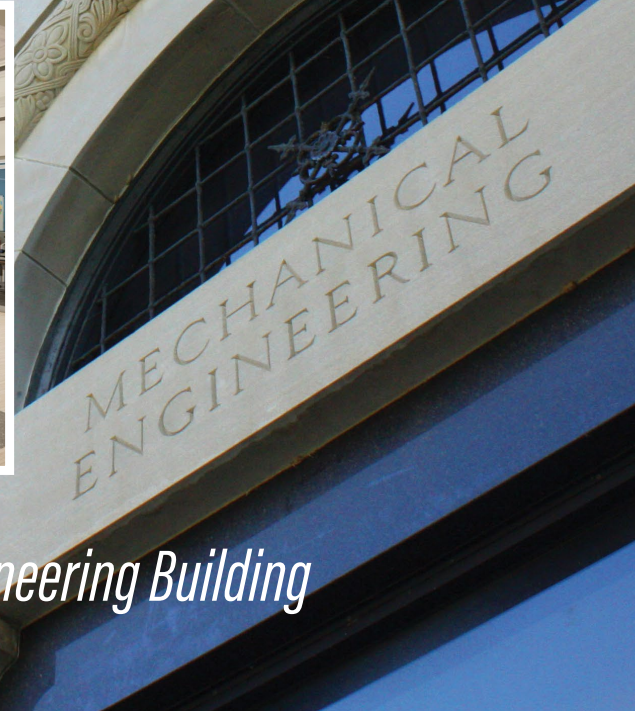
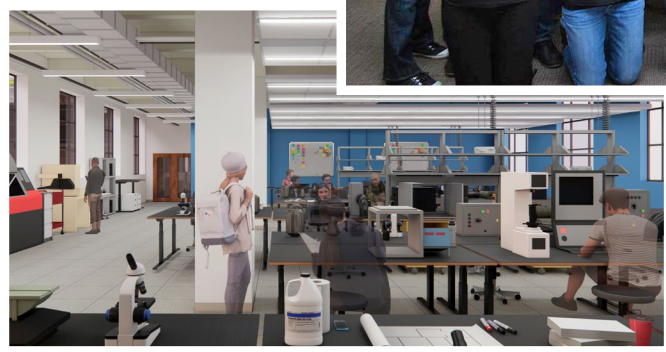




CHANGING THE WORLD FOR THE BETTER ONE STUDENT AT A TIME



Re-imagining the Mechanical Engineering Building

BOILERMAKER BEGINNINGS

When Abraham Lincoln signed the Morrill Act in 1862, Purdue University became Indiana's first "land-grant institution."

Our mission? To teach practical subjects like agriculture, science, and engineering. This was a controversial notion at the time; why would an "engineer," whose entire career would likely be spent stoking a steam engine or shaping metal in a foundry, need formal education?

As if to prove the point, Purdue literally moved a locomotive into the classroom. The *Schenectady* steamed onto Purdue's campus in September 1891, the first locomotive ever studied under laboratory conditions. What seemed at first like a bold and reckless move, quickly became Purdue's calling card. Engineers from around the country visited Purdue's original mechanical engineering building, Heavilon Hall, to see this massive steam engine running in place at 80 miles an hour, while scientific equipment recorded mountains of valuable data.



Railroading was the apex of technological achievement in the 19th century, and Purdue Mechanical Engineering had become its Silicon Valley. **It's no surprise that, even today, everyone associated with Purdue calls themselves "Boilermakers."**

Why is this important? Because it all could have been stopped by one person saying, "That's not the way things are supposed to be done. Engineers belong in the coal hole, not in the classroom."

Conventional wisdom is a powerful force in engineering – so powerful, that it almost killed Purdue before it started.

It took a bold move, and a giant locomotive, to demonstrate how theoretical education and practical hands-on skills can work together to create success.



