MIT's Oldest and Largest Newspaper

thetech.com



WEATHER, p. 2

Showers and fog

FRI: 64°F 42°F Showers

SAT: 53°F | 41°F

Thursday, October 31, 2019

Volume 139, Number 25

Melody Phu '21 of MIT Syncopasian sings "Me and My Broken Heart" Saturday at the Family Weekend A Cappella Concert.

# Student committees created after Epstein student forum

Committees will investigate campus climate injustices and metrics to evaluate future outside engagements

By Wenbo Wu

STAFF REPORTER

The Undergraduate Association and Graduate Student Council created two new student committees to respond to concerns raised in the Student Forum on MIT & Epstein Oct. 1 and the results of the AAU Sexual Misconduct Survey released Oct. 15. Undergraduate committee members will be chosen after conducting interviews, holding student body elections, and receiving approval by the UA Council.

Mahi Elango '20, president of the UA, wrote in an email to The *Tech* that "the committees and the students have full ownership over scope, and therefore any and all ideas relevant to the charge are on the table for discussion." Both committees will produce a report by Spring 2020.

Elango wrote that the Student Committee on Campus Climate and Policies around Discrimination and Misconduct will "investigate systemic injustices on

Meanwhile, the Student Committee on Guidelines for Outside Engagements "will review and discuss MIT core values and the metrics by which outside engagements should be evaluated."

Elango and Peter Su G, GSC president, will chair both committees.

Elango wrote that she and Su "have been meeting frequently with Professor Tavneet Suri, Chair of the Ad Hoc Faculty Committee on Guidelines, and other faculty mem-

New Committees, Page 2

# Students must sign intellectual property agreement for UROPs

Agreement transfers ownership of some IP to the Institute

By Kristina Chen

ASSOCIATE NEWS EDITOR

Beginning in IAP 2020, students applying to participate in UROPs will be required to sign MIT's Inventions and Proprietary Information Agreement (IPIA). The IPIA transfers ownership of intellectual property satisfying certain conditions to the Institute.

When research is sponsored by a third-party or uses significant MIT funds and facilities, the IPIA transfers ownership of the research to MIT. Students may read the Technology Policy Guide to identify what constitutes "significant MIT funds

Currently, students participating in UROPs that meet these conditions are required to sign the IPIA, but under the new policy, all students will be required to sign it during the UROP application process.

Siri Nilsson, IPIA and agreement officer at MIT's Technology Licens-

ing Office (TLO), said in an interview with The Tech, "It has always been required, and it's written into MIT policy that everybody who participates in sponsored research will

"The issue is that not all departments were necessarily aware that it was required, and some departments did not have formal processes in place to systematically collect the signed agreements. It's not a change in policy in any way. It's more of an effective implementation of policy," Nilsson clarified.

This new policy ensures that the Institute does not violate any federal regulations or other funding requirements. Not having the IPIA filed could result in loss of funding for the research project. Nilsson explained, "Under our funding contracts, ... [MIT is] expected to control the disposition of certain intellectual property, so federal regulations actually require MIT to own and to license intellectual property so that that it's publicly disseminated."

Most UROPs that students participate in do not meet the conditions of the IPIA. In addition, if ownership is transferred to MIT, students can ensure they are credited as inventors, be named on a patent, or earn a portion of the revenue that the Institute may receive from a license agreement.

Michael Bergren, associate dean of academic and research initiatives, told The Tech in an interview. "Undergraduates are an integral part of the MIT research community, so it only makes sense that they also should have the opportunity to to be in the conversation about intellectual property ownership, and I think one good outcome of this change with the UROP system is that they get to have this conversation

If students have any questions, they can contact the UROP office and TLO, Bergren added.

# BioMakerspace to open this IAP in Building 26

Lab to have basic equipment including tissue culture room, incubators, pipettes

By Edwin Song

ASSOCIATE NEWS EDITOR

A new biology makerspace, called the "BioMakerspace," is scheduled to open this coming IAP in the basement of Building 26. The space, which is currently under construction, will be open to "the entirety of the MIT community" to be "used for whatever the student users really want to use it for," said Justin Buck PhD '12 in an interview with The Tech. Buck is the manager of the BioMakerspace and is currently overseeing its construction.

Buck said the lab will have Biosafety Level 2 capabilities and contain "all the basic equipment," including a tissue culture room, incubators, centrifuges, microscopes, pipettes, thermal cyclers, a refrigerator, a PCR, and common reagents.

Construction of the space is in the final stages and equipment is in the process of being obtained. "We're really hoping to have a very large and active launch over IAP," said Buck. "We plan to have workshops for folks to come and participate in if they don't have exposure to biology or would like to see and understand what it's like

to work with different projects." MIT students looking to work in the lab must submit a project

BioMakerspace, Page 2



Grace Bryant '21 and Gabriel Owens-Flores '21 make appointments at MIT Medical's Tomorrow Time table Oct. 23.

### **IN SHORT**

Friday, Nov. 1 is the last day to add a half-term subject offered in the second half of term.

There will be no class on Mon, Nov. 11, Veterans' Day.

Interested in **joining** *The Tech*? Stop by for dinner Sunday at 6 p.m. or email join@tech.mit.edu.

Send news and tips to news@ tech.mit.edu.



ARUN WONGPROMMOON—THE TECH

Residents of East Campus's 1W line up pumpkins atop the Green Building in preparation for Saturday night's pumpkin drop.

### **GRAD STUDENT** LIFE

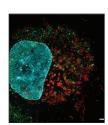
Living at MIT is financially impossible. OPINION, p. 4

### **JOURNEY TO FREEDOM**

One abolitionist's story is told. ARTS, p. 8

### **BOSTON BOOK FESTIVAL**

A heaven for book lovers. ARTS, p. 7



### **HAMMOND LAB**

Developing nanoparticles to reprogram cancer cells. SCIENCE, p. 9

### **IN BETWEEN GLANCES**

Alicja Kwade's exhibit comes to MIT. ARTS, p. 8

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THURSDAY, OCTOBER 31, 2019 2 THE TECH

**WEATHER** 

### **Chilly Halloween sending** shivers

By Sheila Baber STAFF METEOROLOGIST

The falling leaves bear tidings from the north-winter is coming! There will be more rain and fog for the rest of the week, followed by a sunny break over the weekend. Doesn't mean it will get warmer though. Temperatures will steadily creep lower, with nights approaching the lower 40s and even hitting the high 30s. There will be some wind on Friday, so be sure to hold onto those hats, scarves and psets when

passing by the MacGregor wind tunnel! And if you are going trick or treating, consider wearing an extra layer to keep your spooky self warm, at least.

In terms of weather from the rest of the country, extreme fires are still raging on in California, which may be exacerbated by high winds. If only it were possible to send some precipitation from here... On the other end of the spectrum, parts of the midwest have already experienced snowfall-which may come sooner than you think!

### **Extended Forecast**

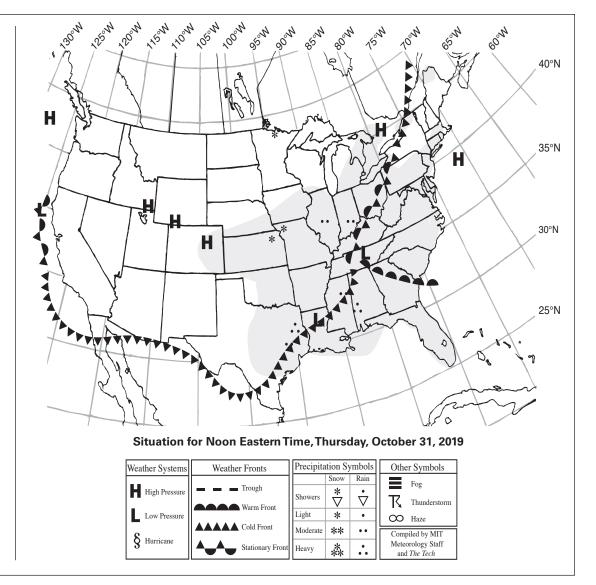
Today: Showers likely, with patchy fog throughout the day. High around 68°F (20°C) and low around 63°F (17.2°C). South winds

Tonight: Showers likely, with patchy fog in the evening. Chance of precipitation 70%. South winds 16-20 mph with gusts as

Tomorrow: Showers mainly before afternoon. High around 64°F (17.8°C), low around 42°F (5.5°C). West winds around 8-15 mph with gusts as high as 26 mph.

Saturday: Sunny. High near 53°F (11.7°C) and low near 41°F (5°C). Northwest winds around 7 mph becoming south in the after-

Sunday: Sunny with a high near 53°F (11.7°C) and low near 38°F (3.3°C). West winds around 7-13 mph.



