

What is the Co-Lab about:

The Innovation Co-Lab provides learning opportunities, open studios, equipment resources, and mentorship to the Duke Community in support of teaching, learning, and researching with technology.

What is the Co-Lab:

The Innovation Co-Lab is a Duke Community resource for learning about, experimenting, and building with technology. We believe that Serious Play can lead to surprising results and inspiring outcomes, and we have built a program to encourage and support this mentality. This includes broadly accessible learning opportunities through our Roots Program and Office Hours, four campus Studios with open access to equipment and technology support, medical-caliber equipment and services supporting the most sophisticated clinical and research needs, and deep mentorship and support opportunities for prototyping your brilliant (or wild) ideas.

At the Innovation Co-Lab, we try to not only provide resources, mentorship, and support for student creativity with technology, but also build a community and environment that supports this kind of work. To that end, we have a living set of principles that help communicate that ethos:

The Co-Lab is for everyone at Duke, regardless of experience, field of study, background, race, gender, sexual orientation, ability, disability, or neurodivergence. Everyone can make things and creativity isn't reserved for "creative people". Everything is an experiment. Play, flow, analyze, repeat. Don't try to create and analyze at the same time. Skills tend to transfer. Previous projects have a funny way of informing unrelated future work. The value of "Hello world" can't be understated – 3d printed trinkets often lead directly to published research. Ask a good question today. The work you do when you should be working is the work you should be doing. Duke is a special place with extraordinary resources. Use them all. There is great value in saying yes.

What locations does the Co-Lab have:

The Co-Lab makerspaces are found in three locations across campus: Technology Engagement Center (West), Rubenstein Arts Center (Central) and Lilly Library (East). These makerspaces are open to all in the Duke Community regardless of experience or interest. Additionally, the Co-Lab also houses the Multimedia Project Studio, the perfect place to experience Virtual Reality.

What is the TEC studio:

What does the TEC Studio offer:

The TEC Studio is our flagship (main) location on West Campus, and is sometimes referred to as just the TEC or just the Co-Lab. This space features a large variety of resources ranging from hand tools to digital fabrication equipment, meeting rooms and workspaces.

The many resources available at the TEC studio are supported by knowledgeable staff providing expertise and consultation to meet your project or learning goals. The studio is open to all of the Duke community regardless of background, experience, affiliation (student, staff, faculty), or use case (personal and academic). The Co-Lab at the TEC is also the home to most of our Roots workshops and technical office hours.

Where is the TEC (Co-lab):

Telcom Building 2 Telcom Dr.

What are the TEC's (Co-lab's) hours:

Open 24/7 (card access only after 5pm). All tools and equipment located in the Workspace are available at all times regardless of staffing. All tools and equipment located in the Garage are only available during staffed hours. Additional tools are available for reservation (see Reservations & Loans).

What meeting spaces does the TEC (Co-lab) have:

TEC Conference Room

The TEC Conference Room (room 132) has tables and seats about 20. It is a Zoom room and has a large TV so you can share your screen. The walls are whiteboard material so you can ideate or write notes on the wall. To reserve this room, please contact us at colab-ops@duke.edu.

TEC Project Room

The TEC Project Room (room 131) has one table and seats 6. It is a Zoom room and has a mounted TV where you can share your screen. The walls are whiteboard material so you can ideate or write notes on the wall. This room cannot be reserved ahead of time and must be reserved on the touchpad outside of the room.

What is the layout of the TEC (Co-Lab):

Where is the bathroom:

The bathrooms are along the wall opposite the main entrance, past the Rotunda (central space). They are further into the TEC than the Workshop and the large Conference Room, with the Men's on the left and the Women's on the right (directions based on standing at the main entrance).

Where are the Printers:

All 3D printers can be found along the leftmost wall of the Workshop, where three rows of printers make up the entire wall.

A regular paper printer can also be found near the Project Room OIT TEC 131, right near the entrance to the Rotunda (central space).

Where is the Workshop:

The Workshop is directly straight from the main entrance. It contains workbenches, Desktops, and all the physical tools and machines available for use, such as 3D Printers, the mill, waterjet, etc. This is where Co-Lab workers can be found. Workers can help with tool questions and machinery use.

