CMS.339 Virtual Reality and Immersive Media Production

Massachusetts Institute of Technology

MITVR
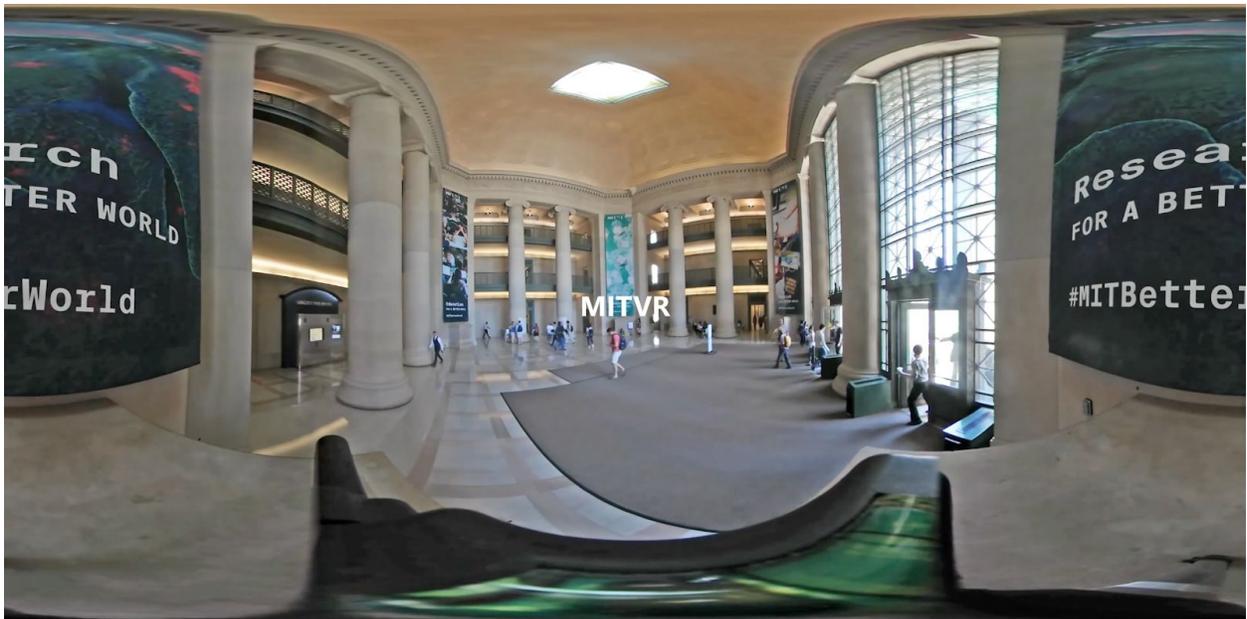
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Every year, more than a thousand high schoolers receive their admission letters to MIT. Elsewhere, there are those who are interested in MIT's research, culture, and history. These people might not have the chance to travel and visit MIT's campus, or if they do, they might miss out on important aspects of MIT culture that make the institute a special place for its students.

With MITVR, we've created an interactive 360° tour of MIT that allows anyone to explore our beloved campus. With an audio narration, 360° video experiences, animations, and teleportation between MIT spots, we're able to bring anyone to MIT.

1 Project Outline

1.1 Experience Summary

When a user loads up MITVR, they will appear in a 360° video scene of Killian Court. The user will see a 1-minute video clip of the scene, accompanied with an audio narration describing the culture, history, or other stories related to Killian Court.

The user will also see arrows pointing to different locations, which they can point to in order to switch the scene. With MITVR, we currently have a total of 10 scenes, each situated at different areas of MIT. The scenes include Kresge Lawn, the Number Man, Mass Ave. Crossing, Lobby 7, Killian Court, Hayden Library, Stata Courtyard, Inside Stata, an MIT classroom, and the Media Lab.

1.2 Related Work

There are various immersive experiences that utilize 360º footage for campus tours. For example, YouVisit provides virtual campus tours that include 360º media and interactive elements. One disadvantage of YouVisit is that it primarily uses 360º photographs, not videos, and its tours sometimes include non-360 media, making it a confusing experience that seemingly breaks viewer immersion.

