

Invention Factory[®] at The Cooper Union

What is Invention Factory?

Invention Factory at The Cooper Union is a summer program for Cooper Union engineering students. You will have six weeks (Monday, July 11 – Friday, August 19) to work intensively with a partner on an invention that you choose (subject to our approval). We provide up to \$2,000 per team for materials, access to and training on prototyping tools such as laser cutters and 3D printers and access to Cooper's machine shops and machinists. Your presence will be required each day at Cooper, Monday through Friday, 11 a.m. to 5 p.m. and one late night each week (for critiques by 'guest evaluators') – but we expect that most of you will work late into the night and on weekends, especially towards the end of the program. We feed you lunch and snacks each day. There will be caffeine. You will compete for prizes of \$5,000 and \$3,000 for "Best Invention" and "Second Best Invention." By the end of the program, you will have written and filed a Provisional Patent Application for your invention with the U.S. Patent and Trademark Office. Each student receives a \$1,000 stipend once all program requirements are successfully completed.

Invention Factory was initially funded by annual gifts from Edward Durbin (EE '48). Ed was an enthusiastic and generous supporter of Invention Factory from its inception in the summer of 2013 through direct annual gifts. Ed passed away on April 12, 2015, but ensured the funding of Invention Factory in perpetuity through an endowment, The Edward Durbin and Joan Morris Innovation Fund. During a transition period when the Durbin endowment had not yet generated sufficient income to fully support the program, a number of Cooper alums stepped forward with much-appreciated gifts, some of which were matched by their employers.

Why the name "Invention Factory"?

We chose the word "factory" to make clear that we expect your intensive effort for six weeks will yield prototypes of marketable products. We believe that Cooper engineering students are sufficiently talented and hardworking that I.F. inventions have a good chance of succeeding in the marketplace. As this is a summer program, you and your partner will be developing your invention in a supportive environment free of classes and other obligations.

Will I be applying for a patent?

By the end of the program you will file a Provisional Patent Application with the U.S. Patent and Trademark Office. A provisional application is nothing more than a detailed description of your invention including drawings. Inventions produced through Invention Factory will be the sole intellectual property of the student inventors. Your provisional application will give you limited protection of your invention for one year from the date you file the application. If you and your partner wish to commercially exploit your invention and seek an enforceable patent, you should file a non-provisional application within that one-year window. Cooper Union pays the filing cost of your provisional application. If you decide to pursue an enforceable patent by filing a non-provisional application, you and your partner will have to pay the associated attorney fees and patent office fees. (Don't worry about the terminology, we'll teach you a fair amount about patent law during Invention Factory.)

Who can apply?

All matriculating Cooper Union engineering students in good standing may participate in the program. This includes current seniors who will have graduated just before Invention Factory starts in June.

How do I apply?

Selection for the program is competitive. We select twenty students each year, who will participate as ten teams of two. You will find the application form at www.inventionfactory.org

Our application form asks you for a short essay.

In the essay (500 words or less) you'll tell us why you are excited to participate in Invention Factory. Perhaps there is a particular problem you would like to attack (e.g., helping the blind or motivating toddlers to learn a musical instrument) and you see an opportunity for an elegant invention to address that problem. If you don't have a problem in mind, you can use the essay to describe (and provide links to) examples of your own creative work. Perhaps you've written a short story, or designed/built an interesting apparatus. You can link to jpgs, video files, etc. (Upload jpgs using <https://imgbb.com/> or similar, upload videos to YouTube – unlisted if you like.)

Applications are accepted until the end of March, unless we have filled the program with 20 impressive students at an earlier date. Applicants will be evaluated on a rolling basis, so it's best to apply early.

What kind of invention might I work on?

Please look at inventions from the first seven years of Invention Factory. You can watch videos of nearly all inventions produced at Cooper during I.F.'s 2013 – 2019 at inventionfactory.org.

The site also includes videos from the programs we spawned at Syracuse University (Invent@SU) and at India's Institute of Technology IIT (Invent@IITGN).

You will select your invention (and your partner) during the first week of the program. A critical focus of the selection process is determining that your invention addresses a real need -- a consumer need, a societal need, or both. We don't want you to invent a particular widget for the reason that you CAN invent that widget – the world may not need it, and therefore may not be willing to pay for it. You will have to convince us that there is a need for your invention before we approve your project. Many students come in with a pre-selected partner (though you apply, and must be accepted individually).

Another important criterion is feasibility. We want you to have (or be able to quickly develop) the necessary expertise/skills complete a working prototype of the invention within the six-week program. This precludes overly ambitious proposals such as tissue engineering, nanostructures, new types of maglev trains. Other constraints on project selection: no chemical inventions and nothing that would require IRB approval (i.e., involving human subject experimentation).