Where is the Conference Room:

The Conference Room is on the right side of the TEC building/Rotunda (based on standing at the main entrance).

Where are Student Developers/Co-Lab Office Hours:

Student Developers/Co-Lab Office Hours can be found in the Rotunda (central space) in the rainbow chairs. They help with software and software related questions.

Where are the storage lockers:

The storage lockers are along the Conference Room, in the hallway next to the Women's bathroom.

What else can I find at the Co-Lab (TEC):

Some objects you might not know about that the Co-Lab (TEC) has includes a sticker printer in the Workshop and a vending machine at the very back of the building (past the Conference Room). See what else you can find! Or ask someone.

What is available at the TEC Workspace, the Garage, and by Reservation/Loan:

When is the Workspace open:

The workspace is accessible at all times and is the place to work on projects and pick up prints.

What equipment & tools can be found in the Workspace:

Ultimaker 3D Printers

High End PC Workstations Workbenches

Hand Tools

Documentation Station

Sewing Machines

Soldering Station

Cricut Vinyl Cutter Color (paper) Printer

Ironing Station

Leather Tools

Cricut Hat Press

When is the Garage open:

The Garage at TEC is accessible during staffed hours, no prior experience necessary to use the garage tools.

What equipment & tools can be found in the Garage:

Protomax Waterjet Cutter

Tormach PCNC 440 Mill Shopbot

CNC Router Epilog Laser Cutter/Engraver

Manual Mill/Drill Power Tools.

What equipment can I reserve at the TEC:

The equipment below is available at the TEC through our reservation request form:

Ultimaker (although generally available at all times, printers can be reserved for projects)

Embroidery Machine

Revopoint Pop 2 3D Scanner

How do I reserve a tool:

For any reservation or question regarding reservations, you can go here:

https://duke.qualtrics.com/jfe/form/SV_1YsnM5UkCv2Lnwx

How do I get started:

Getting Started with 3D Printing

Send a job to the 3D printer with 3dprinter.os

Get free 3D models with Thingiverse

What related workshops are there:

Self-Paced: Basic Laser Cutting Make a Sticker Basic 3D Printing

Instructor-Led: Illustrator for Laser Cutting Intro to Sewing Intro to 3D Modeling (CAD & CAM)

What are the Roots Workshops (aka the Roots Program):

The Innovation Co-Lab's Roots Program is our series of technology learning experiences, including both live and self-paced workshops. The program is free, non-credit, open to anyone at Duke (student, staff, faculty). With a focus on technology and hands-on experiences, we offer a wide variety of workshops ranging from intro to programming to designing and creating your own silicone molds to sewing your first tote-bag and more. You can view, register, and access all of our learning experiences on Pathways – a platform for discovering, managing, and tracking your co-curricular education at Duke. A few highlights and upcoming opportunities are listed below but be sure to visit Pathways for much more.

View all Co-Lab Opportunities on Pathways.

What are personalized classes:

Want to create a fun, educational tech experience for your group? Don't see a current class that fits the bill? Let's chat to come up with a personalized class that we can do for you! Personalized classes we've done in the past include sticker-making, sewing plushies, and rapid prototyping. We can't accommodate all requests, and we ask that you check our Roots program first to see if an existing class would be a good fit for your group. Otherwise, reach out to us at colab-ops@duke.edu to discuss requesting a personalized class.

What are Office Hours:

Need Help: Whether you don't understand a concept from your CS class or need help with a personal development project, the Co-Lab is here to help! The Co-Lab holds regular office hours where our student consultants are available to answer questions about your project in their area of expertise. Co-Lab Office Hours are staffed by our group of student developers - see below for our schedule and our students' expertise. All student developers should be working at a table in the main lobby labeled "Co-Lab Office Hours".

Who are the Student Developers:

Check out our students' expertise below to find the best fit for your needs. For full time developers' help, check out our Team's page (by appointment only).

Our student developers are available for walk-ins at the Technology Engagement Center (TEC). Upon entrance of the building, turn right and look for the table with the rainbow chairs to find the student on duty.

What are the different student developer's expertise:

These are the topics each student developer specializes in. This does not mean they are currently on shift. To find who is currently on shift, go to the Co-Lab Office Hour table with the rainbow chairs, or see who is currently clocked in (described at the end as Current Student Developers).