## Committee members to be determined by student body vote and UA approval

New Committees, from Page 1

bers on the committee and will continue to do so throughout this process." In addition, Elango and Su will coordinate with the Ad Hoc Faculty Committee on Guidelines and the Ad Hoc Committee to Review MIT Gift Processes.

For selecting committee members, Elango wrote that the UA is "looking for candidates with a strong interest in and ability to think deeply about the issues at hand. This may be manifested through a record of relevant experience on or off campus." The UA also seeks individuals who "demonstrate a desire to work towards structural change that challenges the status quo."

Each committee will comprise six undergraduate and six graduate students. Applications to become an undergraduate member of either or both committees are open from Oct. 29 to Nov. 2.

The UA will conduct interviews Nov. 2 and Nov. 3 to select ten candidates, and will soon announce the procedure through which students may vote to select the final six committee members.

The final committee members will be determined primarily by student body vote, but may also be modified by the UA prior to approval by the UA Council to ensure "diversity and the balance of perspectives on the committee," Elango wrote.

In the executive summary attached to Elango's email to all undergraduates, Elango wrote that the committees were formed in response to student sentiment during the Student Forum on MIT & Epstein that MIT needs to offer more support to survivors, hold transparent discussions with community stakeholders, and agree upon insti-

# Student feedback instrumental in the design and contents of the BioMakerspace

BioMakerspace, from Page 1

application and undergo lab training. Steve Wasserman, one of the biological engineering instructors who has helped run the biology makerspace program since its early stages, told *The Tech* in an interview that the lab has a stipulation that allows students to maintain intellectual property of the work they do in the lab and use it to launch their. own companies.

A lounge next to the lab will provide a place to work and congregate. "The idea that we're pursuing is that this facility will serve as the nucleus for a community that is interested in life science," Wasserman explained.

Construction began April 2019 after several years of what Buck described as a very successful "pilot phase," which operated out of the bioengineering department teaching laboratories.

Wasserman said the idea for a biology makerspace program arose several years ago out of student demand. "Students get all kinds of crazy ideas and they want to do them, and a lot of times there are barriers to doing them in various research labs around campus," Wasserman said, citing the lack of spaces with appropriate equipment, intellectual property rights, and supervision.

Past projects through the program range from therapeutic drug delivery to kombucha, mostly "independent projects thought up by

the students," Buck said. "That's what I think makes the space most unique and what it is. Perhaps its greatest value as an asset to the community is that it is open to any

Associate Provost Krystyn Van Vliet PhD '02 told The Tech in an interview that having an independent lab for the biology makerspace has several benefits over continued use of the bioengineering teaching labs, such as not having to risk disrupting classes being taught in the teaching labs and flexibility in regards to research groups and topics.

"Teaching spaces have to have things set up just so, and they're not places where we tend to do projects that would mix different research groups," Van Vliet said. "Creating a mechanism where students, postdocs, other kinds of research staff, and faculty can work on things together that might not be within the research interests and domain of the existing faculty is how new ideas get started."

Both Buck and Van Vliet mentioned the establishment of the biology makerspace as part of a campus-wide trend towards makerspaces. For example, Van Vliet pointed to the planned Project Manus community-wide makerspace that will be on the first floor of the Metropolitan Warehouse.

Buck said the BioMakerspace is the "first space that is really enabled and focused on working with biology as a medium."

Construction of the BioMakerspace is conducted by Greene Construction and sponsored by the biological engineering and chemical engineering departments, along with a donor whose identity Buck declined to disclose.

Van Vliet said additional funds were provided by the MIT Committee for Renovation and Space Planning (CRSP), which she co-chairs. According to Van Vliet, CRSP wa responsible for much of the behindthe-scenes work in arranging for the bio makerspace to be designed

Along with Buck and Wasserman, several other biological and chemical engineering faculty and instructors, including the department heads, are closely involved in the project. Additionally, a BioMakers student group is currently helping with "planning and launching the itinerary of activities for IAP,"

Wasserman described student feedback as instrumental in the design of the layout and contents of the lab and lounge. "In the more public areas, the windows are bigger. ... The windows get smaller and smaller as you go to more private places," Wasserman said. "We asked in one of our surveys how open they wanted to space to be, ... and the students said that they didn't want to be in a fishbowl."

Students interested in the Bio-Makerspace are encouraged to contact Justin Buck at jbuck@mit.edu.



The MIT Concert Band holds its annual Halloween performance in the Student Center Wednesday. Musicians can be seen wearing costumes in the spirit of the spooky season!



Members of the MIT community visit the Hive Pollinator Garden, a space created by UA Sustain for students to relax and learn about the ecological importance of pollinators. Friday,



THURSDAY, OCTOBER 31, 2019 THE TECH 3

# Groundbreaking ceremony held for new Volpe Center

Center developed through collaboration between MIT and U.S. Department of Transportation

**Bv Kristina Chen** ASSOCIATE NEWS EDITOR

The U.S. Department of Transportation (DOT) held a groundbreaking ceremony Oct. 30 to celebrate the start of construction for the new John A. Volpe Transportation Systems Center in Kendall Square. The construction of the new facility is expected to be completed

Present at the groundbreaking were U.S. Transportation Secretary Elaine L. Chao, Chief of Staff of the U.S. General Services Administration (GSA) Robert Borden, Massachusetts Governor Charlie Baker. Mayor of Cambridge Marc C. Mc-Govern, and MIT Vice President for Research Maria Zuber, along with other speakers.

The new Volpe Center will replace the current Volpe's six buildings and parking lots, spread across 14 acres, and consolidate them into a single building occupying approximately four acres of land. This is the result of an Exchange Agreement executed January 2017 between the GSA and MIT.

The Exchange Agreement stipulates that MIT pay \$750 million to design and construct the new Volpe facility. The property no longer occupied by the federal government will then be conveyed to MIT for its

During the groundbreaking ceremony, Christopher Averill, regional administrator of the GSA, said, "The Volpe Center is at the cutting edge of research into the challenges facing our nation's transportation and infrastructure systems, ... but to undertake that work, the members of the Volpe team require a modern 21st century workspace."

According to a DOT press release, the new facility will be "an energy efficient structure accompanied by underground parking and approximately 100 bicycle parking spaces." It will "meet LEED Gold v4 standards, focusing on sustainability."

MIT plans to use the remaining space as a mixed-use environment, which will include four residential and four commercial buildings. The buildings will serve as affordable housing, open space, lab and office space, retail and active street uses, and a community center.

"We are thrilled to be able to offer these amenities to the Cambridge community and to help further advance the Kendall Square innovation ecosystem," Zuber

# **Woodie Flowers dies at age 75**

### Flowers was professor emeritus of mechanical engineering and co-founder of FIRST

**Bv Ronak Rov** ASSOCIATE NEWS EDITOR

Woodie Flowers PhD '73, professor emeritus of mechanical engineering, died Oct. 11 at the age of 75. Flowers is remembered for his passion, enthusiasm, and kindness that have inspired millions of engineering students around the world.

Up until his retirement in 2007, Flowers mentored countless engineering students and won a number of awards and accolades, such as the Ruth and Joel Spira Outstanding Design Educator Award, the Edwin F. Church Medal, and the J.P. Den Hartog Distinguished Educator Award. Flowers was a MacVicar Fellow and was also elected to the National Academy of Engineering. Additionally, he served as a distinguished partner and a member of the President's Council at Olin College of Engineering.

After receiving his bachelor's degree in engineering from Louisiana Tech, Flowers received his masters in engineering, masters, and doctorate degrees from MIT. Flowers then joined the MIT faculty as an assistant professor of mechanical engineering.

As an assistant professor, Flowers taught 2.70, now 2.007 (Design and Manufacturing I). Under his leadership, the class evolved into its current form, a hands-on experience in which undergraduate students are challenged to design and build a robot to accomplish a set of tasks using given materials. The course culminates in a robotics competition.

Later in his career, Professor Flowers served as the head of the systems and design division in the mechanical engineering department and was named Pappalardo Professor of Mechanical Engineering in 1994.

Mechanical Engineering Professor Alexander Slocum '82 was advised by Professor Flowers. Slocum wrote in an email to The Tech, 'Woodie personified gracious professionalism and teaching. If there was ever a version of Miracle on 34th Street associated with teaching, it would be Miracle on 77 Mass.

Ave and Woodie would be Prof. Santa!"

He also shared the following poem: "I cannot say Woodie 'was' / because he will always be 'is' / His love for teaching and design / was simply pure and sublime / He was also a design whiz / and he did it all, just because."

Inspired by the 2.007 final robotics competition, Flowers helped develop For Inspiration and Recognition of Science and Technology (FIRST), an organization that runs engineering and robotics competitions for students in grades K-12, with inventor Dean Kamen. FIRST began with 28 high school teams competing in a robotics competition similar to that of 2.007. Since then, FIRST has blossomed to span four levels from elementary to high school and include over 570, 000 students in over one hundred

Despite the competitive nature of the FIRST LEGO League, FIRST Tech Challenge, and FIRST Robotics Competition, FIRST describes itself as an organization that has

always been about "more than robots."