There's a fantastic YouTube video series by *MITK12Videos* that captures different points around MIT with 360º video. However, the videos do not include narration or animations, and there is no localization for switching videos. Instead, the user must exit the video and change the video using YouTube's user interface.

1.3 Vision

With MITVR, we take ideas from this related work, such as a focus on 360º video and interaction, and we enhance the experience in two main ways.

First, we focus on the storytelling aspect of our experience by not only capturing a wide range of scenes at MIT, but also a narrative from the perspective of an MIT student tour guide. Instead of simply describing a building or an area of campus, we talk about the cultural significance of it to MIT students as well as personal experiences and stories revolving that scene.

Second, we cared about making our experience an immersive and interactive tour of MIT. In order to do so, we allow users to transport to a different scene by pointing towards it, instead of having to switch to an external user interface or not giving the user the option of interactivity at all.

When choosing which film locations, we realized that with MITVR, we can take viewers into areas that regular tours at MIT do not, such as the MIT tunnels or the Media Lab. We believe that by using immersive technologies, we can enhance both virtual and real campus tours.

1.4 Technologies

To create MITVR, we used the Samsung Gear 360 camera to capture our footage. We recorded the audio narration for all our scenes using the recording studio in the MIT Lewis Music Library. There, we used the provided boom mic to record the narration. These audio clips were then edited within Reaper, which is a complete digital audio production application for Windows and OS X, offering a full multitrack audio and MIDI recording, editing, processing, mixing. We then edited the videos using Gear 360 ActionDirector, Adobe After Effects, and Adobe Premiere Pro. At this point, we combined our footage and audio within Unity, where we also programmed the logic and user interactivity for our experience. Finally, we ran our experience with the Oculus Rift headset.

1.5 Relevance and Contribution to Immersive Media

VR tours of college campuses aren't very prevalent, despite them having many useful purposes. Having a VR tour of a college campus, especially a popular one like MIT with already thousands of visitors per year, could bring in a lot of attention to VR and encourage more and more people to try it out. Especially in the college admission process senior year high school students might want to experience what it is like to be in a certain campus, such as MIT. Because

plane tickets are very expensive, visiting multiple colleges might not be an option. Having a VR

experience like VRMIT would both encourage more people to apply to MIT as well as to use

VR.

2 Design

2.1 Cinematography

Moodboard of iconic scenes around MIT

When designing MITVR, our main visual inspiration was the MIT campus itself. We

wanted to be able to place viewers in the midst of the MIT campus, and to do this, one priority

we had was placing our 360º camera in the middle of an area. Most scenes had one or two main

focal points that the viewer would focus on. However, we encourage exploration by letting users

turn around and see different occurrences in the scene. For example, the focus of our North Court (courtyard outside Stata Center) scene is the Stata Center, but looking around, a viewer can see the vibrant Aesop's Fables, II sculpture or the Sean Collier Memorial.
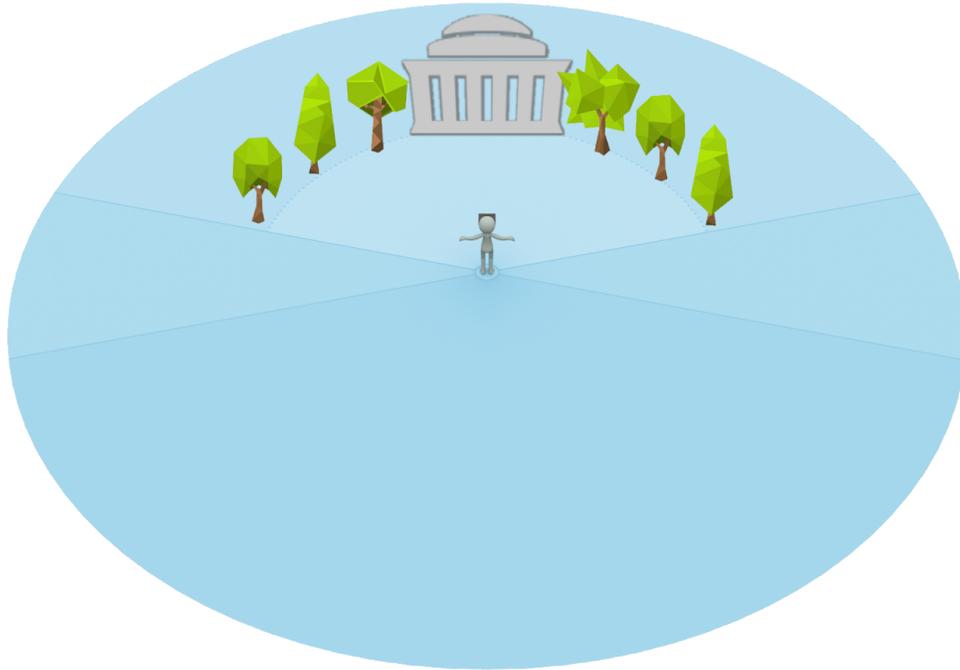

