mph.
Thanksgiving Day: Sunny. High around 46°F (8°C) and low around 31°F (-1°C). West winds 10-15 mph.
Friday: Partly cloudy and windy with a chance for passing rain showers. High around 41°F (5°C) and low around 29°F (-2°C).

At MITHIC, leaders extol humanities’ importance

Many of this year’s projects incorporated artificial intelligence and machine learning

By Samuel Yuan
NEWS STAFF WRITER

At the second annual MIT Human Insight Collaborative (MITHIC) event on Monday, Nov. 17, an array of speakers composed of MIT professors, deans, and administrators extolled the importance of the humanities and interdisciplinary thinking.

MITHIC, which was formed last fall, is one of President Sally Kornbluth’s signature initiatives and aims to promote the arts, humanities, and social sciences. With \$3 million in annual funds for programs and research projects, MITHIC anchors a broader Institute-wide effort to bolster MIT’s humanities programs.

Through these efforts, the administration may be trying to address external perceptions of MIT as a “STEM school.” For instance, the new 2025 Carnegie Classifications reclassified MIT under its “Special Focus: Technology, Engineering, and Sciences” category, unlike many peer institutions that are classified as “Mixed.”

This year’s event showcased the range of multidisciplinary work funded by MITHIC, including a project on “socio-culturally aware AI” that emerged from a collaboration between the Anthropology and Electrical Engineering and Computer Science (EECS) departments.

Provost Anantha Chandrakasan and Kornbluth delivered the opening remarks for this event.

“MITHIC is about inspiring our community to think differently and work together in new ways. It’s about embedding human-centered thinking throughout our research and innovation,” said Chandrakasan. “One year in, MITHIC is off to a strong start, advancing work across the Institute on global challenges.”

Kornbluth echoed the Provost’s sentiment and noted that MITHIC offers a unique outlet for philanthropists and

alumni donors who wish to “drive new and unexpected collaborations.” According to Kornbluth, in 2025, the initiative received 89 proposals and funded 31 of them; it also received nearly 80 proposals for 2026, which are currently under review.

Kornbluth also expressed hope that MITHIC would further faculty and student research in numerous high-impact fields, including artificial intelligence, by grounding them in the “wisdom of the humanities.”

Indeed, AI was one of the big words of the day. Dean of the Sloan School of Management Richard M. Locke PhD ’89 centered part of his keynote address around the humanization of work and its crucial role in managing generative AI.

Quoting research from Sloan Professor Roberto Rigobon PhD ’97, Locke said that “empathy, presence, opinion, creativity and hope” will “increas[e] in value as AI advances.” He reasoned that initiatives like MITHIC would be important to “upskill workers with a focus on the fundamental qualities of human nature.”

During a fireside chat at the event, Dean of the School of Humanities, Arts, and Social Sciences Agustín Rayo PhD ’01 added that skills related to the humanities — like communication and leadership — are becoming nearly as important as technical skills, partly because “human judgment” is becoming increasingly critical as mundane tasks get automated.

“I don’t think we need to abandon the idea that we’re the world’s top technical institution,” Rayo said. Instead, he believes that soft skills are a crucial “part of what it means to be a top engineer in the age of AI.”

Following the talks by administrators, professors held sessions explaining their MITHIC-funded work. This included a presentation on the Compass program, an undergraduate class exploring “fundamental questions about moral and social life,” by Professor of Political Science Lily L. Tsai.



MITHIC event attendees file into the Samberg Conference Center on the morning of Monday, Nov. 17.

Also featured were the “Great Books” initiative by Professor of Philosophy Kieran Setiya and a partial screening of a film about “Bengali Harlem” created by Associate Professor of Comparative Media Studies and Writing Vivek Bald.

The research projects on display, which spanned over six departments, also included work on the material composition of historic musical instruments, climate justice, and research on “scalable and ethical AI for health diagnostics in low-resource settings” done, in part, by Nobel Prize-winning Economics Professor Esther Duflo PhD ’99.

While presenting her work on AI and healthcare, done in partnership with EECS Professor Marzyeh Ghassemi PhD ’17 and others, Duflo explained that her team tested individuals for past silent heart attacks in India. They combined economics, in the form of cost-benefit analysis, and machine learning to accomplish this in a novel and cost-effective way.

She illustrated the life-saving potential of this multidisciplinary work, saying, “What is remarkable compared to existing tests is that it catches young people who are less likely to have had a silent heart attack, but may have many years of life saved.”

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THE KNIGHT SCIENCE JOURNALISM PROGRAM @ MIT

More than 50 attend MIT YDSA’s first meeting

MIT joins four other MA schools’ Young Democratic Socialists of America chapters

By Jada Ogueh
NEWS STAFF WRITER

On Tuesday, Nov. 11, MIT Young Democratic Socialists of America (YDSA) held its first general meeting in Room 56-154. MIT is now the fifth Massachusetts college to have a YDSA chapter, joining Amherst College, Boston University, Northeastern University, and University of Massachusetts, Amherst.

“MIT YDSA is a socialist organization, and we seek to advance an explicitly working class politics,” co-chair Anton Perez ’27 wrote to *The Tech*. According to Perez, the group hopes to empower students and workers to communicate their needs to MIT’s administration. In particular, YDSA aims to preserve protections for international students and prevent MIT from acceding to demands from the federal government, such as the deputization of local officers for ICE.

Perez said that MIT YDSA plans on collaborating with other progressive student activist groups, including MIT Divest and the MIT Coalition for Palestine, whenever their goals align. However, he believes that the focuses of these groups, such as climate change, Gaza, and affordability, are all symptoms of underlying problems with capitalism that can be addressed via a shift to socialism. Furthermore, unlike some other student groups, MIT YDSA explicitly focuses on class in their analysis of society.

Perez stated the chapter ultimately wants to fight for a “sanctuary campus” where the MIT community is free to work and live without fear. According to Perez, YDSA plans on applying pressure to MIT on multiple fronts, including the Starbucks Workers United

strike and the renegotiation of MIT’s Payment in Lieu of Taxes program. To accomplish this, they hope to coordinate with the Cambridge Democratic Socialists of America (DSA) and other Massachusetts YDSAs, along with DSA-endorsed local politicians like Cambridge City Councilor Jivan Sobrinho-Wheeler and Councilor-Elect Ayah Al-Zubi.

On Nov. 11, more than 50 participants — mostly MIT undergraduates — filled the classroom as the chapter presented an overview of their purpose and current campaigns. Also in attendance were two students from Northeastern YDSA, along with MIT Graduate Student Union (GSU) president Lauren Chua G and Councilor Sobrinho-Wheeler.

The meeting started with an introduction of MIT YDSA’s steering committee — co-chairs Perez and Eda Lozada ’27, treasurer Ace Chun ’28, parliamentarian Graciela León ’27, communications chair Victor Dominguez ’27, and political education chair Richard Solomon G, a Ph.D. student at the MIT Department of Political Science. According to Perez, the steering committee evolved from an original organizing committee focused on laying the foundation for a chapter. Some committee members come from “the broader Boston DSA scene” or are involved in other activist organizations, including pro-Palestine groups at MIT.

The conversation then turned to socialism and YDSA’s broader campaign goals, during which Sobrinho-Wheeler and Chua both gave brief speeches. The councilor described his policy goals and accomplishments, emphasizing the housing crisis in Cambridge and his support of “municipal socialism,” which aims to ex-



MIT YDSA Co-Chair Anton Perez ’27 goes over meeting slides on Tuesday, Nov. 11, 2025.

pand public services and public ownership on the level of local government. Sobrinho-Wheeler said he was excited to collaborate with YDSA on socialist policies in Cambridge.

Chua highlighted upcoming contract disputes that would affect graduate students in the spring and expressed a desire to collaborate with MIT YDSA. She did not respond to *The Tech*’s request for comment at the time of publication. “[As] labor organizing is one of the most direct avenues of class struggle,” Perez wrote, “our support for the

GSU follows naturally from this understanding.”

The interest meeting exceeded the expectations of Semai Ralph ’29, who intends on joining YDSA. Having studied similar political movements from a young age, Ralph found himself sympathizing with revolutions that promoted wealth redistribution and improved social institutions in opposition to dictatorships. He believes there is a “new kind of dictatorship on the rise” and that the YDSA has many “like-minded people who want to do something about it.”

Ralph’s main hope for YDSA’s campaigning is that it grows and changes with the times. The failure of many activist clubs across campuses, Ralph wrote to *The Tech*, stems from a reluctance to “shift gears once met with heavy confrontation.”

According to Ralph, YDSA differs from other political organizations on campus because it has broader goals to organize and empower youth interested in socialism, feminism, and anti-colonialism. “[MIT YDSA]’s core mission lies in wanting to effect change for the collective, rather than just the promotion of the individual,” he wrote.

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Solution to Cranberry Sauce

from page 16

9	5	4	7	2	8	3	6	1
2	3	1	9	6	4	5	7	8
7	6	8	1	3	5	4	9	2
3	1	6	5	7	9	8	2	4
4	9	2	8	1	3	7	5	6
8	7	5	2	4	6	9	1	3
5	2	3	6	8	7	1	4	9
1	4	7	3	9	2	6	8	5
6	8	9	4	5	1	2	3	7

Solution to Gravy

from page 16

^{x240} 2	5	6	⁺⁸ 1	7	⁺²⁴ 3	4	8
4	^{x28} 2	7	⁺¹⁴ 6	8	⁺¹⁹ 5	3	1
⁺¹⁶ 1	8	2	⁺⁹ 5	4	7	6	3
3	4	^{x168} 8	7	1	2	5	6
⁺²⁰ 8	7	5	3	2	6	⁺¹⁴ 1	4
⁺¹¹ 6	1	4	2	3	⁺²⁹ 8	7	5
7	6	⁺²⁰ 3	4	⁺¹⁴ 5	1	8	2
^{x90} 5	3	1	8	6	^{x8} 4	2	7

CONCERT REVIEW

MIT Symphony Orchestra’s second fall concert is a veritable display of technique

Adam Boyles conducts MITSO through Shostakovich and Tchaikovsky, with Justin Yamaguchi ’28 as violin soloist

★★★★☆

Shostakovich’s Violin Concerto No. 1, Tchaikovsky’s Symphony No. 5 in E Minor

Conducted by Adam Boyles

Justin Yamaguchi ’28 on violin

Kresge Auditorium

Nov. 21, 2025

By Rex Reventar

For its second concert this fall semester, the MIT Symphony Orchestra (MITSO) presented “Dark Fates,” a show outlining two independent journeys from darkness to light. Indeed, Shostakovich and Tchaikovsky have similar principles at their core; while separated by a wide stylistic gulf, both composers are united in the intense drama of their works and in their full-bodied character associated with the Russian style of composition. In

Shostakovich’s essay entitled “Thoughts about Tchaikovsky,” he cited Tchaikovsky among his influences, remarking on the “definite and profound purpose in everything he wrote.”

Of course, differences still pervade — most notably, the Violin Concerto’s fourth movement is laden with tumult. Although the concerto ends in A major, the piece is not nearly as valedictory as the ending of Tchaikovsky’s Symphony.

Justin Yamaguchi ’28 deftly brought out the immense weight and tragedy of the Violin Concerto. Alternating between plaintive and burlesque, he skillfully demonstrated a wide gamut of timbres, from the husky triple and quadruple stops of the second and fourth movement to the pure high tones of the first and third. In particular, his blending was superb, in the most meditative and plaintive passages as well as in the most virtuosic of runs. Yamaguchi did these effortlessly, blowing through measure upon measure of sixteenth notes and double stops. Yet, throughout the concerto, he stopped just short of fully letting the music run free; the well-projected climaxes felt somewhat restrained even when the music was at its most intense and leering moments.

On the other hand, conductor Adam Boyles brought out the accompanying textures well. The shining string and wind hazes of the first movement and the powerful Klezmer-like climax of the second movement stood out as two of the orchestra’s finest moments. Only slight tensions between the orchestra and the soloist could be felt, as certain anticipations

and uncertainties in transitions and balance occasionally popped up. Fortunately, these did not significantly affect the overall gravity of the work.

