Program Description – Invent@IITGN

Invent@IITGN is an intensive summer program in inventing that originated in the U.S. (the program has the U.S. trademark "Invention Factory") and ran for the first time in India last summer at IIT Gandhinagar (IITGN). The program will run again this summer at IITGN and in future summers is expected to spread to other IIT colleges.

In six weeks (plus a few days of technical training), fifteen teams of two IIT students will each conceive of an invention, prototype it, "pitch" it, write and file a U.S. patent application for it, and finally compete for prizes for the "Best Inventions." You and your partner will work on an invention that you choose, subject only to the approval of the professors as well as safety and budgetary constraints.

If you are chosen for this program (acceptance is competitive!), you will spend almost seven weeks at IITGN. The program will begin on **May 16, 2019**, with a mandatory orientation in which you learn (or for some of you, review) basic prototyping skills -- 3D printing, laser cutting, use of simple tools. The program proper runs during the six weeks from May 20, 2019 to **June 28, 2019**. The founders of the program in the U.S, Cooper Union Professors Alan Wolf and Eric Lima, will be working directly with IIT students for the first four weeks of the program, alongside IIT Professors Vineet Vashista and Nithin George. Professors Vashista and George will remain with the students for the last two weeks of the program after Profs. Wolf and Lima return to the U.S.

The 30 students in Invent@IITGN will be selected from all IITs. Lodging with shared hostel room facilities and all meals will be provided for the entire duration of the program. Each team will have a budget of up to Rs. 50,000 for materials. You will have access to laser cutters, 3D printers, machine shops and machinists.

Your presence will be required each day at IITGN, Monday through Friday, 10 am to 5 pm – but this is the bare minimum. We expect that many of you will work late into the night, especially towards the end of the program. Breakfast, tiffin and dinner will be at IITGN's mess hall, but box lunch will be served at the program work site. Unlimited chai and coffee will be provided.

By the end of the program, each of the fifteen teams will have filed a provisional patent application for their invention with both the Indian and the U.S. Patent and Trademark office. Professors Wolf and Lima will teach the rudiments of patent law and patent searches and will oversee the crafting and filing of provisional patent applications. As part of the program, each team will also craft a short video, demonstrating and explaining their invention. These videos will be posted on the U.S. program main website and elsewhere. Students will find these videos invaluable for securing internships and employment.

You will compete for a first prize of Rs. 2 lakhs and a second prize of Rs. 1 lakh for the teams creating the "Best Invention" and "Second Best Invention." Judging will be based upon several factors, including: how well your invention meets a need, your prototype, your "pitch" to the Judges and your provisional patent application.

All participants who successfully complete the program will receive a Rs. 10,000 stipend with a certificate of participation.

The Cooper Union Invention Factory site (InventionFactory.org) shows videos of many of the inventions created by program students at Cooper Union, Syracuse University and IITGN.

How did this program make its way to IIT?

The program first ran in the summer of 2013 at an elite engineering institution in New York City – The Cooper Union. The program was founded by Professor of Physics (and U.S. Patent Attorney) Alan Wolf and Professor of Mechanical Engineering Eric Lima. In its six years of operation at The Cooper Union, the program has given rise to several impressive, prize-winning inventions as well as inventions that are moving towards commercial development.

In the summer of 2017, The program was expanded to Syracuse University ("Invent@SU -- Powered by Invention Factory" [Program having a registered trademark in the U.S. as "Invention Factory"]), where it came to the attention of four successful and distinguished U.S.-based alumni of IIT Bombay (one of whom was also an alumnus of Syracuse University). The four IIT alums are making the IITGN program possible through a generous donation, in the spirit of “giving back” for the superb education they received at IIT in the early seventies. Professors Wolf and Lima were very excited to work with the legendary students of IIT last summer and are eager to return!

Will I be applying for a patent?

By the end of the program, you will file provisional patent applications with both the Indian and the US patent offices. A provisional application is nothing more than a detailed description of your invention, including drawings. Inventions produced through the program will be the sole property of the student inventors. Your provisional application will give you limited protection of your invention for one year from the filing date of 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 the one-year window. (Don’t worry about the terminology, Professor Wolf is also a Patent Attorney in the US and will teach you a fair amount about patent law during the program).

How do I apply?

Admission is competitive. Selection will be done on a rolling basis, so apply early. Applications are done through the “Submittable” application portal. When you go to this site, you must first create a free Submittable account.