Storyboard of user in a Killian Court scene in MITVR

We broke our rule of centering the 360º camera in several occasions for a number of reasons. In the Media Lab scene, we were unable to film within the Fluid Interfaces research space as they had confidential projects, but as a workaround, we obtained access to film from outside their window where we still capture the inFORM shape display in action. In some scenes, we did not feel comfortable leaving the camera in the middle of a busy area where a passerby could potentially bump into it. As such, we positioned the camera towards the side of a scene, where we could still capture most of the footage we desired and our camera was in a safer

location. Moving forward, we would like to explore different options to film the middle of these busy scenes, such as marking off an area or having a team member sit close to the tripod.

2.2 Animation
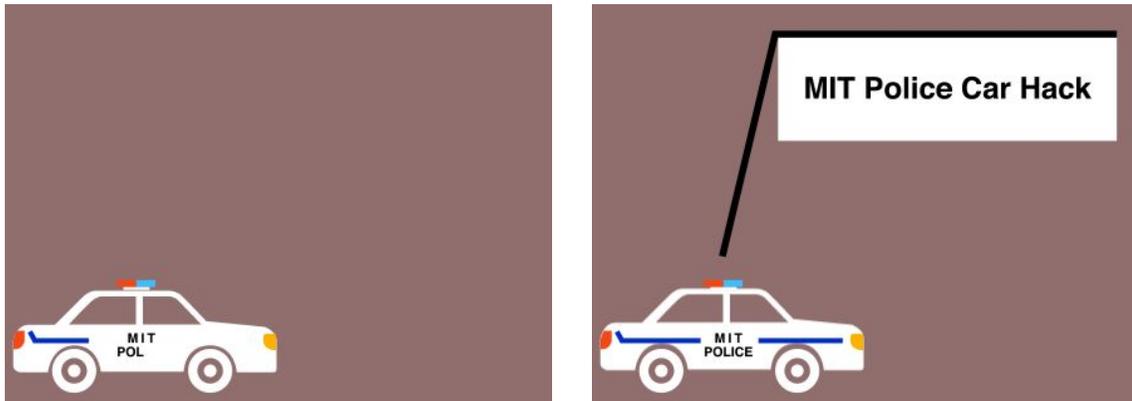
Two frames from an animation used in MITVR

Overlayed over our 360º video, we include short, 2D animations that help users learn more about MIT. These 2D animations help highlight important and interesting historical and present facts about MIT, which will encourage the user to go out and learn more after the VR experience.

In general, we use simple animations as they do not clutter the visual field of our viewers. We utilized line and clipping mask animations to enhance our scenes.

2.3 Sound

Sound was also an important part of our project. In regards to the narration, we recorded the audio in the Lewis Music Library. This year, they opened up two Audio Workstations within

the library, both fully equipped with recording software and hardware. We used the set up boom mic provided in Audio Workstation 2. Rima recorded each scenes' narration 2-3 times, and we edited all of the recordings to make a final audio clip to add to each Unity scene. The audio was recorded and edited all within Reaper. Outside of the narration, we didn't want to add any other additional audio clips other than was already provided through our 360 videos. Because we wanted VRMIT to be an accurate representation of MIT, what better audio to use for each of the 360 videos then the actual recorded audio in each scene.