To use a little patent law terminology, we are looking for inventions that can result in issued "utility patents" (inventions that perform a useful function, not purely ornamental creations that could receive a "design patent"). Your invention must be both "novel" and "non-obvious" – which mean, respectively, that you must be the first to invent this thing, and your invention must be, in some sense, non-trivial. Patentable inventions may also be improvements of someone else's existing (patented or unpatented) invention.

Your invention must have commercial potential ("need"). Your invention must be something tangible – something you can build. You will spend much of your time making, testing and refining a prototype of your invention -- and demonstrating its functionality and its purpose to

others. Your invention may involve software, but it cannot consist entirely of software (e.g., no cellphone apps).

What if I haven't invented anything before?

You are a Cooper student. Believe in yourself. We believe in you.

Is this an entrepreneurship program?

No! There will be no writing of business plans, considerations of marketing or seeking venture capital. This is a program in inventing. For many of you, it's why you applied to engineering school in the first place.

Is Invention Factory related to EID103?

No. While we admire the "Lean Philosophy" and incorporate its basic tenet into the program (you must persuade a majority of the other student participants, and at least one of the two of us that there is a need/market for your invention by the end of the first week), this is not a course in Lean methodology. Nor is Invention Factory a class (for academic credit).

What are the deliverables at the end of the program?

You will write and file a Provisional Patent Application that will be backed up by a prototype that you have developed and tested. Cooper will pay the USPTO's filing fee for your Provisional Patent Application.

At the end of the program ("Judgment Day"), you will present your invention to a jury that will include engineers, patent lawyers, consumers, venture capitalists, and others. You will do a "live" presentation to this jury, supported by a PowerPoint presentation that usually includes embedded videos that you've created (e.g., showing testing or operation of your invention). The jury will select the first and second prize winning "best inventions."

What do I get if I win?

You and your partner will share \$5,000 for first prize. \$3,000 for second prize.

What do I get if I don't win one of the two prizes?

Exciting summer experiences. Pizza/Thai Food/Chipotle/Nutella. A cool Invention Factory T-shirt and maybe a hoodie. An invention that you may want to bring to market through Kickstarter or with the help of a VC. Perhaps you will enter your invention into a larger competition (e.g., the Lemelson-MIT Student Prize). You will learn just enough patent law to help you protect other inventions that you might develop in the future. The likelihood of excellent letters of recommendation from us that may help you obtain summer internships, entrance to graduate programs, prizes in invention competitions. Incredible training in public speaking and effective presentation skills.

How will the program be structured?

By the end of the first week of Invention Factory proper, you will have selected your partner, identified your problem, studied the “prior art” (is your invention new? Is it (in the patent law sense of the term) novel and non-obvious?). You will learn how to use a laser cutter and 3D printer, if you aren’t already comfortable with those tools.

By the end of week two, you should have conceptually finished the design of your invention and started to order required components. You will likely be working on your first prototype.

Weeks two through six will focus on building and refining prototypes, testing your invention, subjecting your prototype to critiques from other members of the program as well as outsiders. Critiques will focus on the need for your invention, whether your invention meets that need, and diverse practical considerations (safety, size, weight, and cost). Everything you do must be documented. You will likely be taking photographs, producing short video clips, and perhaps making CAD animations for inclusion in your weekly presentations to “guest evaluators.” There will be plenty of unstructured time for you to develop and refine your invention.

Who is the “we” you keep referring to?

The program will be overseen by Professors Eric Lima and Alan Wolf. Eric Lima is a professor of mechanical engineering and an avid DIY builder. He teaches several of the design classes in the mechanical engineering department. He holds 3 patents. You can learn more about him and some of his projects at <https://engfac.cooper.edu/lima2>. Alan Wolf is a retired professor of physics and a registered patent attorney. He taught physics at Cooper Union for over 35 years. He also taught patent law courses at Cardozo Law School and at The Cooper Union. You can learn more about Prof. Wolf and his activities (including supervising the drafting of provisional patent applications by Cooper students) at <https://engfac.cooper.edu/wolf>. He will be

physically present for the first two weeks of Invention Factory and will continue mentoring remotely for the remaining four weeks. Professors Lima and Wolf are currently developing their own inventions and have patented their first embodiments (versions) of their device.

Additional FAQ

Who will own my work?

You and your partner will be co-inventors in the eyes of the Patent Office. While Invention Factory funds will pay the nominal cost of filing your provisional patent application (currently \$80), The Cooper Union does not retain any interest in your invention or any obligation to help you develop it further (e.g., underwrite the cost of filing a non-provisional patent application). If you want to protect your inventor beyond the limited protection provided by the provisional application, you and your partner should file a full patent application before the provisional expires.

When will I get my stipend?