Kylie Greenwald: Software development(Python, Flask, Java), Databases (PostgreSQL), Front-end development (HTML, CSS, JavaScript, React, Swift), Design (UI/UX, Figma), DevOps (Docker, Git)

Kelvin Bueno: Expertise: Front End development (HTML, CSS, JavaScript, react), Software development (node.js, python), Databases (MongoDB)

Eileen Cai: Expertise: Front End Development (HTML, JavaScript, React.js), Software Development (Ruby, Rails), Databases (Postgresql), DevOps (Docker, Git)

Judy Chen: Expertise: Software development (ruby, rails), Front End development, and devOps

Olivia Chen: Expertise: Front End development (HTML, CSS, JavaScript) and Software development (ruby on rails)

Johnny Cortez: Expertise: Front End development (HTML, CSS, JavaScript, React), Design (UI, UX), Software development (Java, Python)

Alice Hu: Expertise: Software development (python, java, ruby, rails), Front End development (HTML, CSS, JavaScript), devOps

Hung Le: Expertise: Software development (Python), Databases (mySQL), DevOps (Docker, Git), Front End development (HTML, CSS, JavaScript, React.js)

Raul Ng: Expertise: Hardware (Arduino), Software development (Ruby on Rails), Databases (mongoDB, mySQL), DevOps (Docker, Git)

Alexander Pieroni: Expertise: Software dev (Python, C, React Native, Ruby, Rails), Databases (MongoDB, PostgreSQL), Front-end dev (HTML, CSS, JS, Tailwind CSS, React, Typescript), Design (UI/UX, Figma), DevOps (Docker, Git), Tools (Photogrammetry, ArcGIS, Metashape)

Alisha Zhang: Expertise: Front End development (HTML, CSS, JavaScript), Design (UI, UX), Software development (Java, Python)

Who are the (Full Time Employees) FTEs:

Full-time Co-Lab Development Team staff (FTEs) are available by appointment. These are the FTEs:

FTEs Management Team:

Danai Adkisson: Software developer

David Bryan: Studio manager

Michael Faber: Senior Manager of Academic Technologies

FTEs Outreach and Education Team:

Daniel Davis: Self-paced trainings content creator

Rebecca Johnson: Program Coordinator

Elizabeth Villalta: Technology Education Coordinator

FTEs Studios & Lab Team:

Isaac Rattey: Co-Lab Specialist

Tobey Southworth: Co-Lab Studio Technician

Kevin Thies: Co-Lab Studio Technician

David Zielinski: AR/VR Specialist

FTEs Development Team:

Zhichen Guo Liao: Software developer

Sandra Lasso: Front End Developer

Alexi Sparko: Software Developer

Anni Yan: Software Developer

What are Grants:

Got an idea for a technology project, but need a little help:

Innovation Grants provide students with small seed funding and one-on-one mentorship to help you develop your project, from zero to a fully realized idea.

The Innovation Grant program supports:

Individual or team-based extracurricular or personal projects

Projects stemming from a faculty-supported Independent Study

Pre-entrepreneurial projects from zero to prototype or proof-of-concept

How do I apply for grants:

Students will complete an application outlining a project involving innovative use of technology. This could be a software project, hardware project, an art project, or something entirely different. As long as there's a technology component, we want to hear about it. This application will include project timeline, team members, resources required, technical/expert assistance required, as well as a budget request. Budgets will be commensurate with project scope and complexity, experience, team size, materials cost, and project duration.

What are the requirements for a grant:

Applications will be accepted on a rolling basis, and reviewed by the Co-Lab. Proposals will be evaluated on the following criteria:

Right Team

Do you have the people on board to be able to carry out this project: What experience do the team members bring to this project idea: Do you have a cross-functional team that can handle the various aspects of this project:

Right Size

Is this project achievable with this team in a reasonable amount of time: Do you have specific goals and milestones set that are realistic:

Right Budget

Is the Co-Lab seed fund the right fit for this project: Typically, we support projects that average under \$1000. Is the funding request appropriate and sufficient for the project idea:

Right Idea

Does this project serve as a good educational/learning experience for the team members: How does this project improve the experience of the users who will interact with it: What are the innovative/creative/challenging ideas being presented in this project:

After review, we will typically set up an introductory meeting to discuss the project. Applications can either be accepted, returned for additional information or revisions, or declined.