Today, we call those bold moves "giant leaps" – an homage to Purdue's progressing from locomotives to spacecraft! The technology may change, but the mission of Purdue Mechanical Engineering remains the same:

Changing the world for the better, one student at a time.

In order to change the world, we have a vision to become **the most unique undergraduate mechanical engineering program in the world**, by focusing on three foundational pillars:

- Continuously reforming our rigorous and comprehensive **undergraduate curriculum**, building on the principles of instructional excellence
- Fully integrating superior and challenging hands-on **instructional lab experiences**, as well as **professional and global competency skills** into the undergraduate curriculum
- Offering a comprehensive portfolio of exceptional **experiential learning** opportunities that, in its entirety, cannot be found at any other university



To make this "giant leap" a reality, here are the specific goals we will accomplish:

- Offer the most comprehensive portfolio of **Global, Research, Industrial, and Team (G.R.I.T.)** project experiences, so that 100% of our undergraduate students have conducted one of each, by the time they graduate
- Update and equip our **instructional labs, maker spaces, and student machine shops** to provide the most impactful experiences to our students, while accommodating continuous student enrollment growth
- Carefully implement both **virtual and physical learning experiences** to fully engage all of our undergraduate students
- Continuously pursue an **agile curriculum** that builds on our academic core strengths, while integrating unique and novel approaches for classroom and laboratory instruction
- Increase the **intellectual diversity** of our undergraduate students, staff, and faculty

We never forget that we stand on the shoulders of those who came before. Building upon

that tradition is what allows us to take these "giant leaps" today. **We owe it to the next generation of Boilermakers to create the most comprehensive experiential learning environment in the world**, and I look forward to you joining us and becoming a part of that history.

Eckhard A. Groll

*William E. and Florence E. Perry Head of Mechanical Engineering
and Reilly Professor of Mechanical Engineering*