After an uplifting encore and a short intermission, Boyles returned to conduct Tchaikovsky’s Symphony No. 5. He finely steered the orchestra through challenge after challenge, from the substantial runs, expressive cross-rhythms, and melodic pile-ups to the delicate soli, while consistently bringing out the famous “fate” motif. The grand climaxes filled the entire hall with a reverberant sound,

and the orchestra delivered melody after melody with moving and profound effect.

However, just like Yamaguchi in the first act, the orchestra seemed to have held back, as certain climaxes were restrained. Some of the humor was lost to a focus on precision, with only the timpani going headlong and thus drowning the orchestra out. Nevertheless, Boyles effectively imparts to all listeners the beautiful and expansive fairy tale latent in the work — something that is always a welcome diversion from the tedium of the Institute.



PHOTO PROVIDED BY ADAM BOYLES

The MIT Symphony Orchestra performed Shostakovich’s Violin Concerto No. 1 and Tchaikovsky’s Symphony No. 5 on Friday, Nov. 21, 2025.

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OPERA REVIEW

Met Opera performs Bellini’s *La Sonnambula* with new production and interpretation

Rollando Villazón’s fresh, creative production captures attention with Nadine Sierra showing her best as Amina

★★★★★

La Sonnambula

The Metropolitan Opera

Composed by Vincenzo Bellini

Nadine Sierra as Amina

Sung in Italian with English/German/French/Italian subtitles

The Metropolitan Opera House

Oct. 29, 2025

By Luke Kim

ARTS STAFF WRITER

On Oct. 29, 2025, The Metropolitan Opera performed its penultimate performance of Bellini’s *La Sonnambula*, one of the composer’s most popular operas. The last time the Metropolitan Opera staged *La Sonnambula* was in 2014.

Bel Canto operas prioritize the virtuosity of the singers over the opera’s narrative. This

era was the first period when the *opera seria* tradition and the use of castrati completely died out. Therefore, it is more appropriate to review the performance based on the singing, rather than a convincing delivery of the overall plot. However, it is often difficult for me to fully appreciate the plot of operas from this era. [1]

Rollando Villazón’s overall direction was close to perfect. The set design was beautiful and on point; in particular, the creative motif of the recurring door proved especially effective as revelations continued throughout the opera. Set in a traditional 18th-century mountain town, the costumes represented this era well. Dancer Niara Hardister was a highlight of the performance, representing Amina’s “free spirit” who wants to escape. This idea is a new interpretation of the character, and I found Hardister’s delivery quite successful.

Act I outlines the happy engagement and soon-to-come marriage between Elvino and Amina. In the new interpretation, the overall tone remains joyful, but with underlying tensions. Nadine Sierra as Amina is excellent, electrifying the audience with her captivating voice. Xabier Anduaga’s Elvino represents both a happy groom but also a deeply unsettling character who is prone to judgement and jealousy. Anduaga very convincingly portrays his character with intensity and strong vocals, especially in the duet “Son geloso del zefiro errante.”

Finally, plot development happens when Count Rodolfo (Alexander Vinogradov) intro-

duces Amina and Elvino with items from the outside world. Vinogradov’s singing is excellent; with his deep bass voice and commanding authority, he conveys the impression of a noble man despite his disguise. In addition, his singing sufficiently masks the unconvincing nature of Rodolfo’s character arc, as he acts predatory towards local women in the first act. Sydney Mancasola’s Lisa reveals the character’s slyness through flirtations with the count, her voice easily evoking disdain towards her character. Her vocal expression was impressive, ranging from intense hatred to playful exchanges. The finale of this act is the most intense, with Amina waking from her sleepwalking (hence the title!), only to be wearing the count’s coat, provoking intense anger among the villagers and Elvino. Deborah Nansteel’s Teresa displays stellar acting here, slapping people who unjustly attack Amina and protecting her at all costs.

With a sudden change of heart, the villagers go to ask the opinion of the count at the start of Act II. Anduaga effectively conveys Elvino’s emotional agony and selfishness toward Amina during his aria “Ah! perché non posso odiarti, infedel, com’io vorrei!” taking her ring and lamenting that he is incapable of despising her. The count returns to the village and asserts that Amina is innocent, but Vinogradov’s portrayal neatly captures the count’s selfishness as he forcefully tries to win the argument, hiding his own misgivings beneath an agitated voice. At this point, Elvino is engaged to Lisa, who, in her worst moments,

declares that she has not been found in a man’s room alone. Here, Mancasola becomes shameless incarnate, engaging in a screeching voice fight with Teresa, only for Teresa to produce the handkerchief of the count.

Now, back to square one, the opera transitions to its most delicate moment. The sleepwalking Amina professes her love to Elvino with withered flowers in “Ah! non credea mirarti sì presto estinto, o fiore.” Sierra sings this line with the most delicate yet striking voice; it was near impossible to not feel an emotional connection to Amina here. The vocal range required for this love song was demanding, but Sierra casually mastered this as if it was a cakewalk. Hardister’s dancing was a big plus in the mesmerizing scene, as Amina is tempted to give in. After seeing this devotion, the villagers and Elvino all become convinced of Amina’s innocence, and Elvino once again embraces her.

Here, we see the greatest twist: the finally vindicated Amina runs away! After the very virtuosic final aria, “Ah! non giunge uman pensiero,” in which Amina gets her justice, she grabs the hand of her free spirit. This was a much more convincing ending than the original version. After all the suspicion, emotional turmoil, and betrayals, she finally makes a courageous decision; it’s a cathartic but suitable end to this close-to-perfect rendition of the opera.

[1] Just in this opera, close to a full hour is dedicated to Elvino and Amina declaring their love to each other.

CONCERT REVIEW

BSO premieres León, features soloist James Carter, and presents Brahms's second symphony

León and Sierra given most attention compared to Brahms

★★★★☆

León's *Time to Time*, Sierra's Concerto for Saxophones and Orchestra, Brahms's Symphony No. 2

Boston Symphony Orchestra

Conducted by Dima Slobodeniouk

Featuring James Carter on saxophone

Boston Symphony Hall

Nov. 13 – Nov. 15, 2025

By Luke Kim
ARTS STAFF WRITER

This week, the Boston Symphony Orchestra (BSO) teamed up with Dima Slobodeniouk to showcase a world premiere of Tania León's *Time to Time*, Robert Sierra's Concerto for Saxophones and Orchestra, and the classic Brahms's Second Symphony. Slobodeniouk, a frequent guest conductor, will return in April-May for Beethoven's Symphony No. 9.

As an introduction for *Time to Time*, Tania León herself briefly explained her inspiration from haikus by renowned Edo period poet Matsuo Basho. The influence was clear even from the first note, diving immediately into the night skies of Japan and passing by the full moon through the clouds. The percussionists were the star of this poem; the three of them (plus the timpani) were in top form. It was also a good choice to finish the piece as it began, achieving León's vision of a short-period episode in which clouds cover the moon before the moon returns again.

While the piece featured many interesting ideas, it felt unnecessarily prolonged at times,

and its emphasis on texture over melody left some listeners without a clear thematic anchor. The result came across as almost an atmospheric tableau — highly evocative, if perhaps more scene-setting than structurally self-contained.

Sierra's concerto was intended for the soloist to showcase his virtuosity (and seems to do so, based on my impressions), so it is interesting that Sierra dubbed it a piece for saxophones and orchestra. Aside from this, the concerto was a brilliant showpiece of Carter's immense talent, which stole the show. Interestingly, this concerto keeps to the standard large-form model of the 19th–20th centuries, with an intense and serious first movement, a slow second movement, a scherzo, and a vibrant finale.

The first movement, "Rhythmic," is perhaps the most forward-looking movement, pushing through the Latin mood with a more modern harmonic language. The second movement, "Tender," contrasted well with the first, featuring common-practice harmony and exploring the soprano saxophone's melodic capabilities. The melody itself was also quite captivating.

The scherzo was more of a piece of small musical theatre, a scene where a talented sax player is attempting an improvisation. I appreciated the humor in this movement, with Carter acting as if he were merely practicing or struggling to play the high notes. The last movement had a 1950s rock 'n' roll style to it, paying strong tribute to the virtuosos of that time. One cannot help but tap their feet to the music, with the sax sounding almost like an electric guitar. I also enjoyed the smaller but still noticeable musical jokes in this movement. It was unclear whether these were improvisations or written in the score.

Overall, the concerto was a success, with the latter three movements creating genuine interest while the first movement felt less immediately engaging than their vividly characterized later counterparts.

Following Sierra's Concerto was Brahms's Second Symphony, also widely referred to as the "Pastoral" Symphony. Incidentally, Brahms himself was probably not fond of this designation, based on his letters to Clara Schumann and his desire to escape from Beethoven's shadows. Indeed, Brahms's usage of musical language here is very different from his first symphony, in which Brahms himself recognized the strong Beethoven influence.



PHOTO PROVIDED BY MICHAEL J. LUTCH

Tania Leon receives an ovation after *Time to Time*'s premiere on Thursday Nov. 13, 2025.

Overall, the Second Symphony felt somewhat like an afterthought, with the evening's spotlight resting more on the contemporary works. The first movement ("Allegro non troppo") started calmly with a standard tempo. While warmly shaped, the BSO experienced some challenges in coordination — Slobodeniouk's flexible phrasing didn't always draw unified responses from the strings and winds. While the Brahmsian lyricism was clearly present, a few noticeable slips briefly disrupted the flow, and the final D major chord showed unevenness. The orchestra, however, recovered by the recapitulation, and their full potential shined through the remainder of the movement.

The second movement ("Adagio non troppo") fared much better in terms of execution. Starting from the sighing cello melody, the first violins and cellos played their melodies very well. I particularly appreciated the strong second violins and violas, which are often sidelined. The melodic transfers from the lower strings to the upper strings were natural and smooth. The brass were appropriately keeping to their supporting role in this movement. The only moment of instability was the final B Major chord, which was uneven in placement.

Given its rhythmic intricacies, the scherzo is a difficult movement to execute. Carrying on from the second movement, the BSO maintained a balance in this movement, as both the woodwind and string melodies were appropriately emphasised. The trio section was also done well, with an especially precise rendition by the woodwinds. This success was reprised at the modified scherzo until the end, this time with a beautiful G major chord as the final note. [1]

The finale began with a brass entry more forceful than ideal, momentarily unsettling the balance of the orchestra. The quick quaver runs occasionally blurred in the strings. The woodwinds and brass were precise, but sometimes a bit too loud. Fortunately, the orchestra recovered at the recapitulation, with all instruments entering with well-judged dynamics. The remainder of the movement was executed neatly to its jubilant end, and the BSO was fully focused as a single unit once again. The final coda was as exuberant as one can hope for and ended the night on a high note.

[1] Ending a slow movement in a single I chord occurs quite often in Brahms's orchestral works. One other notable example is the second movement of the violin concerto. The second symphony is unique in that the first three movements all have this ending.

THEATER REVIEW

'Kim's Convenience': A heartwarming comedy

The Huntington puts on a moving performance filled with laughter

Kim's Convenience

Written by Ins Choi

Directed by Weyni Mengesha

Calderwood Pavilion

Nov. 6 – Nov. 30, 2025

By Serena An
ARTS STAFF WRITER

Kim's Convenience by Ins Choi tells the story of Mr. Kim, a South Korean immigrant who runs a convenience store in Toronto. If the title sounds familiar, it's because the play was adapted into a TV show in 2016 that ran for five seasons. The play authentically represents the immigrant experience that many relate to, encompassing themes of family obligation, differing cultural values, and sacrifice.