What happens after acceptance:

Once a project is accepted, the team member(s) will meet with a representative from the Co-Lab to establish a project plan at a Kickoff Meeting. We will discuss the budget and the best way to issue those funds (sometimes we provide it all up front, other times we do not). We'll set up a regular schedule to meet throughout the project timeline to overcome obstacles and celebrate successes. We'll set up a page for you on our site to provide project information, updates, photos, and more. Grant recipients will also be invited and encouraged to participate in Co-Lab events that share the possibilities of our programs and resources to a broader audience.

What are some Frequently Asked Questions about the Grant Program:

Is there an application deadline:

No, applications are handled on a rolling basis throughout the year.

What can I spend the grant funds on:

Most of our grant funds are spent on materials, equipment, and components related to a project. This could include items like Arduinos, Raspberry Pi devices, wiring, electrical components in physical computing projects, raw materials like woods, metals, plastics, and hardware in more mechanical projects, and occasionally software or web resources in software projects.

What can I NOT spend the grant funds on:

These funds are intended to be used on materials and supplies directly related to the completion of the project by the team. Grants may not be used to pay for stipends, housing, travel, consultants, contract labor, food, drink, or entertainment. Additionally, this program is intended for very early-stage prototyping and idea exploration, so in most cases we do not support funds explicitly intended for user acquisition, marketing, or growth of existing projects.

How are funds managed:

In addition to the fundamental learning experiences provided by the technology challenges of the project, this program is also designed to allow students to learn about project and team management, budget responsibility, and stakeholder reporting. If you are awarded funds for your project, you are responsible for keeping accurate transaction records and ensuring the project can remain financially viable, even if materials or equipment needs change as the project progresses (this is normal and totally OK!). Please also be aware that financial awards are taxable. Duke considers these awards to be income – please consult Employee Travel and Reimbursement for more information. For efforts associated with a club or student organization, fund code transfers are available and preferred.

[What are some past Grant Projects:](#)

Bluetooth Bike Shifter: A universal electronic bike shifting system with Bluetooth and iOS components.

Detachable Roller Skates: A mechanism for attaching roller skates to the bottom of your shoes!

[What Professional Services does the Co-Lab provide:](#)

In addition to our free fabrication tools and services available to all of the Duke Community in our Studios, the Co-Lab also provides cost-recovery professional design and fabrication opportunities.

[What is Bluesmith:](#)

Bluesmith is the Innovation Co-Lab's Professional additive manufacturing service. The equipment suite and job pickup table is located on West Campus in the TEC (Telcom Building - 2 Telcom Drive). This service specializes in printing unique and high-precision models used for research, medical, and other professional needs. Bluesmith is a Duke Service Center, allowing us to support projects that have received federal funds as well as entities outside of Duke University.

Bluesmith is a student-run service with the vast majority of prints and consultations being led by undergraduate students. This service is a cost-recovery service, meaning that we charge for materials

and equipment time, and provide consultation to ensure the best results possible. This service is separate from the free, self-service printing available at the Co-Lab studio spaces.

How does Bluesmith Works:

Bluesmith provides end-to-end service from initial consultation to final print, including expert advice on how to best use the various printers and materials we have available for your project. Once we agreed on all the details and costs, we'll print your model to your specifications and post-processing needs. To get started, request a consultation [here](#).

How to start with Bluesmith:

If you're ready to print, or have already consulted with us, the first step is to send your print-ready files to bluesmith.oit.duke.edu, our job management and billing system. Models are printed on dedicated printers using a variety of materials to your specifications and needs. All you need to get started is an .STL file of your model. Upon submission to the site, we will review your files and produce an estimate or request a consultation within one to three business days. Once the estimate is approved, staff will begin printing. Printing and post-processing typically takes no less than 7 days.

How much does Bluesmith cost:

The cost of 3D printing varies widely and is based on technology and the amount of material used. We currently manage a fleet of nearly a dozen different additive manufacturing technologies, capable of countless options of materials and physical properties. For the full breakdown of equipment, materials, and associated fees, visit our Capabilities page on the Bluesmith application. Charged fees are used to recover expenses related to printing materials, machine usage, and other lab consumables. Printer material and consumable fees are charged at-cost, and startup and hourly costs are charged to recover maintenance costs and service contracts. Payment is accepted via fund code or credit card. Duke Corporate Cards are not accepted. If you have a Duke Corporate Card, please pay with the corresponding fund code.