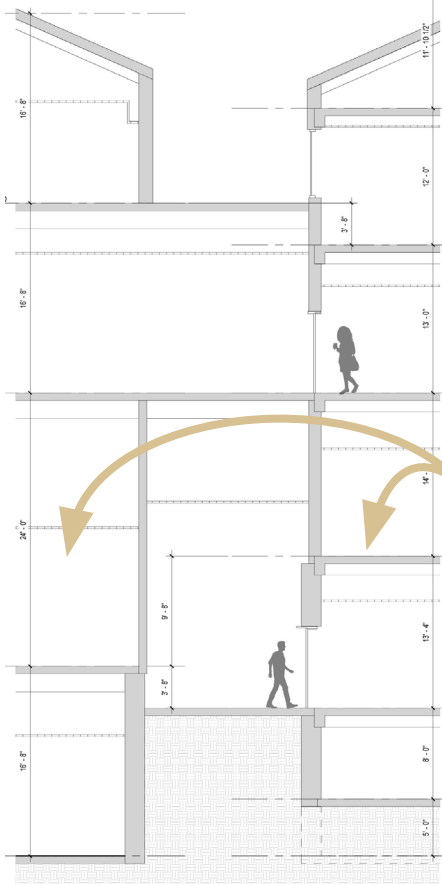
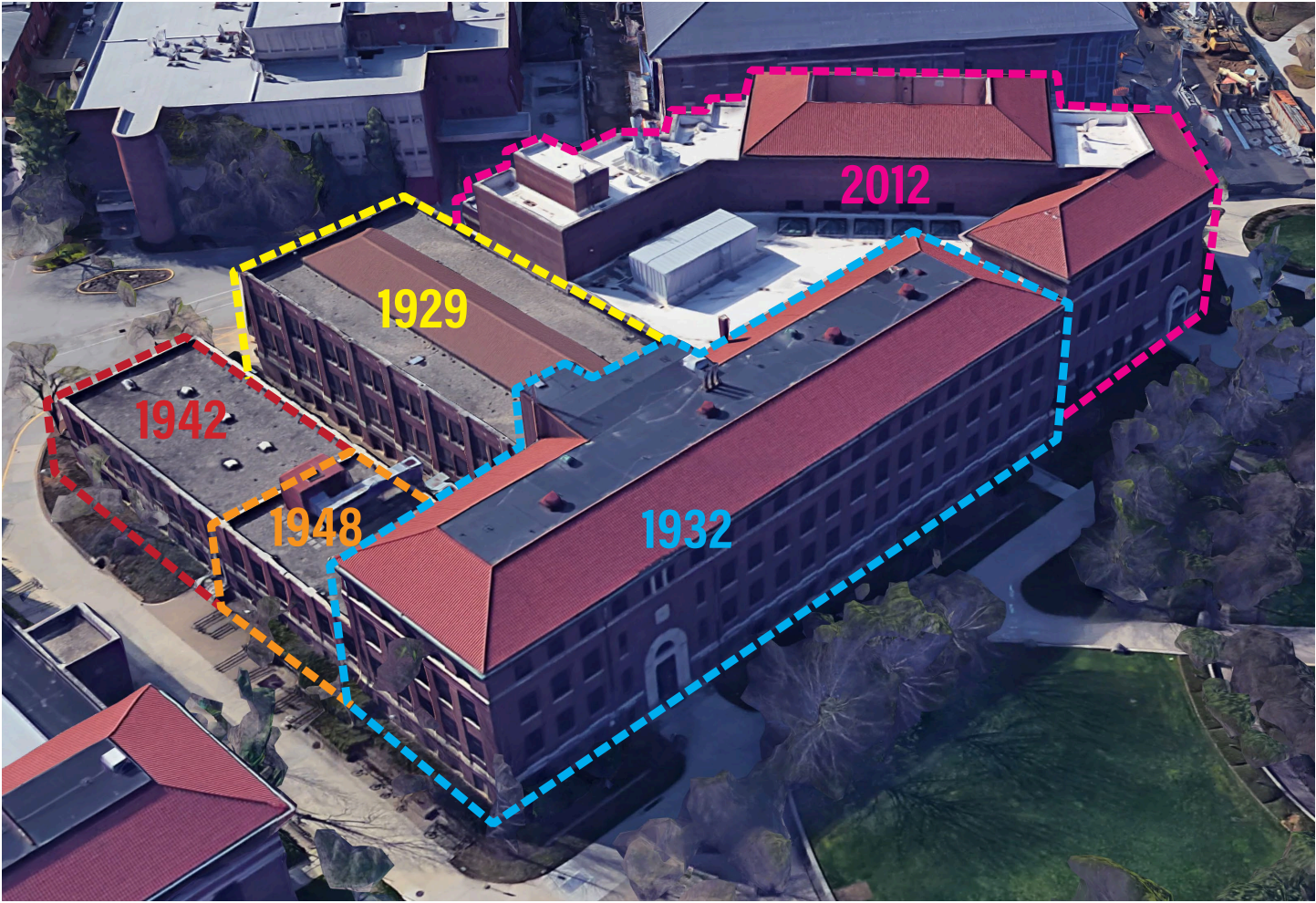
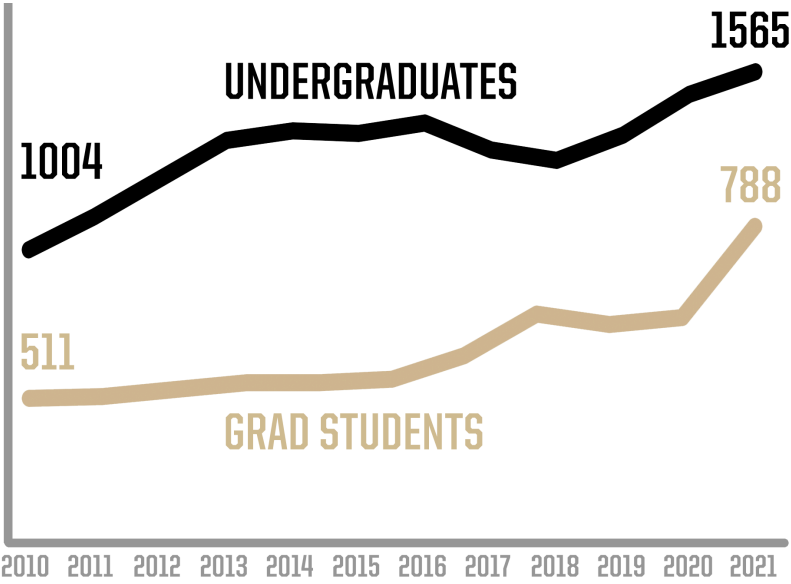