The FIRST memorial fund for Flowers describes how, through Flowers's guidance and focus on the core value of "gracious professionalism," FIRST has not only served to spread passion for engineering, but also promote teamwork, inclusion, and cooperative competition, or "coopertition."

FIRST alumnus Isabella Torres '22 wrote in an email to The Tech, "When you hear about the culture of other sports, be they athletic or academic, it is completely different from FIRST because of Woodie Flowers. His concept of gracious professionalism made FIRST the welcoming community that it is, and he set an example of how to be not just a good engineer, but also a good person."

Summer Hoss '23, another FIRST alumnus, wrote in an email to The Tech that "Woodie Flowers always had a twinkle in his eye and a genuine passion for helping kids learn. He will be missed but his enthusiasm will live on through his positive contributions to FIRST Robotics, MIT, and the world."

FIRST alumnus Aditya Mehrota '22 wrote in an email to The Tech, "If I had to take one thing away from everything Woodie taught me, it would be this — we can achieve absolutely anything when we are together as one. He was the fiercest friend and most loving family member to anyone who knew him. Woodie, I'll miss you so so so much. And thank you, for everything you've done, to change my life."

Even after his retirement in 2007, Flowers remained an active member of the MIT community. Flowers developed an ethos that was centered on people, and he left a lasting impact on everyone who he interacted with.Assistant Director of Admissions Chris Peterson SM '13 wrote in an MIT Admissions Blog post about Flowers, "They say never meet your heroes, but I am here to tell you that Woodie is one of the single-digit number of heroes I have had who not only survived first-contact, but actually got better the longer and better you knew them."

# House Democrats propose College Affordability Act

### Act aims to lower college costs, improve campus climate, and expand educational access

By Kerri Lu

ASSOCIATE NEWS EDITOR

House Democrats proposed the College Affordability Act Oct. 15. According to the Education and Labor Committee website, the act is a "comprehensive overhaul of the higher education system" aimed at lowering costs and expanding educational access for college students.

The Tech joined a press call with Education and Labor Committee Chairman Bobby Scott (VA-03) and Congresswoman Jahana Hayes (CT-05) Oct. 28 to discuss the act.

"The rising cost of college has put an affordable quality degree out of reach for too many Americans, and as a result, a growing number of students are regrettably questioning the value of higher education. Yet, research makes it clear that a college education remains the surest path to financial security and a rewarding career," Scott said, citing that on average, bachelor's degree holders earn \$1 million more than high school graduates during their careers.

The act has three main purposes: to lower college costs for students and families, improve college accountability and campus climate, and expand educational access for students from marginalized communities

The act aims to increase federal and state investment in higher education. Scott said this includes "the single largest increase in the value of Pell Grants since they were created in 1965," which will result in fewer student loans. Haves said the federal-state partnership "will drive states to reinvest in their public universities, which will eventually cut the cost of tuition."

"For those that do take out loans, e hill makes those loans cheaner to take out, simpler to understand, and easier to pay off," Scott said, noting that these measures benefit both private and public college students. The bill will replace the current complex loan repayment system with one fixed repayment plan and one income-based repayment

Hayes said the bill "requires colleges to counsel students on the cost of borrowing, so it forces full disclosure between the institution and the student in a way that we're not seeing right now."

Scott said the act will increase the accountability of colleges by "cracking down on schools that defraud students, veterans, and taxpayers." The bill will block funding for colleges whose students have high loan default rates and colleges that "spend too much money on marketing and lobbying, and too little on educating the

Scott said the act will also increase access to "flexible college options" while expanding on-car pus services such as childcare, career advising, and grants to support students during financial emergencies. It will increase federal support for Historically Black Colleges and Universities and Minority Serving Institutions. By providing funding to states that make community college tuition-free, the act will expand educational access for low-income students.

Scott said the act will benefit work-study eligible students by promoting "paid internships in their line of study, so that when they graduate they've actually got experience in a job related to their

Additionally, the bill includes a provision to block the changes to Title IX proposed by Secretary of the Department of Education Betsy DeVos last November. Scott said DeVos's Title IX rule "has too much of a blame-the-survivor aspect to it" and believes the new bill will "strengthen the prevention of campus sexual assault."

The act is expected to cost \$400 billion over the next ten years. Scott said that the Education and Labor Committee is working with the Ways and Means Committee to secure funding without cutting other education programs such as school nutrition and Title I.

Two years ago, under Republican leadership, [the House] passed a \$1.5 trillion tax cut. If they were able to find \$1.5 trillion without paying for it, we ought to be able to find \$400 billion. It's a matter of priorities," Scott said, adding that a tax cut repeal could potentially help fund the act.

"Fixing present law is half the cost of the bill," Scott continued, citing the example of the Public Service Loan Forgiveness (PSLF) program for federal student loan borrowers who work in public service jobs.

Scott said that under the current system, 99 percent of PSLF loan recipients are denied their discharge. The act will remedy this by broadening PSLF eligibility and ensuring loan forgiveness for those previou ly denied it.

"This bill will open access to opportunities for so many people who see college as a pathway to success. It will help first-generation college students navigate their pathway through college, and not be burdened with debt that they can't understand," Hayes said.

### Solution to Fasten-ating



### **Solution to Broomstick**

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

### **Solution to Cauldron**

3	4	5	1	2	6
5	6	1	3	4	2
4	5	6	2	3	1
1	2	3	5	6	4
2	3	4	6	1	5
6	1	2	4	5	3

### **Solution to Black Cat**

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

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**GUEST COLUMN** 

# MIT's policies force many graduate students to live in poverty

Threatened with eviction, forced to forgo medical care, and living in fear for my family: my life at MIT

By B. Mano

"You're lucky to be here."

The words from the MIT administrator hung in the air. I did feel grateful to study at MIT and receive a world-class education that hopefully one day would help me become an academic. But I was trying to explain to this administrator how unbearably difficult it is to pay my MIT bills while supporting my partner and child on an MIT graduate student's stipend. And here I was, a day late on clearing my balance, being told to feel grateful.

Those words hurt, but they were neither unique nor surprising. MIT administrators have been consistently dismissive towards my tenuous financial situation — a situation created by MIT's own policies that, as I will describe shortly, make surviving as an international graduate student with a family a nightmare.

Indeed, at one of the wealthiest universities in the world, in the richest country in the world, I have been pushed to live near the poverty line for many of those years. Through its policies, both big and small, MIT has made my life as a graduate student financial torture as I struggle to complete my studies. I have been threatened with eviction. I have been forced to forego essential medical care for my spouse and myself. And I have nearly dropped out of school entirely because I could not afford to remain.

I want to note upfront that I am not writing this article to seek any kind of charity, nor to seek action against any particular MIT administrator. In fact, I will refuse both of these if offered, so even if you are sympathetic — and I do appreciate it! — please do not reach out. Rather, in this piece I hope to show that the issues I face are structural, created by MIT's own policies, and faced by many, many graduate students across the university. I only tell my personal story to illustrate the larger struggles we students

# My graduate stipend is not just my own salary; it is my family's income.

Given U.S. laws disallowing my spouse to work, I am meant to support my family — my partner and child — on my graduate student stipend. Put differently, my graduate stipend is not just my own salary; it is my family's income. Unfortunately, MIT's own policies make it nearly impossible to live on a \$30,000 salary.

While housing costs in Cambridge are astronomical for everyone, MIT does little to help international students who are limited by law in how much they can work. The U.S. Department of Housing and Urban Development defines those who pay more than 30 percent of their income for housing as cost-burdened. Those who pay 50 percent or more are *severely* rentburdened. Towards my MIT housing, I pay about *70 percent* of my family income for rent. And this is the cheapest option that my family qualifies for. MIT provides no additional subsidy, even for students in its

own housing. As a result, I live in "shelter poverty": unable to meet my basic needs because of extraordinarily high housing costs

Given how I have to monitor money, I have occasionally been a few days late paying the registration. One time, after being three days late, I was charged a \$100 late fee and was threatened with eviction if I did not pay. This, by an institution that has, by its own rental structure and stipend amount, forced me into this position of stretching every dollar.

As if these housing costs weren't bad enough, MIT's exorbitantly expensive family health insurance plan (\$400 per month) puts further strain on my family. Then there is the seemingly minor — but for people like me, huge — \$50 per month student life fee. That leaves us with less than \$60 a week to pay for food, transportation, and any other costs that may arise — including co-payments.

### My spouse and I never go to the emergency room on the weekend, even if we have to deal with the pain and illness until Monday morning.