Choi stars as Mr. Kim, also known as Appa (father), who begins the play by opening his convenience store for the day. The set design is realistic, as my friend from Toronto confirmed by pointing out the milk bags in the fridge and the Ontario lottery posters. One strength of the storyline is how each event leads naturally to the next. For example, a wealthy businessman named Mr. Lee offers to purchase the store, causing Mr. Kim to wonder whether he should continue operating it, since his daughter Janet (Kelly Seo) is a photographer who does not

want to take over. Instead of instantly conceding his store to Mr. Lee, Appa calls the police about Mr. Lee's car parked in the no parking zone, and a policeman named Alex (Brandon McKnight) arrives. Alex recognizes Janet as the younger sister of his childhood friend Jung (Ryan Jinn), and the audience learns that Jung ran away from home at age 16 after a fight with Appa left him hospitalized.

The play displays the clash of social norms, such as the expression of love, in differing cultures. In one scene, Janet has an intense argument with Appa about how she wants him to simply show appreciation for the unpaid hours she has worked at the store for years; however, Appa feels that she is ungrateful for what he and her mother, Umma (Esther Chung), have provided. The actors portray the conflict very realistically, with Janet preparing to take out the trash but stopping midway because of the argument, and Appa ultimately throwing Janet's planner out of the door.

Besides differences in culture, *Kim's Convenience* also discusses racial and ethnic topics in a lighthearted but direct manner. For instance, Mr. Kim banters with customers about using the Korean word *insam* instead of the Japanese word *ginseng* due to the Japanese colonial period in Korea. He also describes the tensions between the black and Korean communities during the LA riots in the 90s, but includes a heartening story of black customers protecting a Korean convenience store from looting. These historical snapshots are then used warmly, as he directly tells Janet that it is okay for her to marry Alex, who is black. Since Janet is 30 years old and single, Appa wants her to have a boyfriend. Appa even comedically in-



PHOTO COURTESY OF DAHLIA KATZ

Ryan Jinn, Esther Chung, Ins Choi, Kelly Seo, and Brandon McKnight in *Kim's Convenience* (2025). A Soupppper Production in association with American Conservatory Theater & Adam Blanshay Productions.

structs Alex to propose to Janet by twisting his arm using a taekwondo move.

Janet then uses the same move on Appa to make him say "I love you Janet" before she reciprocates that statement and that no one is twisting her arm to say that. They hug, and Appa recalls when Janet interviewed Appa for a school project about who she was proudest of. Many people in the audience teared up at this moment, moved by the mutual understanding between Appa and Janet.

Finally, the play discusses sacrifice, a common theme across immigrant stories. Jung tells Umma that he has a baby named Sonam, but

feels insufficient as a father. Umma then tells Jung the backstory of Appa, who was a teacher in Korea but immigrated to Canada to work at a store, all for Jung and Janet's future. This story inspires Jung to return to the store so he can reconcile with Appa. Ultimately, Appa asks Jung to take over the store and leaves him alone so he can begin working. Although this is a seemingly stoic gesture, the audience can sense how much Appa cares about Jung, ending the play with an affecting father-son moment.

Kim's Convenience is an unexpectedly touching play full of infectious humor that quickly takes hold of the audience.

Hotel Mucus: Could synthetic mucus make our gut more inviting to beneficial bacteria?

A recent MIT study suggests that synthetic mucus might help probiotics stay in the gut

By Ekaterina Khalizeva

When we eat fermented foods like yogurt or kimchi, we consume probiotics, which are beneficial bacteria that can improve gut health. But before they reach their final destination in the gut, these microbes have to go through the long waterpark slide that is our digestive system, grabbing tightly onto its final part — the intestine — to avoid being flushed out. A recent MIT study takes a step towards understanding how the mucus in our bowels helps such beneficial bacteria stick around and how synthetic mucus could make this process easier.

Staying at “Hotel Mucus”

Most of us are intimately familiar with mucus; it’s that snotty goo from blowing noses or clearing sore throats that helps us get rid of harmful bacteria during infections. But mucus doesn’t just expel pathogens; it’s also capable of holding onto the microbes that are worth keeping in our bodies.

Although mucus might not seem like an inviting place to settle from our perspective, it’s a five-star hotel for probiotic bacteria. In the intestine, it provides food and accommodation in the form of mucins, proteins secreted from cells that line the insides of our body. Mucins have a long protein backbone, like the wire of a bottle brush, with various types of sugars attached like bristles.

When we take probiotic supplements to enhance microbiome diversity, only a small fraction of the microbes in the pills actually reach their destination. And out of the ones that do, most get flushed out within a few days.

To prevent that loss from happening, scientists have been studying how bacteria and mucins interact and whether those interactions can be tweaked to favor beneficial bacteria. This is a challenging task: natural mucins are hard to purify for such studies. Furthermore, the traditional strategy of protein synthesis based on a DNA template cannot fully recreate the natural mucins, as the composition of their sugar bristles cannot be encoded in the template.

In the Kiessling Lab at the MIT Department of Chemistry, then-postdoctoral fellow Dr. Jill Alty took a different approach. Instead of trying to recreate the long protein backbone and the sugary complexity of the mucins in our bodies, Alty and her collaborators made synthetic mucins with simplified polymer backbones. Such molecules act similarly to natural mucins, but are much easier to synthesize at scale. They are also much more customizable: scientists can attach specific sugars one at a time, allowing them to gain finer experimental control and a more detailed understanding of the interactions between mucins and bacteria.

“We make it less complex, more synthetically tractable, and it does the same thing,” said Alty, now an assistant professor with her own lab at Stony Brook University. “You can learn a lot about what’s actually happening at the biological level by simplifying [mucin] to one sugar and a non-natural backbone.”

Making mucus stickier

Alty and her team set out to attach sugars to synthetic polymer backbones

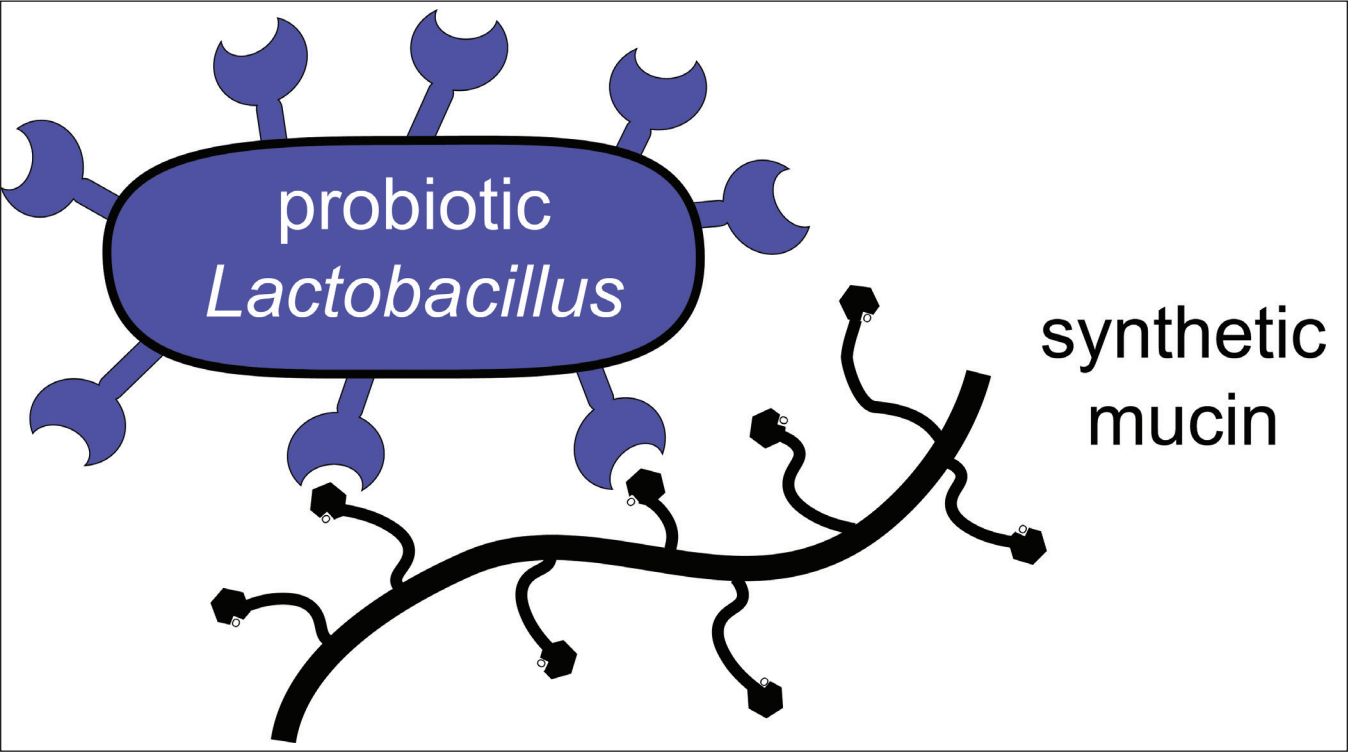


PHOTO PROVIDED BY PROFESSOR JILL ALTY.

Probiotic bacteria interact with sugars on synthetic mucin backbones.

and test their interactions with probiotic bacteria. They first picked three bacterial species, all belonging to one of the most dominant classes of probiotics, *Lactobacilli*, and several types of sugars, attaching them to synthetic backbones one at a time. When they grew the bacteria together with these sugar-coated mucins, they saw that different *Lactobacillus* species preferred mucins with different sugars attached. Surprisingly, some of the species interacted with a synthetic mucin coated in one type of sugar just as well as they did with a natural mucin coated in a mix of different sugars.

Once the researchers confirmed that the synthetic mucins interact effectively with probiotic bacteria, they wondered whether they could harness these interactions to help bacteria stick to natural gut mucus. To test this, the researchers needed to obtain some natural mucins. The process was not easy; first, Alty’s collaborators in the Ribbeck Lab at the Department of Biological Engineering visited a butcher shop and acquired some pig intestines. Then, they scraped mucus out of those intestines — an activity as gruesome as it sounds — and biochemically purified the relevant mucins through a painstaking procedure that took multiple days.

With natural mucins in hand, the researchers created a pseudo-mucus that resembles the inside of the gut by attaching the purified pig mucins to a plastic plate. To measure how well bacteria stick to natural mucins on their own, Alty added the microbes to this plate and used a machine to shake them for four hours, mimicking the natural disturbances the bacteria might experience in the intestine. In the end, most bacteria were knocked off the mucin-coated plate.

But when Alty added synthetic mucins

to the plate covered in pseudo-mucus, a lot more bacteria held on even after vigorous shaking. Not only did synthetic mucins help the microbes cluster together and stick to the plate, but the bacteria actually started to express more digestive enzymes that let them feast on the sugars attached to the synthetic mucins. The researchers found this result promising: it could mean that synthetic mucins both help the bacteria grab on and provide them with food, like a most-welcoming host.

Synthetic mucins as a prebiotic supplement

Alty is excited to further develop synthetic mucins to understand beneficial bacteria’s tastes for mucosal sugars. After all, knowing the guests’ preferences can make our guts more hospitable and hopefully convince the right bacteria to stay at Hotel Mucus.

The endeavor will require nuance. “Initially we had thought [we could] administer the probiotic, which you can buy in a pill ... [and] just have the polymer in that same supplement,” Alty recalled. “What we’ve since better understood is that these need to be two separate things. If you feed the bacteria exactly what it wants, it becomes pickier and can’t survive as well in your gut microbiome, so we don’t want to give it its favorite cocktail.”

Although the synthetic mucins are not yet ready to be used as a prebiotic — a food source for probiotic microbes — they have the potential, according to Professor Eric Martens at the University of Michigan Medical School, who does research on the gut microbiome and was not involved in the study.

“They’ve created something synthetic that’s altering the interaction between a bacterium that could be in the gut, like *Lactobacillus*, and the native mucins that

are there above our cells,” Martens said. “It would be very useful if these were somehow specific in a new way for targeting different bacteria that existing prebiotics didn’t use.”

More sugars, more bacteria, and applications beyond the gut

So far, Alty and her collaborators have only tested a few sugars and bacteria, but their approach lends itself well to scaling up this type of exploration without clearing out butcher shops.

“Because the mucins that we secrete are so complex in their carbohydrate patterns, there’s been a lot of hypotheses and speculation about why that complexity exists,” Martens said. The synthetic mucins that Alty and her colleagues developed provide a tractable platform to finally test some of these theories.