CHALLENGES

As the flagship school of Purdue, we educate more than 1,500 undergraduate students and 750 graduate students every year (only Georgia Tech enrolls more mechanical engineering students than Purdue). We are a leading voice in many scientific fields, and host research facilities found nowhere else in academia.

But despite our stalwart reputation, we face serious issues. **Our enrollment has grown so fast, that our physical infrastructure has struggled to keep up.** We have hired more than 25 new faculty in the last five years, and many of them are still waiting to move into proper lab spaces. Classrooms, labs, offices, and meeting spaces are filled to bursting.

The current Mechanical Engineering building, originally built for a handful of students to study steam engines, just cannot accommodate the needs of a world-class 21st century academic program.



The current Mechanical Engineering Building is actually a hodgepodge of five different buildings, built in different time periods from 1929 to 2012. The result is a building which is more bewildering than welcoming. Some of the floors of the mismatched buildings don't even connect!

There are more issues:

- The old building lacks modern elevators.
- The original 1930's architects likely didn't imagine the number of women today who choose to pursue degrees in mechanical engineering. As such, the restroom facilities are not at all adequate for today's student population.
- Machine shops, instructional labs, and maker spaces are far too small.
- Collaborative spaces for students and faculty are few and far between.

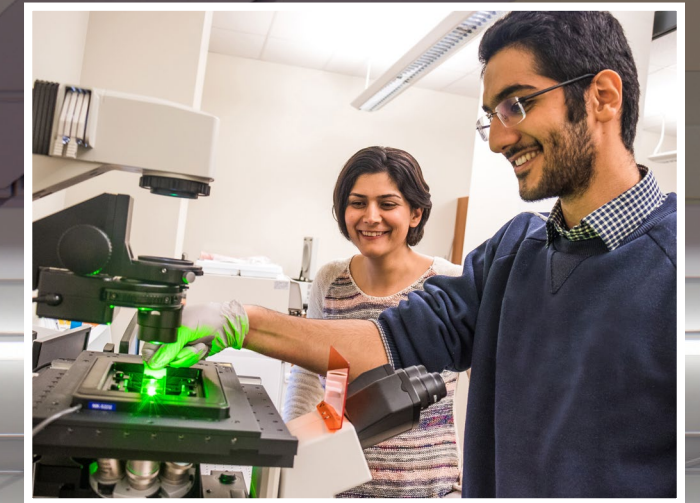
To achieve our goal of 100% student participation in hands-on, multidisciplinary team projects, we must pursue drastic changes in our physical infrastructure.

EXPERIENTIAL LEARNING

The re-imagined Mechanical Engineering Building will focus more than ever on experiential learning: taking the theory you've discussed in a classroom, and putting it into practice in a tangible way. **To do this, we need instructional labs and maker spaces that will allow students to go beyond the typical conformity and drudgery of a sit-and-listen engineering classroom, and instead inspire them to become hands-on problem solvers.**

Every engineering school teaches fluid mechanics; Purdue students should look forward to putting that knowledge to work in an underwater robot. Every engineering school teaches thermodynamics; Purdue students should look forward to testing those concepts on a race car, or a home heating system. Every engineering school teaches design; Purdue students should look forward to seeing their designs 3D-printed and brought to life.