While there have been crucial steps taken over the past two years by the Division for Student Life, including the Family Food Grant, TechMart, and the SwipeShare program, MIT has made a series of unfortunate changes to its policies that make even living on that amount all but impossible — policies that, had students living paycheck to paycheck like myself been consulted, perhaps never would have been made.

Two years ago, for instance, MIT doubled its co-payment for emergency room (ER) visits outside MIT Medical to \$100. Soon after, they cut the hours of the MIT Urgent Care to half a day (8:00 a.m.-7:30 p.m.), with even more limited hours for pediatric services, especially on the weekend. Even in those limited hours, the pediatric service is not usually available, and I am almost always told by Pediatrics to either visit an ER outside MIT or file a complaint with MIT Medical.

One particularly harrowing story illustrates how these changes have impacted our family. A few months ago, for instance, my child had a high fever. We called MIT Pediatrics and explained the situation. They said there was no schedule available and that we should take our child to the ER at the Children's Hospital. At Children's, the doctors emphasized that if the fever didn't subside by the next morning, my child should see her doctor at MIT Pediatrics. We tried to schedule an appointment at MIT but were told no time was available. My child was in pain with red rashes all over her body, so we did what any normal parent would do: took her back to the emergency room. Going back to MIT a third time, we were again told no appointment was available — and so went back to the emergency room for the third time.

Thankfully, my daughter got better within a week, but the effects lingered. That episode caused incredible stress for my wife and me over my daughter's health. In addition, given MIT's policy changes, I had to pay \$300 just in co-payments — more than my entire budget for a month. MIT must do better to ensure its own students can afford health care for their families.

As a result of these seemingly small and externally-caused changes, I live in fear of the weekends. Why? Because — terrible as it sounds — I feel anxious that my child might require medical care, resulting in copays that I cannot afford. So while everyone else is looking forward to a couple days off, each Friday afternoon is a portent of fear for me: what do I do if my child needs to go to the hospital?

My spouse and I never go to the emergency room on the weekend, even if we have to deal with the pain and illness until Monday morning. But we cannot do the same for our child. So when a friend kindly says, "Have a great weekend, longweekend, or holiday," that simply means to us, "Hope your fears won't come true this weekend."

We always prioritize the health needs of our child. But as a result, our own health deteriorates. I cannot purchase a pair of eyeglasses that MIT Medical has emphatically recommended me to wear for two years now, nor can we seek dental care that we need, because these medically-necessary items have turned into "luxury goods" for us. Any parent would make such sacrifices for their children. This is the level of sacrifice I make every day.

MIT made these changes without consulting the students that would be impacted the most by them. And so, one of the wealthiest universities in the world is forcing its own students to put off essential medical care in order to save for co-payment costs of their children.

# I pay about 70 percent of my family income for rent.

Living under this financial strain brings a toll on my mental health and that of my family — questions that MIT never asks in its multiple surveys of, and gestures for, students' mental health. There have been questions of how a student's family health may impact their financial situation, but MIT should recognize the reverse.

I have received tremendous support from my own department (DUSP) and have had only those caring staff and my incredibly supportive advisor to turn to. But unfortunately, the MIT administration, despite my multiple requests of them over the past six years, has not shown even a tiny portion of the same support.

Even worse, MIT has often passed my stories to my department people despite my having shared them in private. The attitude of "you're lucky to be here" or "you're responsible for your ordeal" is

Student Support, Page 5

### **OPINION POLICY**

**Editorials** are the official opinion of *The Tech*. They are written by the Editorial Board, which consists of Publisher Áron Ricardo Perez-Lopez, Editor in Chief Jessica Shi, Managing Editor Ivana Alardin, Executive Editor Nathan Liang, and Opinion Editor Fiona Chen.

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

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### MIT is not helping students who need it the most

Student Support, from Page 4

pervasive wherever I turn to. For example, when I asked an MIT administrator to waive the punitive hold-fee to register for the next semester because I was only one week behind in paying my balance, they shouted at me in a crowded room: "MIT is not a charity organization. Channel your indignation to other offices that should deal with that!"

Embarrassed, I went to the other office they recommended. There, I was asked a range of disturbing and very personal questions cloaked in kindness and concern. "The Institute has always been very clear about the living costs that you should expect as a student, yet you have accepted the offer of admission and, worse, had a child, knowing that you will face difficulties meeting these costs?" Again, I blamed myself and left the room.

I understand the MIT policy (section 8.3.1) that "stipends are not intended necessarily to cover the full cost of living." But how can students like me survive, let alone remain sane, when the current stipend covers at most a quarter of the living expenses that MIT itself has calculated? This is particularly dire for international students, especially those coming from low-income countries, who cannot seek public subsidy programs or non-private health insurance due to the current U.S. administration's policies. Seeking public services while on a non-immigrant visa would disqualify us from obtaining immigrant visas afterwards.

Of course, MIT is limited by U.S. law around international students, but subsidizing housing for those in need and providing flexibility for those living paycheck to paycheck, is the least it could do to live up to the "heart" at the core of its mantra.

Imagine the outcomes if MIT invested more in its students' quality of life than in fossil fuel companies. Imagine the outcomes if MIT administratiors opened their eyes to

the realities of students' lives rather than constantly asking them to open their hearts for this mental health officer or at that counselling service office. Imagine the outcomes if MIT put more resources to overhaul its unjust structure than it does to redevelop half of Cambridge. Imagine the outcomes if MIT administrators, instead of deliberating on whether or not to accept money from an accused sex trafficker, deliberated on how to make pediatrics and childcare services more available to its students.

I would prefer not to publicly discuss these issues: the opprobrium of being associated with financial difficulty haunts our dignity as students, as parents, and especially as internationals. The moment you divulge your ordeal with a friend, a staff, or a faculty member, your relationship with them changes forever: conventional people see you as a rent-seeker, and progressive ones take pity on you. That's loneliness. This leaves me with only a very small circle

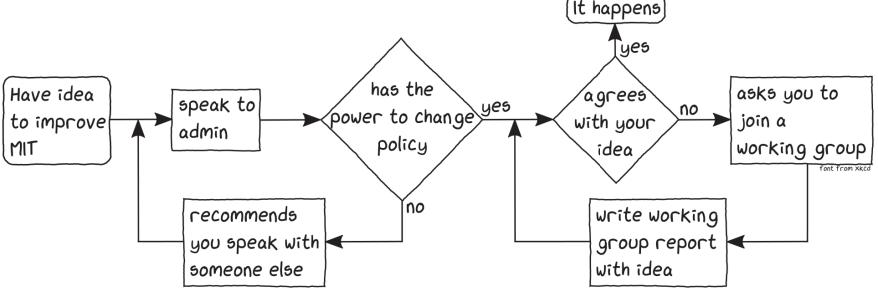
of friends with whom I can comfortably but very occasionally speak.

Yes, I have fears for my future, but I also hope for the future of my family as well as the future of others. So, I share my story so other graduate students know that they are not alone in their suffering, that they can be heard as well. And if doing so comes at the cost of my bearing the ignominy of financial predicament, then let it be.

Yes, I feel lucky to be here. And I am proud that I try to study hard while sometimes — when legally allowed — working four jobs to provide for my family. But I also feel that as students, we deserve better. I feel that MIT needs to live up to its reputation as one of our world's finest universities by treating its graduate students with the respect they deserve.

B. Mano is a shortened name of the author (bmanouch@mit.edu), who would like to preserve some online anonymity for per-

### MIT's Activist Trap by Mark Goldman



Trap 1: No one knows who can make change. You hop between admins forever.

Trap 2: Even if the report contains the idea, the admin still won't like or implement it.

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**By Opinion Writer** 

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6 THE TECH
THURSDAY, OCTOBER 31, 2019

### **MUSICAL REVIEW**

# It's a Bikini Bottom Day

The SpongeBob Musical is a nostalgic yet progressive feel-good musical

### The SpongeBob Musical

**Book by Kyle Jarrow** 

Directed by Tina Landau

**Boch Center Wang Theater** 

Oct. 15-27

By Mahi Shafiullah

STAFF WRITE

As I walked into the theater hall in the Boch Center to enjoy The SpongeBob Musical, the first thing to catch my eye was the contrast between the stage and the rest of the hall. In the early twentieth century buttressed theater, the technicolor stagecraft was like a fish out of water. The second surprise was probably the median age of the audience, a good twenty years lower than what I had expected. Both of these were misleading, as I found out. The musical itself was so immersive that, once it started, I barely had time to take stock of the theater. And while the majority of the audience was children, the musical wasn't just light hearted banter; SpongeBob makes an effort to address some serious issues through music worth rocking out to.