There’s also potential in the applications for synthetic mucins beyond the gut. “I think it could be really interesting in the vaginal tract, where you want to recruit certain microbes and exclude others,” Kiessling said. “I love that [research] area, because this has a lot of potential uses for women’s health.”

All the experiments in this study were done in the lab, using plastic plates and temperature-controlled incubators, without competition from other gut-dwelling microbes. Next, Alty would like to test the efficacy of synthetic mucins as prebiotics in animals — in a more realistic and more competitive environment for the bacteria.

Whether synthetic mucins can improve probiotic retention in humans is still an open question, but both Alty and Kiessling are hopeful.

“I love the idea that we could think about providing prebiotics, molecules that bacteria eat, to promote growth of certain bacteria and minimize growth of others,” Kiessling said.

ch’s MLB CH

By The Tech Sports staff

e MLB Postseason. In the American League, the Series against Minnesota with ease to advance. The Texas Rangers, recovered from the Tampa Bay. e, the Philadelphia Phillies swept Cincinnati, hitting a ho-hitter by Roy Halladay. They face the Atlanta Braves in which every game was decided. The Phillies claim their league pennant and advance to the World Series. The Yankees, with department bragging rights on

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CLUB CLOSE-UP

How the students of Geo@MIT are leading the way in geothermal energy

Through the use of geothermal energy, Geo@MIT plans for net zero carbon emissions by 2035, 15 years earlier than MIT’s estimated timeline of 2050

By Eric Wang
SCIENCE STAFF WRITER

In the Energy Commons in the basement of Building 10, a small but dedicated group of students takes their seats around the TV. Soon after, Megan Lim ’24 steps up to the front of the room and outlines plans to collaborate with the Vermont Community Thermal Network (VCTN), which hopes to introduce thermal energy networks across Vermont communities. However, the VCTN needs a strong technical model to demonstrate why these systems are a superior alternative to the state’s current energy sources — a problem the students will tackle. Almost immediately after Lim finishes, they split into smaller teams, eager to begin the work ahead.

But this isn’t a consulting firm: it’s Geo@MIT. Founded in Fall 2024 by Lim, Jason Chen ’25, and Olivia Chen ’26, Geo@MIT is a student organization dedicated to achieving full campus decarbonization by 2035, 15 years ahead of the MIT Office of Sustainability’s 2050 target. It’s an ambitious goal, but Geo@MIT has consistently pushed the boundaries of sustainability, both on MIT’s campus and in communities across the U.S.

A golden beginning
Geo@MIT was initially formed to compete in the 2024 EnergyTech University Prize for Geothermal Technologies competition, a challenge suggested by MIT D-Lab Senior Lecturer Susan Murcott ’92. Although the competition was outside her area of expertise, Lim couldn’t pass up the opportunity to collaborate with Murcott, who had done impactful work in the field.

However, the team quickly encountered major challenges. With no prior experience in geothermal energy or systems, they faced the steep task of mastering a new technical field while integrating insights from their own disciplines. Support from industry experts and MIT alumni helped ease the process, but Jason Chen, a mechanical engineering (Course 2) student, recalled that the learning curve remained daunting. “Geothermal energy is very complex, and [the alumni] were all experts in this field,” he explained. “When you’re an expert in a field, you forget how to explain something simply to another person.”

Despite these challenges, the team persevered. Their hard work culminated in a presentation of their Advanced Generation District Heating and Cooling (GDHC) and Thermal Storage Systems business plan for college campuses across the United States, which earned them the EnergyTech UP National Geothermal Technologies Bonus Prize, along with \$22,000 in award funding.

A pipeline towards a cleaner MIT
Following their success, the MIT Department of Facilities and the MIT Office of Sustainability contacted the team to write a memorandum on the feasibility of implementing a geothermal energy network on the MIT campus. The students accepted the proposal, and began working under the guidance of Murcott as well as an advising team of industry leaders.

A geothermal energy network replaces current heating, ventilation, and air conditioning (HVAC) systems. Current HVAC systems are too reliant on fossil fuels; the International Energy Agency reports that in North America alone, around 73% of HVAC systems are powered through either natural gas or oil, with only a combined 5.8% of systems powered by district heating or renewable sources of energy. A geothermal energy network would use a system of interconnected pipes with water to exchange heat between buildings instead, allowing for a building that needs heating and a building that needs cooling to transfer thermal energies between one another. Heat is extracted from the latter building and absorbed by water, which is then pumped to heat the first building. In a similar vein, cooled water is pumped to buildings that need cooling, reducing the reliance on fossil fuels for temperature control.

“It would be an extremely efficient undertaking that would pay for itself very quickly in energy savings,” Murcott said. Rick Clemenzi ’81, a senior engineer and advisor for the team, further explained that a geothermal energy network would also be much easier to expand once the central node is established; the operation and implementation costs would be drastically lower compared to initial costs.

In their pilot study, Geo@MIT proposed an initial geothermal energy system that included the Stratton Student Center, Johnson Athletic Center, as well as buildings W31–35. According

to Murcott, their tests indicated that the necessary hardware needed for a geothermal energy system, such as the pipes and a central thermal battery located below ground, could be implemented at a cost of around \$20 million. This study would go on to win second place at the US Department of Energy Geothermal Collegiate Competition Policy Track.

Unfortunately, the proposal was rejected because of current general budget cuts in the MIT administration. The Institute cited a report stating that the proposal would cost approximately \$150 million. Geo@MIT responded by proposing a much smaller pilot program, focusing only on implementing the system in the Zesiger Center Pool (Building W34) and the Johnson Ice Rink (Building W35). In the revised proposal, the student organization outlined how current HVAC pipes could be adapted into an ambient loop that transfers heat from the swimming pool to the ice rink, making it much more efficient than the original proposal. However, progress on that project has also been stalled, with Geo@MIT still waiting on a reply.

An exchange outside of MIT
Facing setbacks with their proposal on the MIT campus, Geo@MIT has pivoted its efforts toward expanding geothermal networks to surrounding communities. Anoushka Tamhane ’28, current co-president of Geo@MIT, outlined the organization’s ongoing partnerships with the VCTN and the Cambridge Water Department (CWD). Despite the slow progress with their on-campus proposal, Tamhane emphasized that the club remains firmly focused on its ultimate mission: decarbonization. “Timelines are complex,” she said. “Everyone has different ways to envision when and how things will get done, but we want to make sure that we’re still focusing on decarbonization. We’re focusing on the problems that need to be addressed — and right now, I think one of those problems is outreach and connection.”

Geo@MIT’s current partnership with the CWD centers on developing a new heat exchanger and heat pump-based system for future implementation. “The [CWD] is an area of interest for us because their system uses piped water from a municipal facility as a thermal battery, allowing them to achieve even greater cost savings,” Jason Chen explained. Geo@

MIT’s role is to develop a methodology and a preliminary report showing how such a system would work in the CWD, as well as prove that such a project would meet the U.S. Environmental Protection Agency’s standards for drinking water in Massachusetts. Additionally, Geo@MIT plans to partner with VCTN to potentially implement thermal network systems in Vermont communities.

Geo@MIT has also contacted other universities for research collaborations. Oxford University, Cambridge University, and other London-based institutions have expressed interest in a joint event around geothermal technology. “We’re Geo@MIT, but I hope it doesn’t stay at MIT,” Tamhane said.

The future of Geo@MIT
The continuation of Geo@MIT has been surprising to the original team leads that participated in the EnergyTech UP competition; a project initially thought to last only a semester has grown into a student organization leading MIT’s decarbonization efforts.

“We didn’t anticipate that it would be anything more than [the competition],” Jason Chen said. “But I guess through that experience of doing the competition, you realize why we do it and see where it goes.” He also talked about the future of Geo@MIT, expressing his hope that the club eventually takes on the role of a student consulting group focused on decarbonization. For now, Geo@MIT is focused on achieving enough success to attract interest and collaborations from people outside Massachusetts, giving its members valuable experience.

For Tamhane, clubs like Geo@MIT offer a chance to inspire students of all disciplines to get involved with The Climate Project at MIT. “The climate system is one of those things that is applicable to every single major,” she said.

Regardless of what the future holds, Geo@MIT’s story stands as a testament to the power of student-driven innovation and collaboration. What began as a one-semester competition project has evolved into a lasting movement — one that not only pushes MIT closer to its decarbonization goals but also empowers students to think critically about the role they can play in shaping a sustainable future.

MIT Climate and Energy Night spotlights progress in sustainability technology

Posters, keynote speakers, and lightning pitches rounded out a night of community building for the Boston climate community

By Vaibhavi Addala

On Friday, Nov. 7, the MIT Energy and Climate Club (MITEC) held its 20th annual MIT Energy and Climate Night at the Engine, MIT’s non-profit incubator for tech startups. The first of the club’s four annual flagship events, the Energy and Climate Night — formerly known as the MIT Energy Night — brought together students and representatives from various industries and academia for a night of keynote speeches, poster presentations, and lightning pitch rounds, all centered around the energy transition and climate crisis.

According to organizer Daniel Wang MEng ’24 PhD ’26, Energy and Climate Night is a celebration of the climate-focused research and innovation happening at MIT. He noted that a greater focus on climate technologies — bolstered by the event’s move to the Engine — and the inclusion of “lightning pitch sessions” from Boston-area sustainability startups were new additions this year, as the event previously only featured keynote speakers and posters. Wang said the organizers added the lightning pitch sessions to “give startups an opportunity to pitch their products and hopefully reach the right audience.”

Energy and Climate Night featured three keynote speeches. Electrical Engineering and Computer Science (EECS) Assistant Professor Priya Donti of the Laboratory for Information and Decision Systems (LIDS) spoke about the intersection of AI and climate change, which

has recently become a topic of debate due to sustainability’s double-edged relationship with AI. On one hand, AI has exceedingly high energy demands; on the other, its proponents argue that the technology can invent solutions to various aspects of the climate crisis.

The second speaker was Iain Addleton, a strategic market analyst at LG Energy Solution Vertech. He discussed the energy grid’s relationship to the energy transition, focusing on the challenge of replacing a grid that took 125 years to build with one powered by renewable energy while increasing its capacity to fit growing needs within the next 10–15 years. Yet Addleton remains optimistic; he believes today’s 45% renewable share of the grid can realistically rise to “60 or 70% by the mid to late 2030s,” all while remaining affordable and reliable. According to him, a 100% renewable grid is not feasible, because “the last 10% is, in a lot of ways, the hardest.”

Still, Addleton stressed that the aforementioned 10%, — often used as a “red herring to not do things now” — should not be a reason to stymie progress. “Maybe we’ll just always live at 80% renewables and not more than that ... but [as a bottom line], we can have a much more renewable grid with existing technology,” he said.

Alex Creely PhD ’19 gave the third keynote speech. He is the chief engineer at Commonwealth Fusion Systems (CFS), a startup spun out of MIT that aims to commercialize fusion energy through power plants known as ARC

(“affordable, robust, compact”). CFS is currently working with MIT’s Plasma Science and Fusion Center (PSFC) to build a nuclear fusion machine known as SPARC, or “smallest possible ARC.” According to Creely, what makes SPARC special is that it will be the first of its kind to return net positive thermal energy after its expected completion in 2027. In more scientific terms, it will have a fusion energy gain factor greater than 1; to compare, most current fusion technologies take in more energy than they put out.

Creely stated that CFS’s long term goal is to build ARC — which will output up to 11 times as much energy as it takes in — with the intent to begin contributing fusion energy to the grid by the early 2030s. While he is optimistic about commercial fusion, Creely acknowledged that thousands of these machines would have to be built worldwide in order to have an impact on the climate.

Aside from the keynote speakers, a part of the night was dedicated to posters from climate and energy research done at MIT, local startups, and other universities from all over the country. As a result of a partnership between MITEC and the Texas Entrepreneurship Exchange for Energy (TEX-E), many presenters were from Texas universities. TEX-E sponsored students from universities such as UT Austin, Texas A&M, and Rice University to present their research at Climate and Energy Night.