Hands-on experiences become the norm, augmented by classroom instruction in the fundamentals (rather than vice versa). It's the sea change that 21st century engineering education needs – and with a re-imagined building focused on experiential learning, Purdue Mechanical Engineering will serve as its flagship.



ACTIVE COLLABORATION

The most important thing we've learned about teaching engineering in the 21st century is the importance of collaboration. That's not possible with rows of desks all facing a blackboard. **Our students need the soft skills of teamwork, leadership, collaboration, and diversity of thought.**

The re-imagined Mechanical Engineering Building is an expression of those goals. **Active-learning classrooms have collaboration baked in from the start**, and team projects an integral part of the entire Purdue ME curriculum.

This in-classroom collaboration naturally extends outside the classroom, offering more opportunities for students to participate in G.R.I.T. (Global experiences, Research projects, Industry participation, and Team activities). Whether it's building a model rocket, or using engineering in community service, the message is the same: **we're all in this together.**



GROUND FLOOR



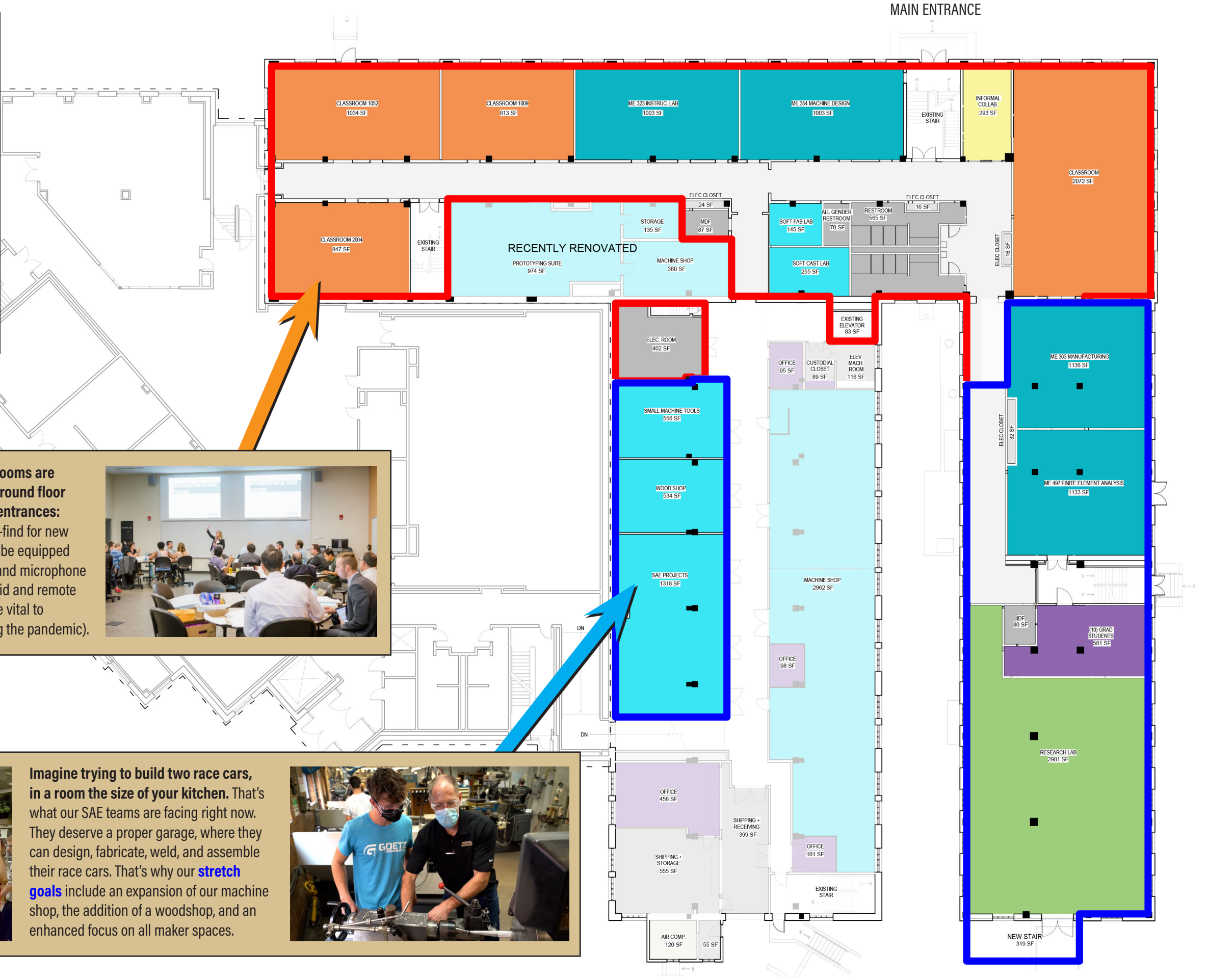
RED: Planned renovation BLUE: Stretch goals