2.4 Interactivity

We made our user experience interactive by enabling teleportation to enhance users' interest, encourage users to explore the area, and help users remember directions for when they visit MIT.

2.4.1 Interactive enhance interest

Similar to watching tours on live TV when guide controls where we will see next, non-interactive VR tour can make user become bored easily when they have to wait until the guide move on to the next place hoping that upcoming place is better. Many time, when people found two or three uninteresting places continuously, they decide to stop watching, so we want to avoid that and allow them to choose their own order. We also making sure we start them at the most famous scene in MIT (Killian Court). Moreover, Killian Court is in the center of MIT connecting West side (dorm row) to East side (academic buildings), so placing this as a first scene enable most option to users on where they want to explore next.

2.4.2 Exploration and discovery

Teleportation encouraging users to explore and discover the place around them. Although we encourage users to explore the area around them, we acknowledge that searching the whole space in all scenes can make users feel tired. Therefore, we include hint of where are the portals using animated arrow placed on the floor. Placing arrow on the floor can avoid disturbing beauty of the overall scene and maintain signal clues at the same time. In the future we plan to make the all arrows appear on floor after looking down on the floor for a while so that users can see the world without additional unreal component until they need it (i.e. when they gaze down for a while looking for a hint on direction).

2.4.3 Remember direction

By actively selecting the next place from 360 video itself, i.e. pointing at the Green building from Stata lawn to teleport to Green building, users can remember the direction better because they explore and spot the other tourist attraction in scene. For example, if you are in front of the lobby 7 looking around you can spot the attractions: Alchemist where people go taking the pictures and the entrance of lobby 7 where people walk inward. If the goal is to make them remembering the direction making passive video with walking video as a transition between places also satisfy the goal, but it could lead to nausea, so we decide to avoid that.

3 Production Process

The production process or MITVR was split into three main stages. First, we brainstormed and planned the design of the project. Next, we filmed 360º videos, recorded audio

narration, and set up our Unity environment. Finally, we edited our footage, added animations, and integrated our video, audio, and user interactivity in Unity.

3.1 Brainstorm and planning

We initially brainstormed fourteen ideas, ranging from a VR skydiving experience to an immersive animation following the life of a tree. We decided on MITVR as we felt that we could explore and learn a wide range of areas of VR development and immersive storytelling.

We then researched MIT history to determine which locations to include in our experience and planned a narration script for these scenes - which included a blend of historical facts, personal anecdotes, and fun facts about MIT culture. The narration was an important part of our project, and we wrote it before recording the audio. After doing our extensive research of MIT, we outlined a set of important facts we had to mention for each MIT scene in our project. After this, we wrote a first draft of the narration that included all the important facts we researched. After this first draft, we talked to people in MIT admissions and current tour guides for more advice about what to say in our audio. The piece of advice that the majority of them said was to create a script that also included personal anecdotes and stories woven into all the facts. That way, people who are listening in on the tour won't get bored and feel like they're listening to a robot. Therefore, we took our draft of the audio and added a few personal details throughout the narration to make the experience feel more immersive, almost like the user listening to a student talk to then rather than the user listening to someone just reading off the MIT website.

3.2 Filming and recording

We used the Gear 360 camera to film our scenes around campus. We iterated on our shooting format several times. We played with positioning of our camera, different times of the day, moving vs. static scenes, and several other factors. We ended up with over 25 different videos, which we trimmed and edited for our final selection.

On the audio side, we recorded our narration in a recording studio in the Lewis Music Library and used Reaper to edit the audio.

3.3 Video editing

To edit our 360º footage, we converted our videos from the dual-spherical Gear 360 format to an equirectangular one by using the Gear 360 ActionDirector software included with the camera.

We then brought our footage into Adobe After Effects to add our 2D animations. Using After Effects' Skybox VR tools, we were able to map our 2D edits into a 3D space. Because of time limitations of the project, we only placed animations in the Killian Court scene, but moving forward we would love to animate all of our scenes. Moreover, we only needed static animations for our Killian Court scene, but when animating other footage, we would like to integrate animation with motion tracking into our scenes.