One such student was Andrew Schwarz, an undergraduate senior from Texas A&M

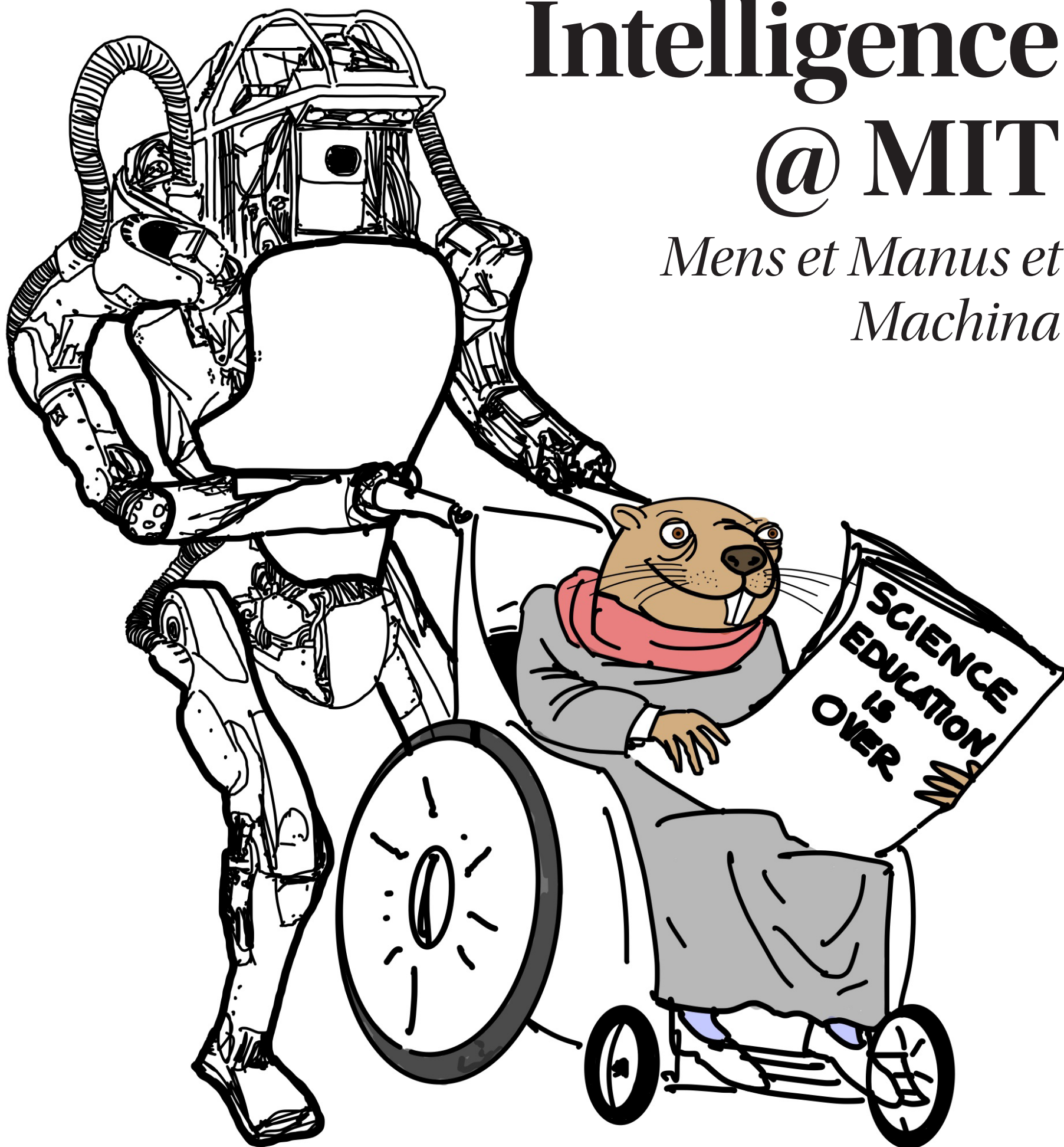
who presented his research on incorporating carbon nanomaterials into concrete to make it “greener.” Schwarz, who was also present at the event last year, thought the main benefits of Energy and Climate Night were “meeting people, hearing people critique [his] ideas,” and the chance to “interface with the more startup entrepreneurial ecosystem that Boston has to offer.”

This community-building aspect of Energy and Climate Night was also a draw for Monica Storrs, social media coordinator of the non-profit Long Now Boston. While she mainly attended the event to find speakers for an upcoming energy panel, she said the event was important because it made the human scale and impact of the climate crisis accessible and engaging, something she believes is “missing big time in science communications now,” especially for climate.

For Storrs, the highlight of the event was its ability to bring the Boston climate community together. “When you’re working on [the climate crisis],” she said, “it feels like you’re doing it alone — and then when you’re in these spaces with each other, you realize that you’re not.”

A focus on innovative solutions to challenging problems and a record attendance bolstered the event’s hopeful atmosphere. When asked about his optimistic view on the energy grid’s transition to renewable sources, Addleton summed up the event’s *raison d’être*: “I have two children under the age of three. I have to remain optimistic.”

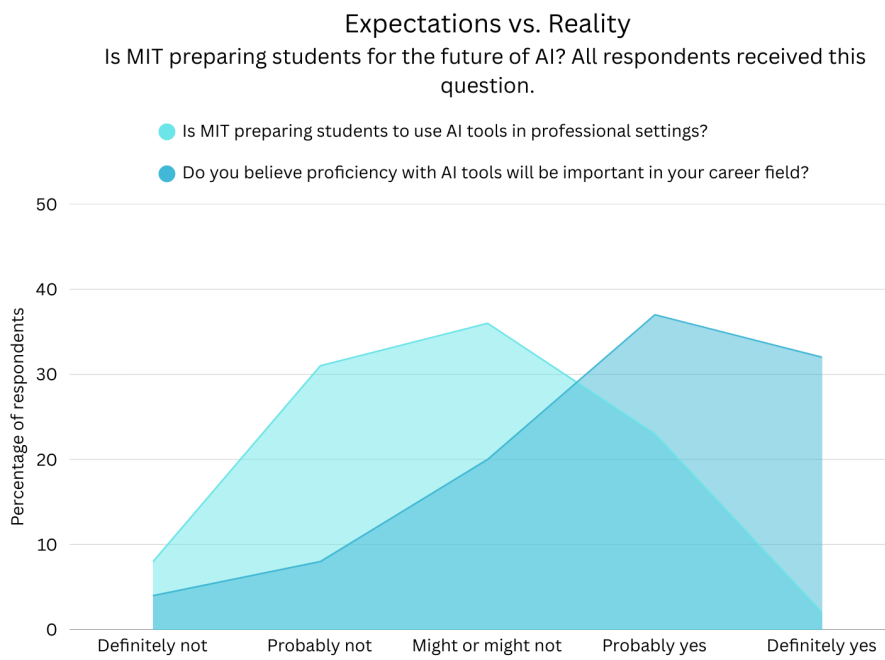
*Mens et Manus et
Machina*



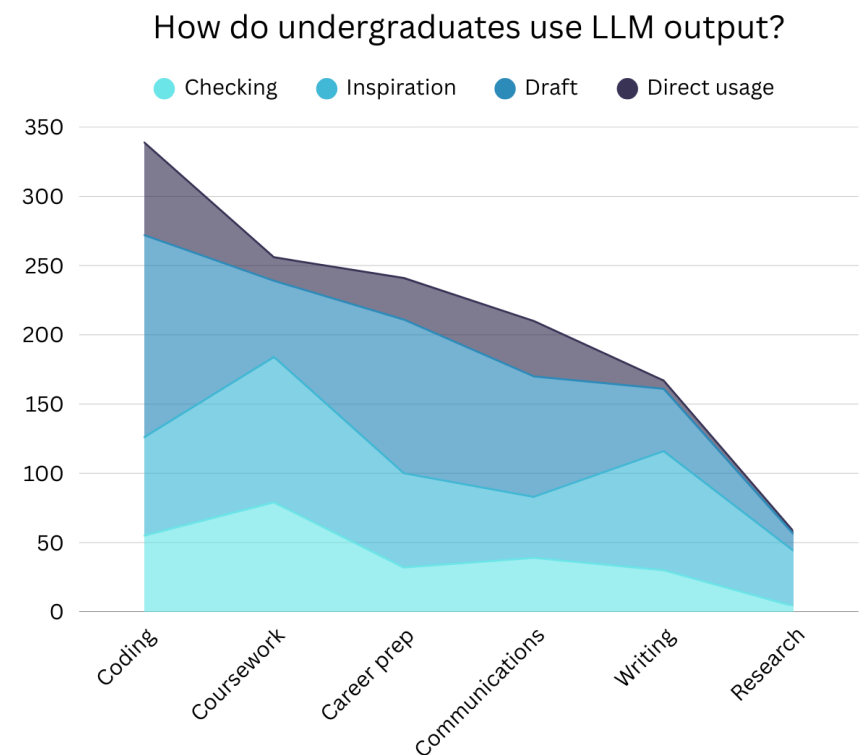
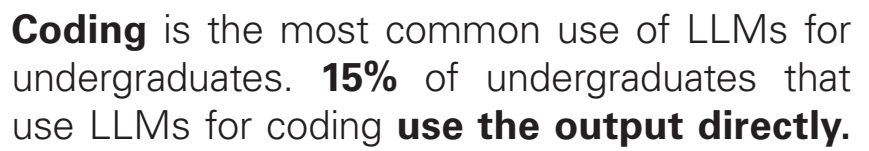
We surveyed 1,007 Institute members, including 659 undergraduate students (14.5% of the population),