SpongeBob's greatest gem is the incredible score. The musical takes us through a whirlwind tour of different genres; popthemed songs like "Bikini Bottom Day"

exists side by side with "No Control" (rock)or "When The Going Gets Tough" (hip-hop). Not only do the tunes get stuck in your head, but also the lyrics are enough to make you fall in love with the characters immediately. The individual songs carve out the outlines of each character well enough that, even with near-zero knowledge of them, I found them quite relatable. Although a star-studded list of songwriters and bands like Panic! At the Disco, T.I., Sarah Barellis, or John Legend seem certain to succeed in hindsight, Tom Kitt's musical direction and orchestration definitely deserves credit for the incredible way he ties them all together.

As if to compete with Tom Kitt's incredible music, Kyle Jarrow built a fantastic multi-layered story that is equally enjoyable for both the kids and the adults. The kids may be entertained by the characters' sometimes reasonable, sometimes stupid, but always hilarious actions. But in my opinion, the greatest achievement of the musical is to thread together disparate themes like friendship, social hysteria, identity, and racism in such a cheerful, bright package, and address all of them with the gravity they demand. SpongeBob (Lorenzo Pugliese) and Patrick's (Beau Bradshaw) friendship, their separation, and finally, their reunion was definitely an enjoyable plotline. How closely their friendship was tied to their identity, and how this tension was explored by Jarrow, was a great exhibit. At one point, the residents of Bikini Bottom decide to blame Sandy Cheeks (Daria Pilar Redus) for the coming disaster. The similarity with Sandy being the only land mammal and Redus being the most prominent black charac-



COURTESY OF JEREMY DANIE

The company of *The Spongebob Musical* assembles on stage. ter in the cast was quite ironic. Similarly. Creating an under

ter in the cast was quite ironic. Similarly, it's hard to think the portrayal of the sardines who follow a simple "savior" whose solution to armageddon is closing his eyes wasn't intentional.

Out of the cast, Lorenzo Pugliese shines the brightest as the titular character, which he plays with every bit of gusto it deserves. I was dubious given his inexperience in Broadway level productions, but that never seemed to matter even a bit. His companions, Bradshaw and Redus, also owned the stage in their character and the two-dimensional characters spring from TV to life. From the secondary characters, Christopher Cody Cooley as Squidward and Tristan McIntyre as Sheldon Plankton were the most memorable, both for their faithful portrayal of the characters, and the panache with which they did it.

Creating an undersea environment on a stage isn't easy, but the stage directors made it so. The mesh of old-school techniques with projections on stage brought the cartoon world of Bikini Bottom to life that day in Boston. Similarly, walking into the theater I knew the characters wouldn't look the same as the cartoon, but the uncanny impression made by Squidward's double legs was indeed quite impressive.

SpongeBob never takes itself seriously, but the number of serious messages it manages to pass to the audience is admirable. It serves as simple entertainment, an uplifting message, and a clever exposé of some of our social problems, all at the same time. The show itself almost reflects one of the ballads, "Not a Simple Sponge"; both SpongeBob and his eponymous musical are much more than that.

### **MOVIE REVIEW**

# Do not go gentle into that good light

Robert Eggers' *The Lighthouse* is a stunningly beautiful experiment in the horrors of cabin fever

By Shreyan Jain

A pitch black screen and the sound of crashing waves — from this void, we are born into the world of Robert Eggers' latest period masterpiece, *The Lighthouse*. Its first scene plunges us into the sea itself. Howling winds, the water churning into ice cold sprays of mist, and a rickety boat shuddering against the storm; we might as well be watching the river Styx carry a pair of damned souls into the very depths of the Underworld. No wonder the film, shot in black-and-white on location off the coast of Nova Scotia, never quite seems to shake loose its bleak, dismal opening shot.

When the boat finally arrives at its destination — an island that is little more than a bare outcrop jutting out from the middle of the sea — it leaves as quickly as it deposits its cargo: "wickies" Ephraim Winslow (Robert Pattinson) and Thomas Wake (Willem Dafoe), who have arrived to man the titular lighthouse for the next four weeks. Over the following days, the men step into an uneasy routine. While Wake mans the lantern room at night, Winslow spends each day toiling away at menial tasks under Wake's suffocating supervision; he carries containers of kerosene up narrow staircases, paints the wind-scraped walls of the tower. and repeatedly sweeps and mops the floor. The monotony of daily existence, coupled with a nagging doubt that Wake is hiding something, slowly gnaws away at Winslow. He quarrels with seagulls, obsesses over a buried mermaid figurine, and gives into increasingly hallucinatory fantasies, eventually losing his grip on reality.

The first thing that needs to be said about *The Lighthouse* is that the visuals are downright stunning. In building his world, Eggers favors establishing shots and extended closeups over elaborate camera movements. The still cinematography and rich, crusty texture of the film (which was shot on 35mm) immerses the audience into the quiet, unsettling isolation of life at sea. And by intercutting scenes from Pattinson's perspective with jarringly quick shots of the supernatural — a mermaid lying uncon-

scious on the beach, or Wake's face contorting with pleasure as he stares into the light of the lantern — Eggers blurs the line between reality and fantasy until the audience no longer has any idea what to believe.

When I had the privilege of meeting with Eggers just a few days before *The Lighthouse* released, our short conversation revealed that the film's captivating visuals were born out of a deliberate and careful attention to detail. In Eggers' own words, the decision to shoot in black-and-white was made to "convey the bleakness and austerity of the film." But cinematographer Jarin Blaschke also passed the film through an orthochromatic filter, since such film is not sensitive to red light, it vividly emphasizes every pore and blood vessel on Pattinson and Dafoe's faces, giving the impression of "salty seamen," while also rendering blue skies white and bleak. Eggers' contagious excitement about such technical details of the film display the inner workings of a brilliant auteur who has painstakingly assembled every piece of the film.

Pattinson and Dafoe prove the perfect match for Eggers' creative vision; every movement, glance, and retort underscores the tension bubbling between the two men as they bristle under the discomfort of living in such close quarters. The film's preferred currency of communication is visceral: we see Winslow and Wake's bodies belch, fart, sweat, spit, and drink within the cramped corridors of the lighthouse. Pattinson in particular excels as the inexperienced lighthouse keeper who chafes under Wake's stifling, authoritarian presence. Eggers emphasizes Pattinson's every movement, grunt, and grimace until he is reduced to little more than an animalistic body. At one point, when Winslow attempts to empty a bedpan into the sea only to have the wind smear his own feces all over his face, all he can do is let out a primal scream.

Wake, the lighthouse veteran who is as grizzled as his bushy mane, is outspoken by contrast; with his folksy dialect and superstitious beliefs, he might as well have stepped out of an Elizabethan sonnet. "Bad luck to kill a seabird," he cautions Winslow,

a logger uninitiated into the traditions of sailors and seafarers. The repeated references to Coleridge, Melville, and the mythology of the sea gain a distinctly new power under Dafoe's masterful delivery, painting his character with an aura of nefarious mystery while also foreshadowing several of the story's central developments.

If Eggers carefully relies on Western European nautical traditions and folktales of lighthouse keepers going mad in constructing his film, then he also draws from a distinctly more modern mythology: that of social theorists Jeremy Bentham and Michel Foucault. The lighthouse, in all its imposing verticality, can be viewed as a panopticon, the watchtower within which Dafoe's overbearing patriarch documents every day in a locked away notebook and jealously guards his prized lantern. It's unsurprising then that Winslow feels increasingly on edge as the film progresses; notice how, each time he attempts to commit some transgression, Wake emerges at once from some unseen corner, as if every single one of Winslow's actions is being monitored. It is by arousing this feeling of being constantly watched, of being imprisoned, that Eggers seeps his film in an atmosphere of sin: sin against nature, the deeper, more hidden sin of murder, and the historical sin of slavery itself.

The film's greatest genius lies in using its aesthetics to emphasize these narrative suggestions. By shooting the film in a boxy, skinny aspect ratio, Eggers simultaneously fills the screen with his characters' faces while also surrounding them at all times with two large walls of black on either edge of the screen. But Eggers goes one step further. He shoots The Lighthouse as if the film were taking place within a whole series of frames: the wooden frame of the interior of the lighthouse inside which almost all of the film's action takes place; the sonic frame of the omnipresent foghorn that punctures the environment at regular intervals; and the larger structuring frame of mythology and allegory itself, in the form of the countless allusions to Greek sirens, Neptune, and the sin of "killing seabirds." It is through these tightly packed, nested frames that Eggers constructs

The Lighthouse

Directed by Robert
Eggers

Screenplay by Robert
Eggers and Max Eggers

Starring Robert
Pattinson, Willem Dafoe

Rated R, Now Playing

the richly claustrophobic atmosphere of the film, as if the audience is imprisoned within the confines of the lighthouse right alongside Pattinson as he proceeds breakneck towards his inevitable fate.