At this point, we used Adobe Premiere Pro to make final edits to our footage. We added noise cancellation and lighting edits, as well as trimming and other small edits to our videos.

3.4 Making an interactive experience + test

After we have videos and audio, we began to build the first scene of Killian Court where the tour begins. Then, we implement pointer component and teleportation based on an assets VR Tool Kits (VRTK): VRTK provides good pointer UI already where the pointer laser turn green if you point to valid area and red otherwise. In addition to green laser, we added portal effects (blue sparkling light when you point to the teleportable area) and the title of the place, they will teleport to if they click to let user acknowledge the present of the portal and where they will be teleported to.

Other than testing by ourselves, we also let a few friends test it. One feedback that we found particularly helpful is from Miguel to add some visual component hint where can users can select to teleport. At that moment of our version when we don't have arrow on the floor, he said that it requires users' effort to find search through the whole space on where are the portals. We agreed with him and decide to added arrows on floor to avoid adding artificial component to the natural scene unless they look down as described in 2.4.2.

Moreover, when we test transitioning between indoor and outdoor, we found that indoor is very dark and human eye perceive the brightness in indoor much better than camera. Therefore we decide to fix this by adjusting brightness of indoor scene to be close to what we perceive with bare eyes.

About the height of user, in some scene we feel that we are too tall caused by the height and position of the camera. We either rerecord it or adjust the height of user's view (Unity camera) in each scene. In addition to height, the direction that users first scene in the teleportation is important. We usually adjust the Unity camera appeared in each sphere (each

physical place) to point to the most interesting place. Then we realize that doing so can prevent eagerness of users to explore environment all around them, so we only make focus to interesting place to only the following scenes: The Killian Court where they should see the MIT when they enter our game and Stata Lawn which users should see the Stata at the first appearance so that users won't be confused that other building is the Stata. Meanwhile, all other scenes we randomly place the initial orientation but make sure that initial orientation is point to the big place rather than small or empty area such as like a wall; otherwise, users will feel very weird.

4 Discussion

4.1 Lessons learned

When loading our 360° footage into Unity, we realized that the videos had a large file size. To address this, we reduced the length of our videos. Initially we planned to have 2-5 minute clips, but to reduce file sizes, we kept every clip to a length of 1 minute. We learned that 2-5 minutes and 1 minute videos are similar enough since most of the time users don't notice the transition when loops happen. Moreover, our narration is about one minute long, so two loops per scene are acceptable, as users will move on to the next scene. From user feedback, it seemed that this trimming and looping was unnoticeable by viewers. In future work, we might show animations that take longer, so we would need to include longer videos.

We also learned about the importance of height and the position of both 360 and in-Unity cameras. We played around with the position of these so that the viewing experience feels natural. Another lesson is that users might get bored if there's no clear indication of interactivity,

so we included visual indicators like arrows in our experience to show users how they can interact with MITVR.

4.2 Next steps

While we addressed storage issues by reducing the length of our video footage, in the future we would look at improving the compression of our videos to achieve longer video lengths especially when an animation on video or video content itself really need longer than a minute such as demoing another Media Lab project.

As discussed in the section 2.4, an interesting feature we want to have for future work is only making arrows appear when users gaze down or when user look around for a while without doing anything, as they might be confused as to what to do.

In regards to the storytelling aspect of our experience, it would be amazing to get more student's stories and experiences immersed into VRMIT. Currently, there are only a few personal anecdotes inserted in the narration, from Rima's perspective. However, if more personal stories were added, from the perspective of other students (especially upperclassmenn), it would make VRMIT a much more interesting experience.

Lastly, VRMIT currently only has 10 scenes which depict what we thought were some of the most important places on the MIT campus. In the future, we would like to expand the amount of scenes our experience has, for example including the Harvard Bridge, more labs, and especially all of the dorms.