What is DesignHub:

DesignHub is a student-led team of engineers and designers that helps clients within the Duke community fulfill their design and prototyping needs. DesignHub provides everything from computer modeling and prototyping to final product small-scale manufacturing.

Our DesignHub service pairs you and your ideas with standout student engineers and designers to model novel solutions to specific needs.

What services does Bluesmith offers:

CAD

We produce computer modeled 3D files ready for manufacturing using 3D printing or conventional subtractive manufacturing.

Prototyping

We use rapid prototyping technologies including 3D printing, laser cutting, and more to generate prototypes and iterate on designs.

Manufacturing

We help determine the optimal path to small scale manufacturing by helping with material selection, sourcing, and manufacturing method selection.

How does DesignHub works:

DesignHub is a subsidized service provided to the Duke community by the Innovation Co-Lab. We will absorb the cost of labor up to a maximum of 20 hours. Beyond this consultation time, the service is cost recovery and you will be billed for time beyond the initial 20 hours as well as at-cost material charges for any materials necessary to fabricate the prototypes (if fabrication is part of the project). We try to scope our projects to stay well within the twenty hours of design and build time. Most projects will leverage 3D printing or other digital fabrication tools, and pricing for these tools can be viewed on the Bluesmith page.

How do I get started with DesignHub:

If you have a problem and an idea for how to solve it, you're halfway there! Working through the list below will help get your project moving.

Identify a Problem

The world is abound with problems. Even small optimizations can lead to drastic improvements in performance. Pick a problem that is personal to you and we can help you solve it.

Work together to Solve the Problem

Our staff will help you turn your vision into a tangible outcome. Try to think of a few potential solutions. Often the prototyping process will be iterative and adjustments will need to be made but we will look to you as the subject matter expert that guides our work. Frame your problem and solution in terms of working backwards from the desired outcome you would like to achieve.

How do I schedule a consultation with Design Hub:

Reach out to our team by emailing designhub@duke.edu or heading to our Booking Calendar to get started. You will be introduced to your student designers who will work with you through the course of your project. They will assess your idea in relation to the realities of design and building. You will serve as the subject matter expert for the project and work in tandem with our design engineers. At this point your work will begin and with any luck, together we will have solved a problem!

What is the Rubenstein Arts Center:

What does the Rubenstein Arts Center offer:

Our Co-Lab studio at the Rubenstein Arts Center (Ruby) is the best place for learners and makers who love the intersectionality of Art and Tech.

This studio is one of our three (3) makerspaces on Duke's Campus, and lives in beautiful Ruby on central campus. It is the best place to get acquainted with some of our more craft/art driven offerings such as silicone molding, soap making or hand engraving. It also features high-tech equipment including 3d printers, laser cutters, and a full size CNC machine.

Where is the Ruby Studio:

The Ruby (Rubenstein Arts Center) is at Rubenstein Arts Center 2020 Campus Dr.

You will find the Ruby studio in the back right of the Rubenstein Arts Center (diagonally opposite to the main entrance).

What are Ruby's Hours:

The Rubenstein Arts Center building hours:

Monday through Friday: 10am-8pm

Saturday & Sunday: 1pm-6pm

3D printers and manual tools are available at all times regardless of staffing. Laser cutters and milling tools are only available during staffed hours. Additional tools are available for reservation (see Reservations & Loans).

The studio is accessible whenever the Rubenstein Arts Center is open.

What is at the Ruby Studio:

What equipment & tools can be found at the Ruby:

Ultimaker 3D Printers

Shopbot CNC Router

Epilog Laser Cutter/Engraver

Cricut Vinyl Cutter

Hand Tools

Soldering Station

High-End PC Workstations

Workbenches

Some of the equipment in this space cannot be used without being turned on by a staff member, but no prior training is necessary to use the tools.