If there is a weakness to the film, it is by design. The film functions more as a meticulous experiment in mood and tone than as a clearcut, engaging narrative. Some viewers may be confused or turned off by the ambiguity of the film, which resists tidy explanations and ends with a surrealist final scene that offers more questions than answers. But Eggers relishes in how the multiple layers of the film leave it open to interpretation. When I probed him about his decision to "break the 180" in the nightlv dinner table conversations by repeatedly switching camera positions so that Wake and Winslow keep changing places in the frame, he acknowledged the thematic undercurrent of identity without clarifying his intent in such scenes. Is Wake merely another of Winslow's fantasies, perhaps of his own future self? Is Winslow an unreliable narrator, insane, or simply the victim of a maliciously dishonest Wake? And what are we supposed to make of that dazzling final shot? Audiences will have to answer such questions for themselves, but one thing is for certain: Eggers is a master craftsman, and he's just getting started.

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### **EVENT REVIEW**

# A day in Boston's book oasis

Writing Beyond Binaries talk at the Boston Book Festival 2019

**The Boston Book Festival** 

**Copley Square, Boston Dudley Square, Roxbury** Oct. 19-20

> By Lulu Tian STAFF WRITER

The Boston Book Festival (BBF) is an annual celebration of authors, readers, and the brilliant community that comes from books.

The event took place this year on Oct. 19-20,

centered around Copley Square on Saturday,

while on Sunday, it took place in Roxbury.

Through workshops for writers, fascinating speakers, and interactive events for everyone from children to adults, this weekend is a buzz of heartwarming enthusiasm for literature and learning. With NPR as the festival's presenting partner, many well-known speakers such as Meghna Chakrabarti, host of NPR's On Point, and Marie Lu, author of YA series Legend, participated in events.

Checking their website in advance, I found that each day had an astonishing number of events — over 100 on Saturday! From workshops for aspiring/current writers to discussions about climate change or the criminal justice system to storytimes for children, this festival touched upon every possible slightly book-related interest. Although a little overwhelmed, I was amazed to see how many people were involved enough in this writing community to host and speak at these events.



Attendees of the Boston Book Festival sit on the steps of Copley Square

On Saturday, when I got to explore the festival, I was even more fascinated by how many people flocked to Copley. The area was filled with banners and volunteers wearing red shirts. Copley Square was a palooza of advertiser booths, book tents, and activities. Bookstores like the Brattle Book Shop had carts with books at discounted prices, independent publishers displayed their works under their tents, and organizations like the Boston Public Library and Boston Cultural Council had people you could speak to about the role of arts and humanities in the Boston community. Bustling, sunny, and teeming with stimuli, Copley Square on this day was a book lover's paradise.

I attended one talk in the "BBF Unbound" category called Writing Beyond Binaries, located in a venue on Boylston Street. The conversation focused around transgender and nonbinary representation in books and amongst authors, a relevant topic that I hardly hear discussed. Accomplished writers from across all genres, including mystery, poetry, and the graphic novel offered their insights into the publishing process as well as their own personal growth as nonbinary people, including Alex Marzano-Lesnevich (The Fact of a Body), Gabe Cole Novoa (writing as Ava Jae; Beyond the Red Trilogy), Cameron Awkward-Rich (Transit, Sympathetic Little Monster), Alex Myers (Revolutionary, Continental Divide), Lisa Bunker (Zenobia July, Felix Yz), L. Nichols (Flocks), and Kay Ulanday Barrett (When the Chant Comes).

The authors spoke to an audience of around sixty people and among themselves in a very down-to-earth way, often sharing laughs and building upon what the others had said. Although the mood always remained cheery, the authors shared their struggles, not only related to their sexual/ gender identity, but in the case of Kay Ulanday Barrett and Gabe Cole Novoa, with chronic pain, or as Cameron Awkward-Rich brought up, with people less willing to discuss "the craft" of writing as opposed to social justice implications. Through the conversation it became clear that each writer had to think about the balance between spotlighting advocacy for the LGBTQ+ community through writing and focusing on the technical skill and caliber of their "craft." What is seen as bold splashes of representation by the diversity-dry mainstream landscape is really how the authors already perceive the world to be and expect their work

Inevitably, publishers tried to censor the content of the authors who included more sexually explicit stories and "rainbow characters," as worded by Lisa Bunker. Even with a great publishing team full of nice people, the process of creating unique narratives is met with endless editing, marketing, and personal trials. However, the writers retained an inspiring degree of positivity. Alex Marzano Lesnevich described their experience promoting their novel in a village in France, where the people had no idea about gender binaries, but a hundred people showed up to learn about the topic. Many authors shared the same sentiment, especially finding it amazing to be sitting at this event next to other currently prominent nonbinary authors. Their creativity and interest in the genres and stories of the other authors really spoke to their passion for writing and created a real, intelligent conversation. I only wish that there were more natural inclusion of the audience in terms of questions and interactions. However, even as a pure observer of the authors' conversation. I found the event enjoyable and informative. Moderated fluidly by writer and teacher Milo Todd and very well-organized, this "BBF Unbound" discussion created the space needed to highlight a crucial narrative and wonderful talent.

### **CONCERT REVIEW**

# We're all Earthgang

Earthgang performs at Middle East

**Earthgang** Middle East Oct. 21

### By Victoria Dzieciol

Earthgang is the stage name of a pair of rappers, Olu and WowGr8. Known for their off-center sound and lyricism, the two have earned a large audience and have collaborated with big names in hip hop like J. Cole. To kick off the release of their latest album, Mirrorland, Earthgang came to Middle East in Cambridge to perform.

The first act of the show was Benji. With st over 2 thousand monthly listeners on Spotify, he's pretty unknown, but after watching his performance, I'm definitely going to check him out. His regular street clothes matched the informality of his short set, during which he playfully joked with the audience and dapped up the people in the front. It was clear he was still a bit of a rookie; he didn't necessarily do anything special, and he did have a pretty underwhelming beat drop in one of his songs after hyping it up to the audience. But he did perform a variety of songs that I could see myself chilling to in the future, with a lyrical sound somewhere between Chance the Rapper and Aminé.

Duckwrth took the stage next and brought a completely different feeling to the show. Wearing an all-white outfit and

almost constantly bouncing around and dancing as he rapped, Duckwrth made it a point to put on a show. His songs were just as energetic as he was, and even the slowest parts were pretty upbeat. A guitarist accompanied Duckwrth, which gave his songs a unique sound that made them even more fun to dance to. The bass was incredible, and I could really feel the music, but it was a little hard to hear his voice clearly over it. Still, it seemed that Duckwrth wanted to emphasize the sound and energy of his songs more than the lyrics, so I didn't feel like I was missing out too much by not understanding every word he said.

Finally, it was time for Earthgang. In a hip and unique style that matched the feel of their music, Olu showed up in a white fur coat and colorful headwrap, while WowGr8 wore overalls and a collared shirt. Earthgang combined all of the best parts of their two opening acts. They radiated confidence and energy and turned the show into a party just as Duckwrth did. There was barely a moment where they stopped dancing, and Olu worked up such a sweat that, by the end of the show, he had removed both his coat and headwrap. They were also as playful and lyrically-focused as Benji. They involved the crowd in the performance, throwing water on the audience and inviting volunteers to dance on stage. They made jokes throughout the night, including pretending to leave halfway through the show as if the concert

The theme of the show was encouraging harmony among all types of people. Olu and WowGr8 rallied the crowd by having them chant "Earthgang," uniting them into one

voice. Halfway through the night, the duo gave a short speech that dismissed racism, sexism, and all other types of prejudice. And for the duration of the concert, WowGr8 kept repeating, "I am Earthgang. You are Earthgang. We are all Earthgang." They addressed real issues through their music and placed as much emphasis on the meaning of their songs as the sound.

To be honest, I was initially nervous that the duo would be slightly disappointing. I didn't love Mirrorland as much as some of their older music, but something about hearing them live made even the songs I didn't like as much sound amazing, and the duo also mixed in a good number of their songs from older albums or Revenge of the Dreamers III by Dreamville. My only real complaint was that for a good amount of the time, the DJ was just playing the song and Olu and WowGr8 weren't actually rapping, although I don't know if that's typical because this was my first time going to a rap

Overall, I had an incredible time. Great music, a meaningful message, and a fun environment made Earthgang's concert one of the best I've ever seen.



WowGr8 (left) and Olu (right) of Earthgang perform for an excited crowd in Middle East Cambridge Oct. 21.

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**MOVIE REVIEW** 

# Moses is a woman

Harriet delivers thrills, chills, whistles, and frills

**★★★☆** 

### Harriet

**Directed by Kasi** Lemmons

Screenplay by Gregory **Allen Howard and Kasi** Lemmons

Starring Cynthia Erivo, Leslie Odom Jr., Joe Alwyn, Janelle Monae

Rated PG-13, Playing Nov. 1

### By Nyssa Miller

Araminta "Minty" Ross was born into slavery in Maryland around 1820, the fifth of her enslaved parents' nine children. Her father was ultimately granted his freedom per arrangement by their first slave owner; however, even though a similar arrangement was made for Minty's mother, their current owners denied the manumission.