- CLASSROOMS
- INSTRUCTIONAL LABS
- RESEARCH LABS
- OFFICE / CONFERENCE
- STUDY / COLLABORATION

Active-learning classrooms are concentrated on the ground floor and 1st floor near the entrances: convenient and easy-to-find for new students. They will also be equipped with the latest camera and microphone systems, to enable hybrid and remote learning (which became vital to Purdue's success during the pandemic).



Imagine trying to build two race cars, in a room the size of your kitchen. That's what our SAE teams are facing right now. They deserve a proper garage, where they can design, fabricate, weld, and assemble their race cars. That's why our stretch goals include an expansion of our machine shop, the addition of a woodshop, and an enhanced focus on all maker spaces.



1ST FLOOR



RED: Planned renovation BLUE: Stretch goals

CLASSROOMS

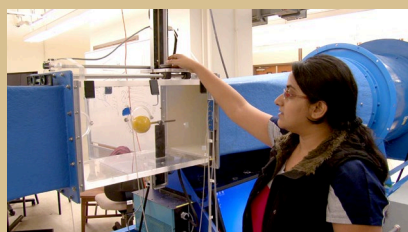
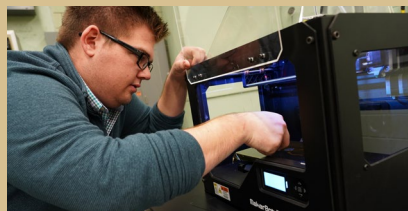
INSTRUCTIONAL LABS

RESEARCH LABS

OFFICE / CONFERENCE

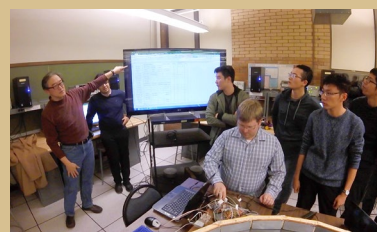
STUDY / COLLABORATION

The Hollander Atrium is the focal point of the new Gatewood Wing and the central gathering space of the ME Building. But if you're on the 1st floor of the older wings, you can't get there! A new staircase will finally connect the two floors.



You'll see this floor is overwhelmingly blue. **These are all instructional labs and maker spaces**, designed for students to get hands-on experience learning about and working with:

- Fluid Mechanics
- Solid Mechanics
- Design
- Heat & Mass Transfer
- Manufacturing & 3D Printing
- Systems, Measurements, & Controls
- ... and more!



An aerial photograph of the University of Michigan Law School building. The building is a large, multi-story structure with a red-tiled roof. The windows on the right side of the building are highlighted in red, and the windows on the left side are highlighted in blue. A yellow arrow points north towards the top right of the image.

Imagine telling a visitor: "Sorry, there aren't any women's restrooms on this floor." **Modern restrooms** are a basic feature which are long overdue for the older wings of the ME Building.