5 Conclusion

MITVR is an immersive, 360° tour of MIT that uses audio narration, animations, and user interaction. Its development was motivated by a lack of online resources to explore areas in VR. We use the Samsung Gear 360° camera to record our footage, which we then edit in Adobe After Effects and Adobe Premiere, and piece together in Unity. We modified our system's design to accomodate for system limitations of VR platforms. Overall, we learned how to immerse users in 360° video, the importance of storytelling in immersive media, and how to design and develop VR experiences.

6. Narration

Here is the scripted voice over you hear as you explore the scenes in VRMIT.

<u>Introduction:</u>

Hello there! Welcome to the the Massachusetts Institute of Technology! My name is Rima and today I'll be showing you around the MIT campus. I hope that you enjoy your visit and explore some of what MIT has to offer. Before we embark on our tour, I'll start with a brief overview of MIT. MIT was first founded in 1861 by a natural scientist named William Rogers. His goal was to create an innovative institution to address the challenges posed by rapid advances in science and technology. He believed that best way to learn was through research and focusing attention on real-world problems, which I find to be true as I continue taking classes here. MIT's five schools, which are, architecture and planning; engineering; humanities, arts, and social sciences; management; and science—allow students to pursue over 40 majors and minors,

as well as participate in interdisciplinary research to learn in an even more interdisciplinary environment.

MIT was originally located in Boston's Back Bay, and the Institute moved to Cambridge in June of 1916, to the campus you now see today. The campus is now located on over 150 acres that extend more than a mile along the Charles River. In 1914, The beaver was chosen as MIT's mascot because as quoted, " Of all the animals of the world, the beaver is noted for his engineering and mechanical skills and habits of industry." In addition, MIT official colors are Cardinal Red and Silver Gray. As we move on with the tour, you'll notice I'll refer to campus buildings by a number. Although many campus buildings are named, MIT students and staff usually refer to buildings by their assigned numbers.

Killian Court

We'll start off our tour in Killian Court. Killian Court is named after MIT's 10th President, James R. Killian, Jr. On a beautiful sunny day like this one, you'll often see many student laying on the grass, enjoying the sun. I know I love coming here between my classes when its nice out to take a good nap. There are two main sculptures here. On tone side of the courtyard is the 11-piece granite sculpture *Guennette* by Michael Heizer. On the other side, is the sculpture *Three- piece Reclining Figure, Draped* by Henry Moore. From this courtyard you'll see the iconic Great Dome, inspired by Rome's Pantheon. The Dome is part of the original buildings, known as the Main Group, that made up MIT after its 1916 move from Boston to Cambridge. Inside the Dome is the Barker Engineering Library, which is personally one of my favorite and beautiful places to study on campus. The Great Dome is also a popular location for

hacks. You might have heard of the big, "hacking" culture at MIT, and no I don't mean the type where you code on a computer.

Hacks at MIT

Hacks at MIT are creative, difficult, and anonymous campus pranks. They are meant to demonstrate technical aptitude, cleverness, or to commemorate popular culture and historical topics.

Coming to MIT, I heard many stories of all the amazing hacks that happen here. My personal favorite is the police car prank. On May 9, 1994, hackers placed what appeared to be a real MIT police car on top of the dome, equipped with flashing lights. The car was assembled over the course of one night, and was painted to simulate an MIT campus police car. In the front seat sat a dummy police officer holding a toy gun with a box of donuts. The car's number was pi, the license plate read "IHTFP",and a parking ticket on the windshield said "No permit for this location". Reporters, camera crews, and even several helicopters came to witness and record the hack. The car was dismantled by 10AM the morning after it was put up, but local and even national news carried the story.

Another one of my favorites is earth day hack in 2017. To celebrate Earth Day, hackers decorated the Great Dome to look like a globe - inside and out. The top of the dome looked like the Northern hemisphere and the underneath (in Barker) the Southern hemisphere was suspended.

Not all good MIT hacks involve the great dome though. During Caltech's Prefrosh Weekend in 2014, a giant admissions tube, in the style of the MIT admissions tubes, appeared

outside the Caltech admissions office. When opened, a message inside was revealed,
"Congratulations! You've been HACKED!"