Minty was frequently ill following a head injury by an overseer, and when her condition worsened in 1849, her owners attempted to sell her. Unwilling to be sold like many of her own siblings, Minty ran away to the North. Minty changed her name to Harriet Tubman, and up until the Civil War, Harriet returned to the South to rescue 70 more slaves from bondage, earning herself the name "Moses."

Harriet follows the life of Harriet Tubman (Cynthia Erivo), starting shortly before her escape and focuses on her several forays back to the South to save dozens more slaves. Even though we all know how the story ends – slavery is abolished and Harriet survives to the ripe old age of 70 — the film is so captivating that you'll still find yourself on the edge of your seat. Director Kasi Lemmons finds a good balance between adrenalinefilled sequences and feel-good moments, all without sugarcoating the atrocities committed against slaves and free blacks.

Erivo's spectacular acting is both captivating and compelling. Erivo slips into Harriet's skin and wears her convictions and passions on her sleeve. Her performance weaves strong religious notes throughout the story and truly fleshes out the likeness of one of America's most prominent and influential heros.

Yet where Harriet leads in story it lacks in emotion. Most of its emotional scenes arise not necessarily out of the passions of the characters but more out of the visceral imagery Lemmons presents. Because this is a historical film — and a film that follows a well-known history — it pays to focus less on events and more on the people. When Harriet faces exceptionally difficult moments, like when she returns to Maryland for the first time after running away, her decisions seem less motivated by passion than by choosing to move the story forward. Had Lemmons spent more time developing Harriet's emotional story arc, this film could have been a real Academy Award contender.

Slavery is a heavy and very personal subject in American history. Where other films float on the surface of the topic, *Harriet* takes the audience into the deep end of slavery and the fight to prove that all people are created equal. Harriet Tubman was an incredibly courageous woman, and Lemmons's film honors her strong will and unbreakable spirit.



Cynthia Erivo stars as Harriet Tubman in Harriet.

ART EXHIBIT REVIEW

# At the intersection of art and technology

Kwade's In Between Glances is the perfect art exhibit for MIT



CASSANDRA RODRIGUEZ/STEALTH VISUALS

Visitors tour Alicja Kwade's In Between Glances exhibit at the MIT List Visual Arts

### By Victoria Dzieciol

Alicja Kwade's In Between Glances is on display at the MIT List Visual Arts Center and is a perfect fit for the venue at the intersection of art and technology.

Kwade is an internationally renowned artist primarily known for her sculptures and installations, which use ordinary found objects and transform them to make viewers question societal norms. The first pieces you see when entering the gallery are from her Reconstituted Objects series. Consisting of a chair and several vases, each on a brass

pedestal and presented in glass, Reconstituted Objects looks almost like a collection of historical artifacts in a museum. The objects don't look too special; each is made of a dull. metallic, speckled material. But the names of each piece betray their significance. A large urn titled "Computer (Powermac)" was once actually a computer, which Kwade ground into a powder to make a completely new object. Reconstituted Objects is a collection of pieces that are more meaningful than they are pretty. Viewers ponder the idea of transformation and consider the functions that everyday objects play in their lives.

Just past Reconstituted Objects is a group of three large carved tree trunks. Kwade used a robot arm to cut partial stools, coat racks, and canes out of the wood with great detail. Object-Tree Works seems almost out of place, natural and unpolished in contrast to Kwade's other, more carefully refined works. It's also the hardest to understand at first and were definitely my least favorite pieces of the show. That being said, it is interesting to look at and made me think about the relationship between material and final

To the left, an abacus hangs on the wall, so small that it's easy to miss. On the ground below it most of its beads are scattered, which for a moment I thought someone forgot to clean up. But the piece has a very contemplative feel to it that brings up questions of how things are measured and given value.

Trans-For-Men 11 (Fibonacci) is the star of the show, the row of rocks and mirrors shown in all the advertisements for the exhibit. It's a clear representation of transformation. In the center is a granite boulder, to either side of which Kwade placed five other stones of a variety of materials from sandstone to bronze. Using 3-D scans, Kwade formed each rock to progressively transform from the shape of the boulder to the shape of a sphere on one side and a cube on the other. The mirrors placed between each rock seamlessly blend each form into the next. Trans-For-Men 11 (Fibonacci) is beautiful to look at, but it also references the connections between contrasting things, the impact of different materials, and the power of technology to record and create.

At the end of my tour of the exhibit, I walk into an adjacent room and am immediately caught off guard by the magnitude of A Light Touch of Totality. Trans-For-Men 11

In Between Glances Alicja Kwade

**MIT List Visual Arts** Center

On display until Jan. 5, 2020

(Fibonacci) was promoted the most, but this piece might be even more impressive. It's never been displayed before it was set up in the List Visual Arts Center, and it responds to the space that it takes up. It consists of five massive intersecting stainless steel rings, from which are strung hundreds of strands of beads. The beads are primarily strings of white wooden beads on which are printed letters, punctuated every now and then by blue lapis lazuli beads. It's a little overwhelming, but it's supposed to be — just like the shower of information we experience on a daily basis.

Just outside the exhibit is Kwade's painst the Run installation. At first glance, it looks like a regular clock; but when you look at it longer, you notice that with each tick of the second hand, the entire clock face turns backward. It's strangely calming to stand and watch the clock turn for a few moments, and it's a good way to reflect on the connections between the past and present.

*In Between Glances* is an exhibition worth checking out. On campus, it's easy to stop by after or between classes. Kwade's works are great to contemplate the world we live in. There could not have been an art exhibition better suited for MIT than this one.

Python Edit **Options** Buffers Tools Im-Python Help from new\_skills import \* def learnMarketableJobSkills(): return linux, OSX, javascript, applescript, perl, python, PHP if self.interest == True: print "E-mail join@tech.mit.edu" ---:---F1 joinTechno.py  LAB SPOTLIGHT

# Targeting tumors with nanoparticles

The Hammond Lab develops polymeric nanomaterials for cell regeneration and drug release

By Kerri Lu

Since its founding in 1995, the Hammond Lab has been an integral part of the Koch Institute for Integrative Cancer Research, developing nanoparticles that encapsulate and release drugs to reprogram cancer cells. Chemical engineering department head Paula Hammond '84, Ph.D '94 leads research initiatives that range from designing thin films for tissue regeneration to embedding nucleic acids into nanomaterials to silence cancer cell expression.

Hammond Lab researchers use a layer-by-layer process to create ultra-thin films that can enclose dissolved biological materials. "You are absorbing positively charged material until the charge is reversed, and then negatively charged material until the charge is reversed. And because it's a self-limiting process, each layer of material that is absorbed is only a few nanometers thick," Hammond explained. These films allow researchers to program the transport and release of proteins and nucleic acids in the body. The lab also develops materials that rapidly release peptides for blood clotting and wound

According to Hammond, a central focus of the lab is to "use these layer-by-layer nanoparticles to target tumors selectively over healthy cells, [which] allows us to design combination therapies." In particular, the lab enhances the effectiveness of chemotherapy drugs by combining them with nucleic acids such as siRNA (which silences genes that enable cancer cell survival) and microRNA (which replaces functions that were lost in healthy cells during the growth of cancer). The layer-by-layer architecture enables the "staged release" of drugs, so that researchers can block different genetic pathways in specific time frames to orchestrate cancer cell death.

Natural biological barriers, such as the blood vessels in the blood-brain barrier, often make the transport of large nanomaterials difficult. To address this problem, Hammond Lab researchers have developed ligands that use transcytosis, a process in which nanoparticles are taken in at one end of a cell and ejected from the other. Another major challenge involves the stability of siRNA. The nanoparticles must be designed so that the siRNA remains stable during its transport in the bloodstream but destabilizes once it enters the tumor cell, where it can interfere with mRNA to prevent the expression of cancer genes.

Hammond recalls several exciting moments in the lab's 25-year history. In 2006, she collaborated with Professor Angela Belcher, head of the Department of Biological Engineering, to design a layer-by-layer electrochemical battery that contained nanoscale wires made from viruses. This project was published in Science. More recently, the lab has pioneered new methods in combination therapy for tumor targeting: "We've been very excited about the fact that we can deliver nucleic acids, including siRNA, directly to wounds. For me, that means that we may be able to deliver other kinds of nucleic acids like gene editing components directly to tissues as well," Hammond said.