—*Karie Shen '27*
Editor in Chief

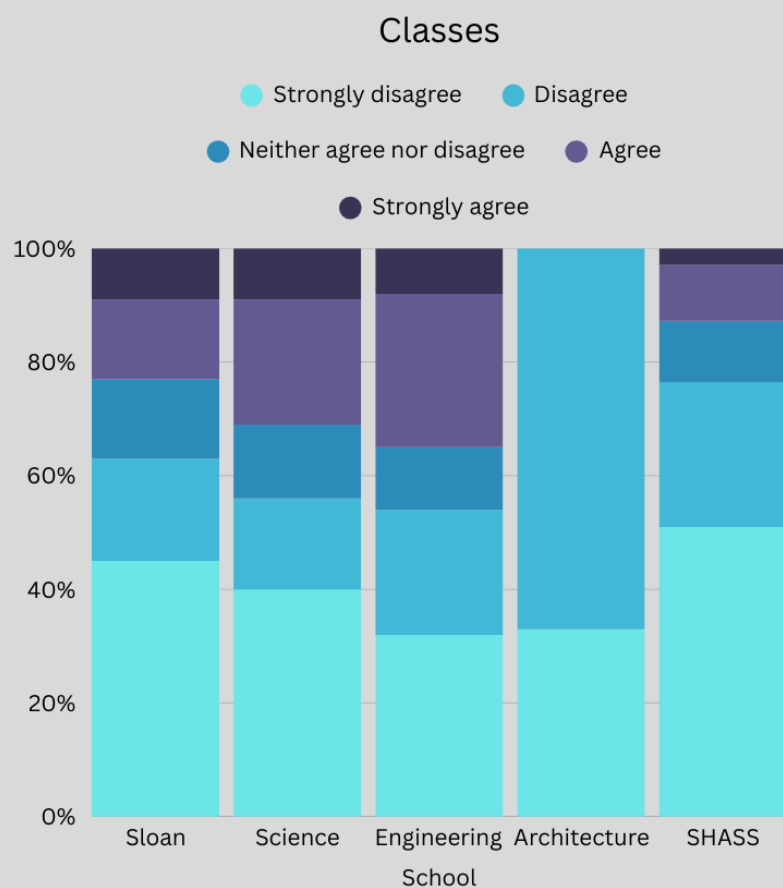
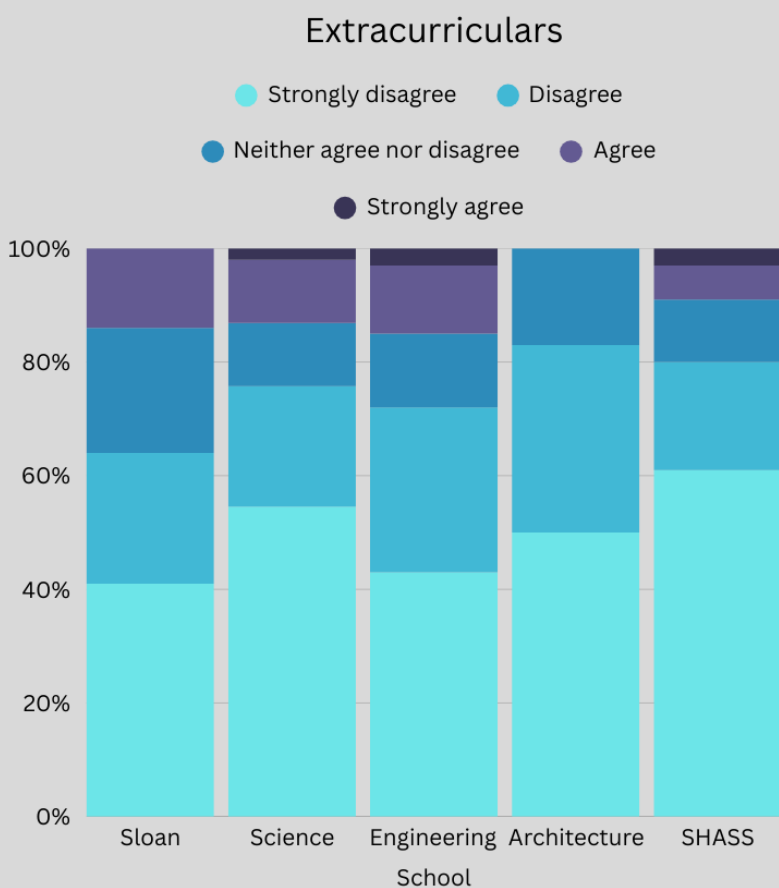
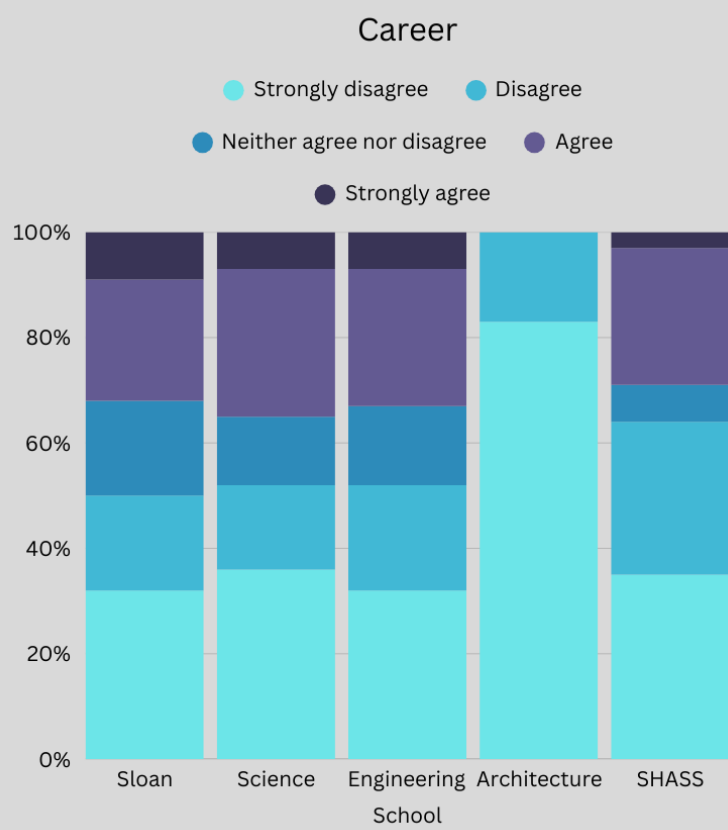
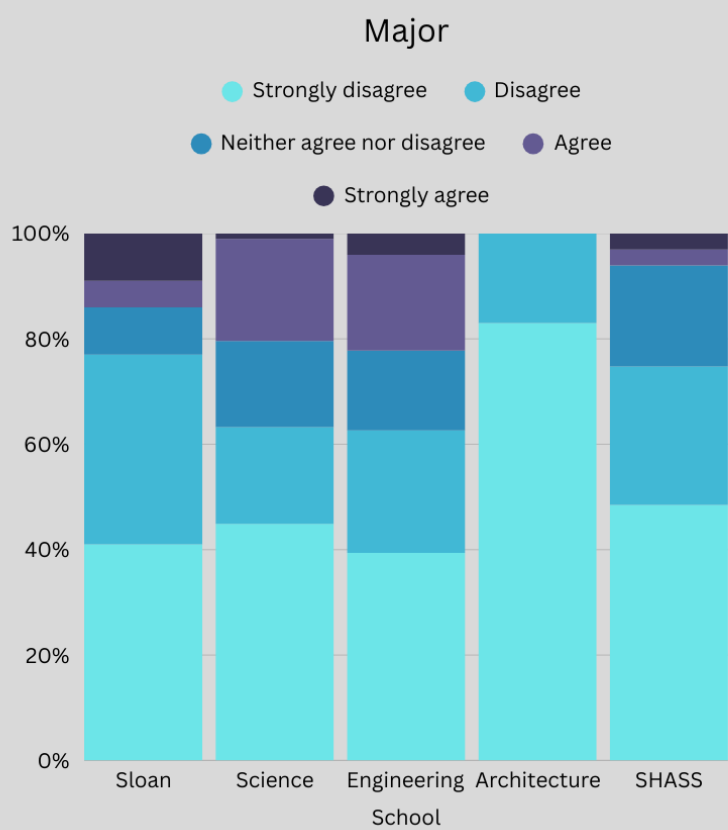
COMPUTERS START TO PROVE PAGE 15



While most respondents feel that **AI will be important** in their career field, fewer feel that **MIT is preparing students** to use AI tools.



Has the development of AI impacted students' choice of...



SHASS shares wide-ranging views on AI

Prof. Graham Jones: “Everyone in SHASS will need to take some kind of stance”

By Sabine Chu
ASSOCIATE NEWS EDITOR

Since OpenAI launched ChatGPT in November 2022, the chatbot has generated trillions of words, upending traditional modes of humanistic education in the process. At MIT, all students are required to take eight humanities, arts, and social science (HASS) classes, including two introductory Communication-Intensive HASS (CI-H) courses, but the vast majority major in technical subjects. Thus, for HASS professors who wish to meaningfully engage with their students, the challenges and opportunities posed by AI may be particularly profound.

Large language models (LLMs) can summarize philosophy papers, make flashcards about the Civil War, and translate ancient Chinese poetry. One of their primary uses, though, is in the act of writing itself: workshopping the user’s words or producing new ones out of whole cloth. A Sept. 2025 National Bureau of Economic Research study found that 24% of consumer ChatGPT messages asked for writing assistance, making it the third-most common query category after “Practical Guidance” and “Seeking Information.”

It’s not hard to see why. When *The Tech* asked ChatGPT to generate a sentence to follow the one opening this article, the tool came up with the following: “Its influence has forced educators and institutions to rethink not only assessment and authorship, but the very skills students must cultivate to thrive in an AI-saturated world.”

The sentence is grammatically and factually correct. It expresses a cogent point that naturally flows from the initial prompt. If a prospective news writer turned it in for editing, they’d probably be told to cut down the word count, and maybe mention MIT, but keep the main idea.

So, in an uncanny echo of ChatGPT’s pronouncement, we might ask the following: What happens when students never learn how to write by themselves? What will be the effect on their academic, professional, and personal lives? What and how will they think? How might a HASS instructor structure their classes to accommodate this new world while continuing to instill fundamental skills?

Graham Jones, a professor of anthropology and the Undergraduate Education Liaison for the School of Humanities, Arts,

and Social Sciences (SHASS), has helped organize several workshops this fall centered on the problems and possibilities of AI. The first, led by Professor Dwai Banerjee of MIT’s Program in Science, Technology, and Society, introduced key concepts about LLMs, while the second, led by Professor of History William Broadhead, focused on “AI-proofing” reading or writing assignments.

The director of Global Languages Per Urlaub’s upcoming workshop will discuss how AI can enhance learning. Finally, over IAP, faculty will workshop their spring syllabi. Chanh Phan, the SHASS Academic Programs Specialist, said that 86 faculty members have registered for one or more of the first three workshops, and about 50 have attended the first two.

Jones has observed a wide range of views in the workshops. Still, he said, “it has become unavoidable that practically everyone in SHASS will need to take some kind of stance on AI.” He believes that he exemplifies the SHASS faculty’s “deep ambivalence” regarding AI, reflected by his teaching approach. This semester, Jones is teaching two courses. Humane User Experience Design (21A.S10), co-taught with computer science professor Arvind Satyanarayan, considers how to build AI companions. In his more traditional Magic, Science, and Religion class (21A.520), Jones has pivoted towards “in-class experiential activities” in an effort to “AI-proof” work.

Although Jones is unsure whether MIT or SHASS can create generally applicable AI policies, he thinks any assessments of the forthcoming Task Force on the Undergraduate Academic Program (TFUAP) recommendations will need to consider AI.

Some might wonder whether these efforts are even worth it. In a widely-discussed piece for the *New Yorker*, author and professor Hua Hsu writes that humanities professors may ask, “Why bother teaching writing now?” He discusses teachers inured to widespread AI usage and students unable to get through class without it.

Still, Jones remains optimistic. In his opinion, students “want their education to help them be their authentic selves,” and one of SHASS’s strengths lies in its “personally meaningful” modes of learning. He believes that even though teaching methods will require adaptation, the humanities’ historical benefits can continue to exist alongside AI tools.

The Tech reached out to several CI-H instructors to ask about their strategies for teaching and learning in an age of AI.

Urlaub hopes that his CI-H course, European Thought and Culture (21G.059), can help his students grow as “empathic listeners, close readers, critical thinkers, sophisticated writers, and passionate debaters.” He believes that in the modern world, all the qualities above will require an understanding of AI’s role as a “mirror” to human values. Urlaub highlighted the humanities’ ability to “offer laboratories for exploring the affordances and limitations of technology.”

Urlaub has incorporated AI into his teaching with a custom GPT called “Post-warSocrates” and a “low-stakes” assignment wherein students used Perplexity to identify the locations of scenes from a European TV show. Although he prohibits his students from using LLMs in their weekly writing reflections, for the final project, he has invited students to pick from six distinct categories of AI use. These range from complete independence to having an AI “co-drafter” with a human “editor.” Students who choose to use AI are asked to submit a 500-word reflection on their choice and its effects on their learning. Urlaub hopes that this multifaceted approach will “help students evaluate technologies critically and constructively” and guide them towards “productive engagement rather than superficial use.”

On the other hand, Ken Urban, a Senior Lecturer for Dramatic Writing in the Theater Arts department, believes that “AI is robbing us of the difficult work of thinking and creating.” He is currently teaching the CI-H class Script Analysis (21T.131) and Writing the Full-Length Play (21T.350), a more advanced course. Students in both classes must sign an honor code at the beginning of the semester. For most assignments, they cannot use AI, but when they are permitted to use it, they must cite it.

If a student seems to violate the policy and their work “features the common tropes of AI-generated text,” Urban uses Internet resources to look into the likely sources, then speaks to the student if his initial guess is supported. He says that students who violate his policy usually “didn’t realize the ethical reasons behind [his] rationale.”

Philosophy and Women’s and Gender Studies Professor Sally Haslanger has taught at MIT since 1998. As a defense against AI, she now requires students in her

CI-H course, Classics of Western Philosophy (24.01), to draft their first two papers through closed-book, closed-note in-class exams, revise them after receiving instructor feedback, and take an oral exam based on their third paper. Haslanger noted, however, that writing exams by hand can be difficult for students. She hopes that MIT invests in technology for computer-based, closed-book, and closed-notes exams and that the Subcommittee on the Communication Requirement reassesses CI-H requirements given AI-induced changes.