Borderline

The Borderline Mural Project is located in one of the tunnels under MIT, which are typically used to get across campus during bad weather. More than twenty-five MIT-affiliated artists started painting murals here in the spring of 2017 and more murals are being added every semester. What makes Borderline such an amazing place is how the murals interact with animations created through augmented reality in the Art-i-vive app. Pointing your phone camera through the app at the AR-enabled murals allows you to see the hidden related animations!

Stata Courtyard

Right now we are in the Stata Lawn. The Stata Center is home to the Computer Science and Artificial Intelligence Laboratory (CSAIL), the Laboratory for Information and Decision Systems (LIDS), and the Department of Linguistics and Philosophy. Designed by architect Frank O. Gehry's, he wanted to design a building that could house together the intelligence sciences and its researchers, who shared many of the same goals, within an open environment that encourages intellectual and social interaction. A special feature of education at MIT is the opportunity for students and faculty to collaborate in research activities. There are 70+ special laboratories on campus. Nearly all of the laboratories are shared by undergrads, grad students, and faculty members all working together. The Undergraduate Research Opportunities Program (UROP) cultivates and supports research partnerships between MIT faculty and undergraduates.

Next to the Stata center is the David H. Koch Institute for Integrative Cancer Research at MIT, founded in 2007. The Koch brings together biologists researching cancer together with an equal number of MIT's best and brightest engineers. By combining engineers and scientists, the Koch aims to revolutionize the diagnosis, monitoring, and treatment of cancer.

Stata Inside: Cranes

Here we are inside the Stata center, near one of its many entrances. The thousands of white paper cranes suspended that you see here were individually folded and arranged as a tribute to Officer Sean Collier, who lost his life protecting our campus in April 2013. Contributions of cranes came from across the MIT community and beyond, including from students, faculty, alumni, and friends from throughout the greater Boston area.

Harvard Bridge / Charles River

Causing much confusion with visitors, the bridge that crosses the Charles River at MIT is called the Harvard Bridge. It is the longest bridge over the Charles River connecting Boston and Cambridge. It was named after John Harvard for whom Harvard University had earlier been named. When the bridge was opened in 1891, MIT was located in Boston. The controversy over the bridge's name began in 1916 when MIT opened its Cambridge campus. The official length of the Harvard Bridge is 2,164.8 feet, or as locals like to refer to as 364.4 Smoots, plus an ear. Oliver R. Smoot, as a frat prank, repeatedly laid down on the bridge as his brothers marked his height on the sidewalk, his height being one Smoot. Distances on the bridge are indicated with a colored paint mark every Smoot and a number every ten Smoots.

Massachusetts Ave. Crossing

After we leave Lobby 7 and go down the steps to cross Mass Ave, right in front of us is building 20, which houses the Student Center, or the Stud as students like to call it. Inside the stud, you'll find a variety of quick dining options, as well as a convenience store and several useful service shops. There is also a small branch of the Tech Coop, which is MIT's bookstore. Many students, also spend a lot of time here between classes, weather it be working on a class project, napping, getting lunch, or studying in the 5th floor reading room and Athena cluster. I personally go to the 5th floor a lot to work on Psets with my friends. Building 20 also houses offices for many of MIT's student activities. In fact, MIT has over 500 student organizations and clubs.

Number man

Here, we are under The Alchemist sculpture, often referred to as the number man. This sculpture was designed by Jaume Plensa and was gifted to MIT for its 150th anniversary to honor all the alumni who have later helped support the Institute over the years. Many students like to think this sculpture is a good representation of the MIT student body number and nerdy culture. For example, we like to refer to buildings and majors by their assigned numbers. For example, Math here is referred to as Course 18, and Computer Science as Course 6. Admissions decisions are also always realised on Pi day at Tau Time, which is 6:28.

Kresge lawn

The grassy area you see here in front of Kresge Auditorium is called Kresge Oval. Kresge Auditorium outer shell is one-eighth of a sphere that floats freely from the rest of the auditorium. The main auditorium seats 1,100 people. The Little Theatre has a smaller capacity of 200 and is used for smaller productions by the MIT student groups. Here, we can also see some of the student housing along the river, on dorm row. Most undergrads live in one of MIT's 11 Institute houses or 36 affiliated fraternities,sororities, and living groups and All first- year students live in one of the Institute's residence halls. On the other side of Kresge lawn is the MIT chapel. Religious services for over 25 different religions will take place inside and in the Religious Activities Center. Some of the religions supported by the Chapel include Judaism, Buddhism, Catholicism, and Islam.