You will receive your stipend shortly after the end of the program provided that you have completed all program requirements on time (attendance, a working prototype, presenting your invention to the judges on Judgment Day, a filed Provisional Patent Application, etc.). Development of the videos you see at www.inventionfactory.org will extend beyond the last day of the program, but generally will not require much additional work on your part. Raw video will be shot in the sixth week of the program, but post-production work by students editing your videos will run into the following semester. There is a possibility that we may need to reshoot some or all of your final presentation.

Do I have to pay taxes on my stipend?

The IRS says a stipend is reportable income. Of course, depending on a number of factors, you may not owe any taxes in a given year or you may be entitled to a refund. Some students (already on the books for work/study at Cooper) will be paid through payroll. Other students will be paid through accounts payable.

What ultimately happens to all of the materials my partner and I purchase with our project budget?

You and your partner will have a budget of up to \$2,000 for materials. We pre-approve all of your purchases. Anything you purchase with your budget that does not appear in your final prototype will remain the property of Invention Factory. You retain your final prototype, once we have completed all photography and videography required for promoting the Invention Factory program.

Must I work with a partner?

Yes. If you want to work with a friend, the two of you should apply separately, but let us know of your interest in working together. There is no guarantee that we will accept both of you. Teams sometimes form before the start of the program and sometimes form during the first week of the program.

What if I don't find a partner / don't like my partner / my partner quits halfway through the program?

Yes, we can expect some of these issues to arise, just as they do in the "real world." We will deal with such problems as they arise.

Can I work in a group of 3?

No.

Is this program open only to engineering students?

Yes.

Do I get academic credit for participating?

No.

Will there be classes?

There will be a few sessions in which we discuss writing a patent application, teach you how to use a laser cutter (if you don't already know how), and similar things. These will be informally structured, without tests or grades (except for one patent law quiz towards the end of the program), and they will mostly take place in the first weeks. We may offer a few more sessions as needed or as the opportunity arises. But mostly this program is about

giving you the support and resources to develop an invention without distractions. Starting about week three, each team will be coached on effective public speaking by an actress / vocal coach / acting coach who we've used for the past few years. She has worked wonders with students of all levels of confidence and skill in public speaking.

Can I continue working on a project that I've already started to develop in another course or on my own?

No.

During Invention Factory can I also... (work at a job/take a summer course at Cooper or elsewhere/participate in an externship)?

No. Not even if the work/course/etc. takes place before or after the 'official' program hours of 11 a.m. to 5 p.m. Not if the job/course/etc. has ANY overlap with the period June 29 – August 7.

Do I have to sign a photo/video release to participate in Invention Factory?

Yes. Videos and still images of Invention Factory participants, their inventions and their presentations help to promote The Cooper Union, the Invention Factory program, and the School of Engineering. We require that participants sign the standard Cooper Union photo/video release and participate in making I.F. videos. You will be provided with a copy of the release to review and sign if you are admitted into the program. I.F. Videos will generally be posted at <http://www.inventionfactory.org/> (which links to YouTube videos) as well as other web sites.

Can my food allergies and dietary restrictions be accommodated?

Often, but not always. We provide lunch each day and lots of snacks. For lunch, we order food such as pizza, Subway, Chipotle, Thai and Chinese food. These meals are delivered "on rotation" (e.g., pizza each Wed.) from local restaurants. We will poll the group to find out preferences, but we haven't had a problem since we began the program.

We can place a second lunch order each day for students who require Kosher/Halal food, if we have enough of those students to meet delivery minimums. We've had vegetarians/vegans who were able to work within these constraints (e.g., ordering a meatless Subway sandwich).

If your food allergies/requirements don't work within this structure, we will require you to prepare/provide/pay for your lunch each day. We have our own refrigerator and microwave oven. When it comes to snacks, we have somewhat greater latitude. We provide fresh fruit, ice cream, Nutella, pastries, and more, and we can order, e.g., some gluten-free snacks or other special foods. Keep in mind, we are working within a budget! (No caviar.)

Do I really need to be at the program from 11 a.m. to 5 p.m. every weekday?

Yes. And one late night each week, in weeks 2 through 5, when you present to "guest evaluators." You and your partner will either consistently present on Tuesday evening or on Thursday evening. Those sessions may run as late as 7:30 p.m.

Is it okay if... I start the program on the 2nd day, or leave a few hours early on one Thursday, or go with my family on a short vacation that would have me come in late one Monday?

No.

What will the invention I create with my partner be judged on?

In short – identifying a need, meeting that need, and meeting the need practically. While there may be a need for an improved can opener, it probably shouldn't weigh 100 lbs., cost \$1000 or emit gamma rays. During the first week of the program, we'll give you the complete list of criteria for evaluating I.F. inventions that is provided to guest evaluators and judges.

Revised 1/17/22