Currently, the lab is developing an immunotherapy for ovarian cancer. In collaboration with biological engineering and materials science professor Darrell Irvine Ph.D '00, the lab has incorporated cytokines (proteins that activate the immune system) into a new type of nanoparticle

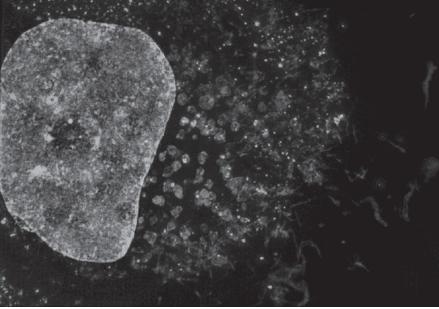
that can "sit on the outside of tumor cells rather than go inside them," Hammond said. She believes this treatment, which has been successfully tested in model mice, could potentially raise the long-stagnant ovarian cancer survival rate.

Hammond also looks forward to applying biological nanoparticles to treat resistant infectious disease. Through the Singapore-MIT Alliance for Research and Technology, researchers have used the Hammond Lab's technology to encapsulate antibiotics in nanoparticles and disrupt the protective biofilm surrounding pathogenic bacteria. "Here, instead of targeting cancer cells, we're targeting bacteria cells. Here, instead of the barrier being these epithelial, these blood vessel linings, it's this biofilm that the bacteria build," Hammond said.

More broadly, the lab aims to develop nanomaterials that circulate in the bloodstream and target different cell types, taking on immune cell functions. Looking towards the future, Hammond hopes that "if we can do that, we can not only generate disease-targeting nanoparticles more effectively and target a broader set of diseases, but we might be able to design nanoparticles that can monitor the immune state, treat the immune disease or chronic disease, and help us characterize it."

SCIENCE

SCIENCE



Ovarian cancer cells treated with nanoparticles designed to target cancer cells and



### **Broomstick**

Solution, page 3

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

Instructions: Fill in the grid so that each column, row, and 3 by 3 grid contains exactly one of each of the digits 1 through 9.

### **Cauldron**

Solution, page 3

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1-	6÷		216×		
	60×			<u> </u>	1
72×			30×		4
	12×			11+	
		6+			3

Instructions: Fill in the grid so that each column and row contains exactly one of each of the numbers 1–6. Follow the mathematical operations for each box.

12

25

39

50

19

38

42

46

69

56 57 58

31 |32 |33 |34

13

43

59 60 61 62

64

# Fasten-ating by Brad Wilber

Solution, page 3

### **ACROSS**

- 1 Taxi
- 4 Auto fuel
- 7 Vatican City boss
- 11 Common blood classification
- 13 Computer buyer
- 15 Operatic solo
- 16 Ranchland measures
- 17 Gentle, as petting-zoo animals
- 18 Small butter portions
- 19 Fastener that keeps laundry on the line
- 21 Otherwise 22 Past and present, for verbs
- 23 Occupational suffix for auction
- 25 Secret agent 27 Classroom boss
- 31 Hollywood cops' org. 35 Western defense alliance
- 37 Sportscast replay speed, for short
- 38 Not very friendly
- 40 Go bad, as fruit

- 41 Bashful
- 42 Christmas song
- 43 Hand out cards
- 45 Cats and canaries
- 46 Main dinner courses
- 48 Fall behind 50 Room for science
- experiments 51 Catholic Church services
- 56 Vicinity 59 Fastener that keeps pants
- 63 Small fruity pie
- 64 A Great Lake
- 65 Mark on an exam
- 66 Majestic story 67 Beavers' river blockers
- 68 All gone, as one's lunch
- 69 Engrave deeply
- 70 Prepare, as an alarm clock
- 71 Pay-\_\_-view movie

### **DOWN**

- 1 Ride a bike
- 2 Cook's cover-up garment
- 3 Deep red veggies

- 4 Courage, informally
- 5 Without delay, in memos
- 6 "Half" prefix for final
- together
- 8 Of the mouth
- 10 III-at-\_\_ (edgy)
- 11 Diplomatic skill 12 Campfire residue
- 20 Sports cable channel
- 26 Golf course distances
- 28 "There's no place like \_\_"
- 30 Fishing sticks

- 33 City where ships dock
- apartment shut
- 39 Pest on a pooch
- 44 Baby sheep

- 7 Fastener that keeps pages
- 9 Centers of peaches

- 14 Actress Zellweger
- 24 Toward the right, on maps
- 27 Sum's bottom line
- 29 Give off, as light
- 31 Doily material
- 32 Actor Alda
- 34 Fastener that keeps an
- 36 Tip of a sock
- 47 Receded, as a tide
- 49 Tire pressure checker
- 52 Metal in a junkyard 53 Ice hockey footwear
- 54 First-born of two

55 Viewed

56 Suit to \_\_ (fit just right) 57 Totally attentive

65

68

15

18

21

23 24

- 58 Guitarist Clapton
- 60 Historical periods
- 61 Green citrus fruit 62 Try out

### Vassar New



a comic about life at the 'tvte



Wolcome, everyone, to the reveal of our newest dorm!



And now, please welcome ..



### **Black Cat**

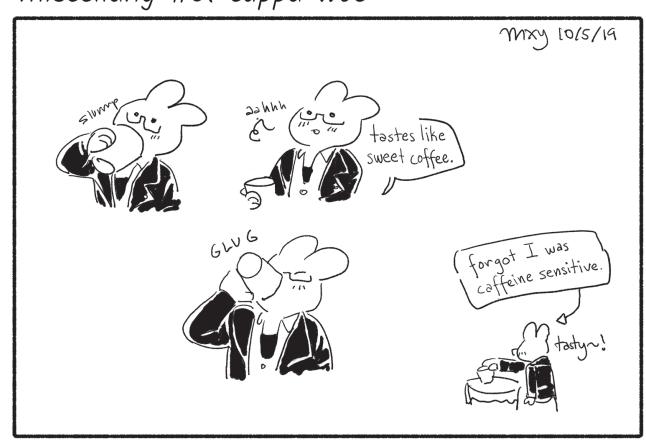
Solution, page 3

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				2	<b>-</b>	3–		<del> </del>
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Instructions: Fill in the grid so that each column and row contains exactly one of each of the numbers 1–9. Follow the mathematical operations for each box.

# miscellany #5: cuppa woe





# SSPORTS SPORTSSPORTS

### **FIELD HOCKEY**

# MIT Women's Field Hockey beats Clark University

MIT Women's Field Hockey secure an 8-1 win

By Suleman Thaniana

The festivities of the match began by honoring Devon Goetz '20 and Taylor Grey '20 for their contributions to the MIT Women's Field Hockey program during their four-year careers. Because the match took place over Family Weekend, the families of both seniors were present to celebrate their achievements.

The Senior Day celebrations continued as MIT gained an excellent first quarter start with two goals by Amanda Garofalo '21 and Jenna Haque '21. Haque's goal was unassisted, coming on a backhand, while Garofalo's goal came from outside the circle. The team continued the second quarter in the same fashion as Goetz scored an early goal off a pass from Paige Forester '23. Another goal by Garofalo followed, coming off an excellently set up penalty corner. The first half ended with a 4-0 lead for the Engineers.

The third quarter was dominated by a show from Forester



BEN KETTLE—THE TEC

**Devon Goetz '20 and Jennah Haque '21 protect the ball** from defenders in Saturday's 8-1 win against Clark..

as she scored two goals, then assisted one, scored by Delia Stephens '21. During the last quarter, Anna Joyce put Clark up on the board with a goal. Goetz eventually scored another goal, and the match ended 8-1.

Throughout the match, Goetz finished with two goals and three assists, Forester with two goals and two assists, and Garofalo

with two goals. As a whole, the Engineers outshot Clark by a 43-3 margin and attempted 16 penalty corners, while Clark attempted only one penalty corner. This victory marked the 50th win for the senior class. The team will conclude the regular season on Saturday, Nov. 2 with an away game against Springfield College beginning at 1 n m

### Friday 1st

### **Rifle** vs. Wentworth 6:00 p.m.

Men's Squash
vs. Boston University
5:00 p.m.

Men's Squash vs. Boston College 6:30 p.m.

### Saturday 2nd

Men's Water Polo vs. Iona 12:00 p.m

Men's Water Polo vs. St. Francis 5:00 p.m.

Football vs. WPI 12:00 p.m.

### **Sunday 3rd**

THURSDAY, OCTOBER 31, 2019

Men's and Women's Cross Country

at NEWMAC Championship at Franklin Park Men's Race—11:00 a.m. Women's Race—12:00 p.m.

### **Tuesday 5th**

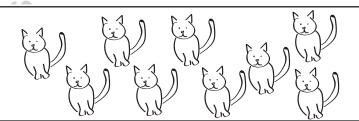
Men's Soccer NEWMAC Tournament

Women's Volleyball NEWMAC Tournament

Field Hockey NEWMAC Tournament

Men's Basketball at Harvard 7:00 p.m.





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