What equipment can I reserve at the Ruby:

Ultimaker S3 (although generally available at all times, printers can be reserved for projects)

Shopbot

Additional equipment other than that listed above is available through our reservation request form

What is Lilly Library:

What does Lilly Library offer:

The Co-Lab studio at Lilly library is the perfect place for First Year students to get started with 3D printing.

Our Co-Lab studio at the Lilly Library (East Campus) is the smallest of our three (3) makerspaces here on Duke Campus. It has 3D printers and tools to experiment with. The Co-Lab at Lilly is open for free and to all, regardless of background, experience and affiliation (student, staff, faculty).

Where is the Lilly Studio:

Lilly Library 1348 Campus Dr.

What are Lilly Library's Hours:

The Lilly Library hours:

Monday through Thursday: 9am-7pm

Friday: 9am-6pm

Saturday: closed

Sunday: 1pm-5pm

All tools are available while the library is open.

Equipment & tools found in the Lilly Studio

Ultimaker S3

Hand Tools

Tools at this location are available while the library is open.

What is Perkins/the Bostock Library:

What does Perkins/the Bostock Library offer:

Perkins/Bostock has the Multimedia Project Studio (MPS).

What is the Multimedia Project Studio (MPS):

The MPS Studio is Duke's home for developing and experiencing Virtual Reality (VR), and Augmented Reality (AR).

The MPS features resources for VR and game development, 3D modeling and object scanning, as well as video and photo editing. The MPS is free and open to anyone at Duke, regardless of experience, affiliation (student/staff/faculty), or field of study. Staff members are on hand to orient you to the space and help you get started.

Where is the MPS:

The Link is at Perkins Library 411 Chapel Dr.

You can find the MPS studio in Room 006 on the lower level of Perkins/Bostock Library, down the hall from the Link.

When can I use the MPS equipment:

Side rooms and some resources are only available during staffed hours.

What is at the MPS:

Main Studio

High End PC VR workstations

VR Headsets (staffed hours only) iMacs

Dedicated VR Dev Suite (Reservable)

High End PC VR workstation VR/AR Headsets

VR Movement Suite (in progress)

High End PC VR workstation VR Treadmill

VR Exercise Bike (coming soon)

Software

Game engines: Unity, Unreal 3D Modeling: Maya, 3dsMax, Blender, Sketchup

Adobe Creative Suite: Premier, Photoshop, Illustrator

What equipment can I reserve at the MPS:

The equipment below is available through reservation or in consultation with our staff:

Quest1 VR headsets

Revopoint Pop 2 3D Scanner

Magic Leap 2 AR headset

What rooms can I reserve at the MPS:

VR Dev Suite VR Movement Suite

Visit the lab and talk to our consultants or email us for further inquiry

What other services does the MPS offer:

The MPS also offers services for faculty and groups:

VR Development for faculty-led projects (email us for more information)

Tours/VR experiences for Academic courses or other groups

Our studios are equipped with many tools and resources to allow users to create using 3D printing, laser cutting, milling, soldering, and much more on the makerspace side as well as unity and adobe cloud

amongst others on the software side. We continuously improve our selections, so make sure to check back on what we have to offer every now and again.

Request a Tour or Custom Workshop

How do I request a tour:

TEC Tour: This tour will be a short visit to our studio space and an introduction to our equipment, including 3D printers, laser cutters, and more. Additionally, we'll walk through our Bluesmith studio, where we make precise parts out of high-quality materials for medical, research, and other professional applications.

MPS Tour: This tour will show you around our VR studio. We'll introduce you to our equipment designed specifically for creating VR experiences, including our computers, VR headsets, scanners, and more.

These are the Upcoming Roots Classes:

, Create a Website: Interactivity with Javascript: 2024-04-09T10:00:00.000-04:00, Unix Terminal Customization and Setup: 2024-04-09T13:30:00.000-04:00, Digitized Embroidery: 2024-04-15T13:30:00.000-04:00, Preparing a Web Project: 2024-04-16T10:00:00.000-04:00, Build a Computer: 2024-04-16T13:30:00.000-04:00

The studio workers can help anyone use the 3d printer, laser cutter, and other physical tools.

These are the Current Studio Workers (part-time help with the studio and garage):

Devi Yuliarti

Student developers can help anyone with software issues.

These are the Current Student Developers (part-time help with software):

Judy Chen, Hung Le