Outlined in blue are **stretch goals**, beyond the planned \$27 million main renovation. **It would be much more ideal to accomplish both of these at once**, with the building unoccupied and construction crews on site, rather than having to attempt two separate renovations.



CLASSROOMS

INSTRUCTIONAL LABS

RESEARCH LABS

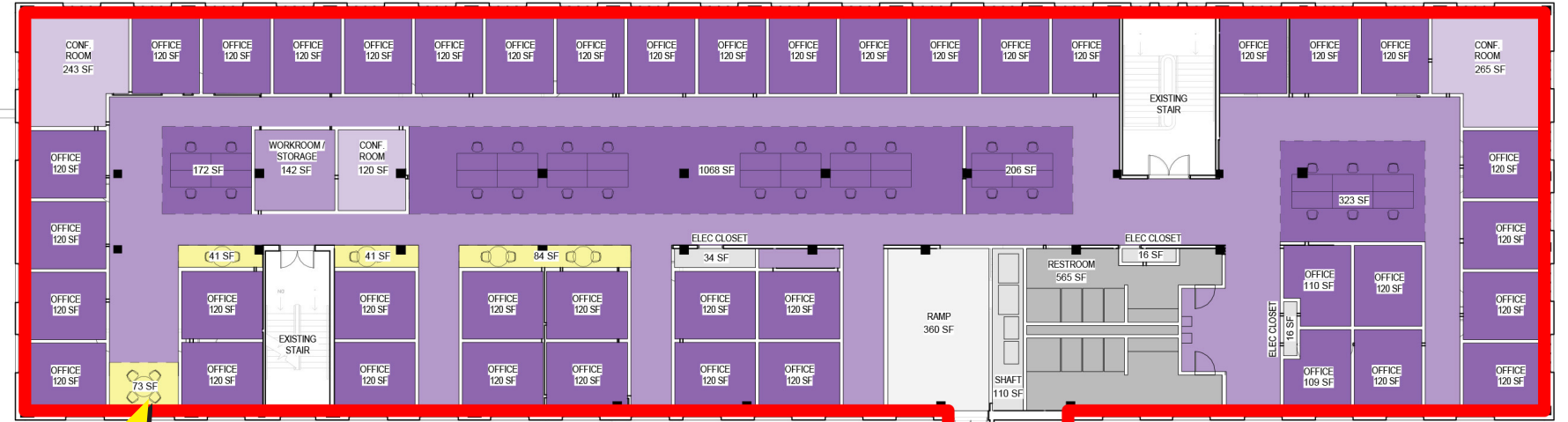
OFFICE / CONFERENCE

STUDY / COLLABORATION

3RD FLOOR



RED: Planned renovation BLUE: Stretch goals



In addition to the concentration of offices for staff, faculty and teaching assistants, the 3rd floor provides **meeting space for student teams to collaborate on projects**. It can be tough to find a place to collectively brainstorm and work out your ideas as a team, so the ME Building will create these intentional collaborative spaces.



The old cargo elevator has done yeoman's work, but it's time for the safety and streamlined operation of a **modern elevator**.



CLASSROOMS
INSTRUCTIONAL LABS
RESEARCH LABS
OFFICE / CONFERENCE
STUDY / COLLABORATION

THE FUTURE IN YOUR HANDS

- **We owe it to the next generation of Boilermakers:** the next astronauts, entrepreneurs, and problem-solving engineers. They deserve a one-of-a-kind environment where they can pursue every field imaginable. The ME Building will be completely focused on offering mechanical engineering undergraduate students **the most comprehensive experiential learning environment in the world**.
- **Will you help us make this happen?** A \$27 million expansion and renovation of the ME Building isn't just an investment in bricks and mortar. It's a "giant leap" for the School of Mechanical Engineering into the 21st century.
- **Contact us today** and learn how to get involved!

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MECHANICAL
ENGINEERING