Benjamin Mangrum, an associate professor of Literature, has taught CI-H courses every year since joining MIT in 2022. In that time, he has seen both students who “hate” AI and those who are “pretty explicit in their belief that it makes writing and other traditional humanistic activities seem obsolete.” In his current CI-H course, Reading Nonfiction (21L.050), which centers on the “craft of writing,” Mangrum prohibits AI use. However, he has revised his policy each semester and is “not opposed” to all types of AI use. He also uses AI to generate writing for in-class student analysis, as “it tends to be very competent but bland, and it’s useful to think about those qualities of prose.”

Mangrum believes that AI has intensified an existing popular view of the humanities as irrelevant. He said, “It tells many people what they already believe about the value of spending time studying history, philosophy, art, literature.”

Noel Jackson, also in the Literature Department, has addressed this problem by developing classes in which AI itself is “less relevant.” Last semester, he taught a course on the practice of walking in literature and film. Every week, students had to document their walks in journal entries that reflected on relevant reading material. Jackson knows that students can input enough information to generate a “plausible” entry. Still, he noted that “it would be easier, and I think more enjoyable too, if that student simply took a walk.”

In another course, Jackson has centered his pedagogy on questions generated by students. He believes that if students take the time to enjoy their own thoughts and those of their classmates, “we may find that the ‘superintelligence’ that purports to generate definitive answers for everything is not as nearly as interesting or as useful as what we can accomplish ourselves.”

Dean Locke warns of automation’s effects

Locke asserts need to reimagine education given top firm’s decreasing hiring

By Samuel Yuan
NEWS STAFF WRITER

MIT Sloan Dean Richard M. Locke PhD ’89 bluntly warned that artificial intelligence (AI) automation is set to reshape white-collar jobs and called on universities to reimagine education in an address and panel at the MIT Human Insight Collaborative event on Monday, Nov. 17.

“It used to be that some of the top consulting or investment banking companies would come and hire 20 or 30 Sloan graduates at a time every year in this huge cohort,” Locke said. “They still come, but they’re hiring in smaller numbers because they don’t

need as many students as they used to due to the automation of some tasks by AI.”

These remarks echo a nationwide sense of uncertainty about the increasing presence of AI and the job market. In one *Wall Street Journal* article published this month, companies predict that 2026 will be the “worst college grad job market in five years,” partly due to AI. In another, it was noted that corporate HR departments are taking steps to “quell employee fears” about automation. And in a 2025 Gallup poll, over 70% of respondents believed that AI would reduce the number of jobs over the next decade.

Accordingly, Locke shared his belief that education — both in management and in

other disciplines — must be reinvented so students are “upskilled” in terms of interdisciplinary knowledge and literacy, with technology serving as a tool. He also emphasized equipping students with stronger “value-oriented” mindsets as they prepare for changing white-collar workplace demands.

Locke, a former executive at Apple, specifically referred to his time at the Cupertino-based technology giant as a guide to the importance of values in the workplace. “People were flushed out not because they weren’t good at tech, but because they didn’t align with the values of the company,” Locke said.

But job market changes may vary depending on the industry. This year’s MIT Fall Career Fair in September saw an increase in the number of represented organizations compared to last year, with 225 taking part this year relative to 180 in 2024. Computer software, hardware, and quantitative finance companies were notably well-represented.

Other scholars have argued that the discourse around AI has the potential to discourage young people from entering AI or learning how to code. Stanford Adjunct Professor Andrew Ng SM ’98, founder of Google Brain and Coursera, wrote about an email conversation he had with a high-schooler who was worried that AI would leave him with no “meaningful work” after college in a recent issue of his “The Batch” newsletter.

Ng reassured the student that there would be “plenty of work” for him “for de-

acades hence” and added that “hype about AI” was beginning to be harmful due to its adverse effect on young people’s ambitions.

“AI has stark limitations, and despite rapid improvements, it will remain limited compared to humans for a long time,” Ng wrote.

Moreover, a *New York Times* article published in August of this year reported that many corporate investments in AI — amounting to billions of dollars — have yet to pay off in the form of tangible productivity gains.

Yet many AI startups are still looking to capitalize from the craze for automation. One of the hottest new buzzwords in Silicon Valley is “agentic AI” — the idea that some AI assistants could be deployed to independently take action and automate full jobs and routines end-to-end.

According to research from the *MIT Sloan Management Review* and Boston Consulting Group from Nov. 18, out of 2,102 respondents who represented organizations across 21 industries and 116 countries, 35% say that their organizations have begun using “agentic AI” and 44% indicate that they plan to do so soon.

More conspicuously, new controversial billboards in San Francisco from the AI startup Artisan call for employers to hire their “Artisan bot” instead of humans.

“Artisans won’t come into work hungry,” one billboard reads. Another declares, “Artisans won’t complain about work-life balance.”



Lobby of the MIT Schwarzman College of Computing building on Vassar St. (Building 45).

SAMUEL YUAN—THE TECH

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HOPE TO SEE YOU THERE

dui. Praesent ullamcorper hendrerit dui, a auctor diam elementum

Etiam imperdiet pellentesque tellus, at ornare sem tincidunt vel.

When algorithms create, who's the artist?

MIT scholars Dr. Ziv Epstein and Professor Justin Khoo reflect on AI art

By Karie Shen
EDITOR-IN-CHIEF

An unexpected song played in one of my recent Ubers. Melancholic indie pop, a woman sang about slowly growing apart from a best friend, those small betrayals and growing silences. I was genuinely moved.

Curious, I pulled out my phone to Shazam the song. That's when I saw the artist: Xania Monet. It turns out the song came from an album that was entirely generated by artificial intelligence (AI).

The quality had surprised me, especially the specificity of the lyrics about the loss of friendship, a subject pop music tends to skip over in favor of romantic heartbreak. But now, when I replay the song in my mind, the rhymes begin to nag at me. Every couplet is linked together with the precision of an algorithm following patterns rather than a human reaching for the perfectly imperfect word. How funny is it that I only noticed in hindsight?

The moment captured something essential about where society stands with regard to AI-generated art. The questions it raises are no longer theoretical exercises for philosophy seminars. Instead, they're urgent inquiries as AI-generated content floods our feeds, our galleries, our playlists, and our understanding of what creativity means.

The human element

For Dr. Ziv Epstein, a postdoctoral associate at MIT's Schwarzman College of Computing, the answer begins with a simple premise: "An artist is a human who creates art." It's a stark line in the sand, one that immediately excludes machines from the creative circle.

"Art is a dynamic dialogue between humans, expressing intent, emotion," Epstein explained. "It is participation in a scene, responding to the zeitgeist of the moment and its corresponding anxieties and imaginaries." In his view, art isn't just about producing beautiful objects. It's about making meaning within a cultural context, a conversation that requires human stakes, human fears, and human dreams.

MIT Philosophy Professor Justin Khoo approaches the definition in a similar way. He sees artists as "people who create works which are for focusing the attention of others in particular ways." When we engage with art properly, we enter what he calls "a mode of appreciation." This framework leaves open intriguing possibilities while maintaining focus on human intentionality.

The creativity conundrum

Can an algorithm be creative?

Khoo points to philosopher Lindsay Brainard's criteria: creativity requires mak-

ing something new, through a process without a predetermined outcome, involving "the exercise of individual agency" and "deliberate critical reflection." Whether AI systems meet these standards remains, in his words, "an open question."

Epstein is less ambiguous. "Creativity involves the creation of something new, but is as much about the process as the product," he stated. It's about negotiating with a medium, wrestling with constraints, and making countless micro-decisions. Modern AI systems, he suggested, actually work against this. They may "homogenize creative production," threatening both the diversity of creative output and the resilience of creative labor markets.

At their core, Epstein wrote, these systems are high-dimensional probability distributions. When you prompt an AI, you're sampling from patterns already embedded in training data. These patterns reflect particular cultural assumptions, biases, and aesthetic preferences. Ask an AI to "be creative," and you're invoking someone else's codified notion of what creativity looks like.

The authorship puzzle

Perhaps the thorniest question is one of attribution. When AI generates an image from your prompt, who created it?

Khoo offers two competing frameworks. In one, the AI is "a very malleable all-purpose paintbrush," like any other an artist wields. In the other, the AI is the actual artist, and the prompter is merely a patron, someone who commissions work but doesn't create it. "I'm not sure which is the better way to conceptualize things," Khoo admitted, and his uncertainty feels appropriate given how rapidly this technology is evolving.

Epstein sees another possibility that is "the dearth of the author," a phrase from Santa Clara University scholar Max Kreminski. According to him, a prompter's intent is "underspecified" with countless creative decisions delegated to an "AI-slop machine." The result is a kind of ghosted authorship, where training data biases and trends replicate themselves without clear creative responsibility.

He warns against anthropomorphizing these systems, as they "undercut credit to human artists and increase credit to the technologists who built it." It's a power dynamic worth interrogating.

Liquid art in a solid world

Epstein introduces a compelling metaphor from artist and researcher Kate Compton who believes that we're entering an era of "liquid art." Just as mechanical reproduction challenged the uniqueness of paint-



KARIE SHEN—THE TECH

When DALL-E is prompted with "be creative," whose notion of creativity does it represent?

ings, algorithmic reproduction makes any single AI-generated image "but a drop in the ocean." Compton coined the term "Bach Faucet" to describe situations in which generative systems produce endless supplies of content at or above the quality of culturally valued originals, rendering rarity and traditional value obsolete.

In this framework, "the model is the message," as stated by Isabelle Levent and Lila Shroff. Any individual AI creation is less meaningful than the underlying patterns and processes that generated it. Treating a liquid artifact as a solid piece of art, Epstein suggests, misses the point entirely.

Yet he doesn't advocate abandoning these tools. Instead, he proposes reconceptualizing them, not as answer machines, but as "hermeneutic technologies" and "serendipity machines." Used thoughtfully, AI can inject unexpected randomness, creating "happy accidents" that spark lateral thinking. The key is cultivating your own voice first, then using AI's glitches and surprises as raw material for reflection.

"AI is a cliché machine," he said. "This is very dangerous but can also be genera-

tive when treated as prompts for critical reflection."

The uncertain future

Khoo senses a "prevailing uneasiness" around AI-generated art, stemming partly from uncertainty about what a world "awash in AI-generated art might look like." But he also sees historical precedent. Photography, phonographs, and remixes each sparked similar anxieties before people found creative uses and developed new evaluative standards.

Both scholars agree that art students should engage with these tools. Khoo encourages his philosophy graduate students to explore AI in their workflows, noting that the technology will only become more embedded in daily life. Epstein frames it more urgently: "Now, more than ever, is your time to find your personal voice and style."

Perhaps the real challenge that AI poses is not whether machines can create art, but whether humans will continue to cultivate the distinctive voices, critical perspectives, and intentional decision-making that make art meaningful in the first place.

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Making a computer solve your math problems

Chase Norman: “If there exists a proof, we’ll eventually find a proof of that statement”

By Hongning Wang

Sometimes, all you need to do to get over a roadblock in a math proof is to think about the problem in a different way. This was the inspiration behind Chase Norman’s automated math problem solver.

On Nov. 19, Norman, a PhD student at Carnegie Mellon University, presented Canonical, his theorem prover, at a talk organized by the student group AI@MIT.

Canonical is built on top of a mathematical proof assistant called Lean, which automatically checks if a sequence of math statements (“tactics”) written in the Lean programming language correctly proves a statement.

When a person proves a theorem, they typically present a sequence of logical steps. If each step is valid, they together establish the truth of the original statement. For instance, someone might show that each angle in an equilateral triangle is 60 degrees by observing that the sum of the angles in a triangle is 180 degrees, the three angles are the same, and that 180 divided by 3 is 60.