Z Center

Just beyond Kresge and next to the Student Center are the athletics facilities, including the Z Sports and Fitness Center. Farther ahead you'll also see the Stadium and Briggs Field. MIT has 33 varsity teams and MIT competes mostly against Division III New England colleges and Ivy League schools, with rowing competing on the Division I level. MIT's intramural program offers competition in 18 different sports. P-E is also required for all undergrads. Students are required to take 4 PE classes and pass a swim test in order to graduate, In regards to the swim test, students were originally required to be able to swim the width of the charles river. However, when students brought up you only have to swim at most half of the charles river width if you happen to fall in, they changed the test, requiring students to be able to swim half the distance.

Hayden

Here we are in the Hayden Memorial Library, home of several departments in the School of Humanities, Arts, and Social Sciences, as MIT likes to hall HASS. Most people recognize MIT for world-renowned science, math, and technology education, but many don't know about the amazing and varied programs in the humanities, arts, and social sciences. Every undergraduate is required to complete 8 HASS subjects and declare a concentration. This year, I decided to do my concentration on Comparative, Media, Sciences. For example, CMS includes the amazing class that I'm in this semester called Virtual Reality and Immersive Media Production. SHASS also offers 19 undergraduate majors and 6 interdisciplinary majors. Students can pursue a double major or a joint major in science or engineering and the arts and humanities. Hayden Memorial Library is also 1 of 5 major subject libraries on campus. All in all, The MIT Libraries have more than 5 million items in print and digital formats.

Media Lab

Here we are in the 3rd floor of the Media Lab.The Media Lab was created in 1980 and grew out of the work of MIT's Architecture Machine Group. At the Media Lab, researchers find innovative ways to solve the current problems of our world. Topics covered in the media lab Range from cognition and learning, to socially engaging robots, to neurobiology. The MIT community's Product designers, nanotechnologists, industry researchers, and pioneers of computer interfaces work side by side to invent—and reinvent—how humans experience the world, and how that can be aided by, technology.

Why I personally love the MIT Media Lab is because it steps over all known boundaries and disciplines through a unique and interdisciplinary culture that covers a huge range of research areas. Within the media lab, this year I worked in the Laboratory of Social Machines, working on a children's literacy app. I love being able to apply what I learn in class in a real world setting, incorporating my creative side. I also love how the media lab uses digital technologies in an extremely creative way to enhance the ways that people think, express, and communicate ideas, and explore the frontiers of science.

Classroom

Here we are in one of MIT's many lecture halls. Classes this big are usually used for general institute requirements, or GIRs. These are classes that everyone has to take in order to graduate. MIT students are required to take or test out of Biology, Chemistry, Calc 1, Calc 2, Physics 1, and Physics 2.

Infinite

Here we are in lobby 7, under MIT's little dome. Students walk up these steps everyday to enter the infinite corridor and go to their classes. The Infinite Corridor is the hallway, 251 meters long, that runs through the main buildings of MIT, specifically parts of buildings 7, 3, 10, 4, and 8. The corridor is the most direct indoor route between the east and west ends of campus. Twice per year, in mid-November and in late January, the infinite lines up with the plane of the ecliptic, causing sunlight to fill the entire corridor. Students and faculty Named this even MIThenge, and it really amazing to watch.

<u>Green Building</u>

The tall building you see here is the Green Building which houses the earth, atmospheric, and planetary sciences department, also known as Course 12. MIT was the first to break the Cambridge skyline barriers with the green building, making the Building the tallest building in Cambridge at the time of its construction. The black structure in the middle of the courtyard you see here is known as the Great Sail. The myth goes that the sail was put in place to lower the effects of the wind tunnel in the courtyard. However, after MIT students tested the effect of the sculpture, It turns out that it actually does not block any wind.