According to Norman, Lean verifies proofs in a similar way. It begins by compiling tactics into standardized proofs (“terms”). Each term attempts to prove a

logical proposition (belonging to a “type”). Lean verifies that a term is correct (or “type-check” each term), and ultimately returns if any term belongs to the type of the original theorem.

“Another advantage of automated theorem proving is that there is a formal definition of a mathematical proof and there’s a way to verify whether the proof is correct or incorrect,” Norman said.

Norman’s main insight was that mathematicians rarely solve hard problems by repeatedly coming up with brilliant intuitions and writing out terms. Rather, an important part of problem-solving is breaking down a complex task into smaller, more manageable types or transforming it into a more tractable form.

Norman referenced a seminar from Fields Medal-winning mathematician Terence Tao: “If you can find the right state in C — which is halfway between A and B — and each of those steps is half as difficult, that is a major, major advance.”

Programmatically, Lean enables this strategy of searching for the right intermediate states via computational tactics on propositions. Norman divided these operations into three main categories: closers, which will instantly prove a type if possible;

simplifications, which rewrite a proposition into something easier to work with if possible; and transformation tactics, which change a type into a related proposition. He chose to let Canonical try all possible closers and simplifications, and then focus on the transformations.

“There’s not that many [closures or simplifications]. They don’t take that long to run. If they succeed, then you’ve made the goal simpler,” Norman said.

For his final insight, Norman observed that all proof transformations, no matter how complex, have three steps: creating a new subgoal, proving this tool is mathematically legal, and using it to complete the original proof. In the equilateral triangle example, a person might first reduce the original problem to the task of showing that the angles in an equilateral triangle are the same, and using this tool to show that each angle is 60 degrees. In Lean, a have function defines a subgoal. So, Norman could replicate all techniques available in Lean only using have statements.

Canonical puts all of these insights together. Given a goal claim (represented as a type), Canonical begins by creating a placeholder term for the proof. It then systematically refines this term through successive

steps, exploring different transformations until it discovers a reduction that satisfies the goal.

“If there exists a proof, we’ll eventually find a proof of that statement. And our guarantee of Canonical is that if there is a short proof, then we can find that proof relatively quickly,” Norman said.

In the future, Norman hopes that incorporating artificial intelligence (AI) will enable Canonical to think about a problem from many different angles. One current challenge of Lean is recognizing separate representations of the same concept. For instance, a human can understand a positive number as its distance from zero and as its prime factor decomposition, but these two representations are programmatically very different. Norman envisions that AI tools, with their ability to interpret meaning rather than syntax alone, could bridge this gap and expand the capabilities of automated theorem proving.

“You no longer need to reason about terms. You can just reason about types. You no longer need to reason about any other tactics, even. And now, in order to take this one level of abstraction higher, I think the way to do it is with artificial intelligence,” Norman said.

MTC head: business acumen still key in AI age

Over the past decade, MIT has had most undergraduate founders per capita

By Samuel Yuan

NEWS STAFF

Long before Bill Aulet SM '94 returned to MIT to direct the Institute’s entrepreneurship center, he was at IBM, right at the dawn of the personal computer revolution, when Apple and Microsoft were just fledgling startups.

Now the Managing Director of the Martin Trust Center for MIT Entrepreneurship and a Professor of the Practice at the MIT Sloan School of Management, Aulet has seen much of the technology industry’s history up close. And he says that building successful technology startups is as much, if not more, about business acumen as it is about invention.

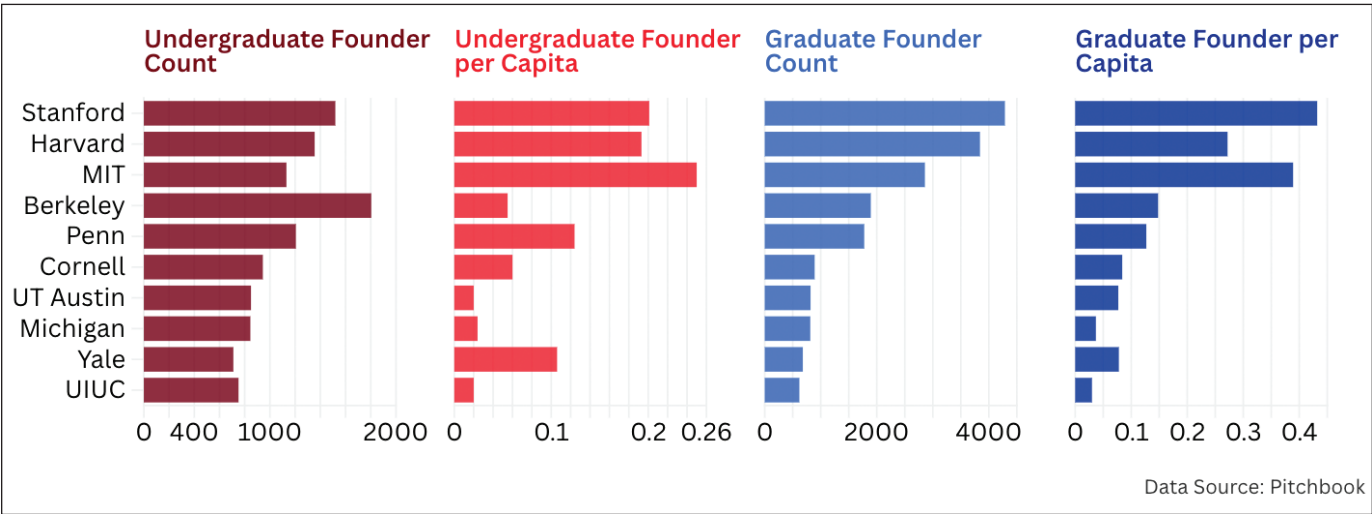
Referring to the history of Silicon Valley, Aulet pointed out that while companies like Apple, Google, and Meta just “laterally innovated” many of their key technologies, their success could largely be attributed to their ability to recognize underutilized technology and commercialize them. For instance, Apple was instrumental in bringing the graphical user interface (GUI) to customers, an innovation that originated at Xerox PARC.

“Innovation is invention times commercialization. So if you have someone who’s just a good hustler, but they have no technical aptitude, then invention is zero and you get nothing,” Aulet said. “But at MIT, they do invention, and they sometimes don’t figure out how to commercialize it.”

Reading the market

Aulet reasons the importance of the Trust Center’s programs and classes — like MIT delta v, StartMIT, and the Venture Engineering class (15.373) — comes from the need for both market literacy and technological aptitude. He believes that this is especially pertinent for student founders, as artificial intelligence (AI) represents a new wave of opportunity, just like the PC and the internet before it.

“We’re not there to grab a piece of their company. When you come to MIT, all this stuff’s free,” Aulet said. “We’re teaching people to get better so their odds of success are higher, and even if they fail, they’re still going to learn a ton.”



Founder count data for ten American universities with most undergraduate founders over the last decade according to PitchBook.

Aulet also remarked that while one of the best ways to start a successful startup is to solve a problem that one sees, building a “highly scalable company” is still very different from “product hacking” or building “stuff like a science fair project.”

MIT’s startup scene

Like Aulet, many students at MIT are similarly interested in entrepreneurship. According to data from Pitchbook, MIT now ranks fourth and third in terms of the number of undergraduate and graduate founders, respectively.

Moreover, by *The Tech*’s calculations, out of the ten American universities that produce the most entrepreneurs, MIT has had the highest undergraduate founder count per capita over the past decade. It also has one of the highest graduate founder counts per capita, second to only Stanford.

While Silicon Valley is thousands of miles from Cambridge, Massachusetts, many of the most prominent AI startups located there — such as OpenAI and Cursor — were founded, in part, by individuals affiliated with the Institute.

An AI bubble?

Despite the meteoric rise of AI startups over the past few years, there has recently been growing skepticism about their success. For instance, a Nov. 22 *Wall Street*

Journal article reported lower-than-usual investor enthusiasm for Nvidia’s Q3 2026 earnings. The article also cited Nvidia’s deal with AI startup Anthropic, concluding that the AI environment was “worsening” but that the “the AI bubble” would not “pop” just yet.

Last month, a *New York Times* article analyzed the circular nature of OpenAI’s deals and investments, noting how these complex transactions induced some fear in investors. Some believed that the San Francisco-based company was “inflating a potential financial bubble” while still building a “highly speculative technology.”

Looking long-term

Still, many familiar with the history of the technology industry remain confident in AI’s future.

Paul Wesling, Life Fellow and Distinguished Lecturer of the IEEE who gave a presentation on Silicon Valley history for the Stanford Historical Society, wrote in an email to *The Tech* that “AI will be just like previous Silicon Valley innovations and productizations and will again drive improved productivity and GDP for America.”

Wesling cited a *Wall Street Journal* op-ed by former Federal Reserve Board member and Distinguished Visiting Fellow at the Hoover Institution Kevin Warsh to illustrate

how AI represented just the latest iteration of “Silicon Valley dynamism” and “American ingenuity.” He said that this innovation burst was spurred by individual builders and risk-takers enabled by a “deregulatory agenda.”

Meanwhile, Aulet said that AI might be similar to the dot-com bubble in the sense that there will be “some huge winners” but also many losers. While sites like Pets.com were failures, companies like Amazon also emerged from the bubble.

Aulet also believes that tech giants are currently “placing massive bets” in AI to remain relevant in the industry in the long term. In some sense, he feels that they are learning from IBM and are accordingly much more “paranoid” about survival.

“We at IBM invented the technology that ultimately killed us,” Aulet said. “We could not imagine that somebody else could steal the computer. It’s just unfathomable.”

Aulet specifically referred to Google’s venture-capital-like investment strategy as proof of this idea. He noted that Google’s investment in Android and mobile paid off for “100 other” investments. Furthermore, he added that if Google can move from the last curve to this curve of AI — for which they’ve also invented a core technology in the form of the Transformer — then it will “be such a testament to Google.”

Have something to say?

Write **opinion** for *The Tech*!

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Cranberry Sauce

Solution, page 4

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Gravy

Solution, page 4

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[1645] Toasts

CHAMPAGNE FOR MY REAL FRIENDS AND REAL PAIN FOR MY SHAM FRIENDS!

PSEUDOPODS FOR MY REAL FRIENDS AND REAL PODS FOR MY PSEUDO-FRIENDS!

PETTICOATS FOR MY REAL FRIENDS AND REAL COATS FOR MY PETTY FRIENDS.

LOOSESTRIFE FOR MY REAL FRIENDS AND REAL STRIFE FOR MY LOOSE FRIENDS!

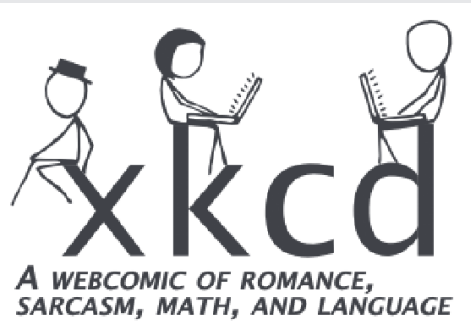
LADYBUGS FOR MY REAL FRIENDS AND REAL BUGS FOR MY LADY FRIENDS!

SINGLE-PAYER FOR MY REAL FRIENDS AND REALPLAYER FOR MY SINGLE FRIENDS.

TUMBLEWEEDS FOR MY REAL FRIENDS AND REAL WEED FOR MY TUMBLR FRIENDS!

FAUXHAWKS FOR MY REAL FRIENDS AND REAL HAWKS FOR MY FAUX FRIENDS!

Platonic solids for my real friends and real solids for my platonic friends!



by Randall Munroe

[1973] Star Lore

THAT CLUSTER WAS KNOWN TO THE ANCIENTS AS THE FIVE SISTERS.

THE RED ONE IS A SUPERGIANT, AND WILL PROBABLY EXPLODE WITHIN THE NEXT MILLION YEARS.

WOW!

THERE ARE TOO MANY STATUS LEDs IN MY ROOM.

That one is a variable star which pulses every 30 seconds. Its name comes from a Greek word meaning "smoke alarm."