We will accept applications until the end of March, unless we have filled the program with 30 students at an earlier date. We require all applicants to submit a video and a brief (500 word maximum!) description of why you would be a good fit for the program. Please familiarize yourself with the type of inventions crafted in the program by watching videos at Inventionfactory.org (omit www).

Your online application will be reviewed by Professors Wolf and Lima in the US and Professors Vashista and George and other members of the Indian Team. We may also contact you by Skype or WhatsApp.

Your grades and previous prototyping experience are not of great importance to us, so long as you are an IIT student in good standing. We have observed that students with low academic grades are sometimes great inventors.

Do I need to have an invention in mind before I apply to the program?

You do NOT have to choose an invention before the start of the program. In fact, we prohibit any advance work on possible inventions, including projects you may have started in other classes or on your own. At most, you may wish to think about projects that you might be interested in working on. You are free to do internet research on such topics, but no prototyping, CAD work, etc. Most of the teams that won first or second prize in the U.S. program did not conceive of their invention until the first week of the program proper.

What kind of invention might I work on?

Please look at inventions from the first six years of Invention Factory [Program having a registered trademark in the U.S. as "Invention Factory"] at inventionfactory.org (do not type www before the site name.).

You will choose your project (and your partner) during the first week of Invent@IITGN proper (not during the orientation period). A **critical** focus of the invention 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.

Another important criterion is feasibility. We want you to have or quickly develop the expertise and skills necessary to complete a working prototype of the invention within the 6-week program period. This precludes overly ambitious proposals such as tissue engineering and nanostructures. Other constraints on project selection are – no chemical inventions and nothing that would require Institutional Review Board (IRB) approval (i.e., involving human subject experimentation).

To use a little patent terminology, we are looking for inventions that can yield "utility patents" (inventions that perform a useful function, not purely ornamental creations that can receive a "design patent"). Your invention must be both "novel" and "non-obvious" – which mean, respectively, that you must be first to invent this thing, and your invention must be, in some sense, non-trivial. Your invention may be an improvement of someone else's existing invention. Your invention may have commercial potential ("need"). Your invention must be tangible – something you can build. You will spend much of your time making, testing and refining a prototype of your invention, and demonstrating it to others. Your invention may involve software, such as an embedded software that allows your working model to operate, but it cannot consist entirely of software, such as a mobile phone app.

What if I haven't invented something before?

You are an IIT student who passed the world's most grueling entrance exam. Believe in yourself. We believe in you.

Is this an entrepreneurship program?

Emphatically not! There will be no writing of business plans, considerations of marketing or seeking venture capital. This is a program in **inventing and working with your hands to build and test a prototype**. It fits in very nicely with Prime Minister Modi's exhortation – MAKE IN INDIA!

What are the deliverables at the end of the program?

You will file a provisional patent application that will be backed up by a prototype developed and tested by you. The donors funding the program will pay the filing fee for your provisional application.

You will present your invention to a jury that will include engineers, patent lawyers, consumers, venture capitalists and others. Your presentation will include a short video that demonstrates your invention. The jury will select the first and second prize winning "Best Invention" teams.

What do I get if I win?

The first prize winning team will share a prize of Rs 2 lakhs. The second prize winning team will share a prize of Rs 1 lakh.

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

Every student completing the program will receive a stipend of Rs. 10,000, plus an exciting all expenses paid summer experience – free room and board, endless cups of coffee, chai and occasionally pizza and samosas and a cool Invent@IITGN T-shirt. You and your partner will have an invention that you may want to bring to the market through Kickstarter or with the help of a VC. Perhaps, you will enter your invention into a larger competition abroad like the Lemelson-MIT Student Prize at MIT. You will learn enough patent law to help you protect inventions you might develop in the future.

For those of you who may want to study abroad for higher studies, participation in the Invention Factory program may strengthen your application.

How is the program structured?

By the end of the first week of Invent@IITGN proper, you will have selected your partner, identified your problem, studied the "prior art" (is your invention new? Is it in patent law parlance "obvious"?) and will have learned how to use a laser cutter and 3D printers, 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 ordered any 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 the need you identified, and diverse practical considerations such as safety, size, weight and cost. You will likely be taking photographs, producing short video clips, and perhaps making CAD animations for inclusion in your weekly presentations to "guest evaluators" and for the presentation to the Judges at the end of the program.

There will be plenty of unstructured time for you to develop and refine your invention.

The program, hosted by IITGN, will be overseen by Professors Eric Lima and Alan Wolf of Cooper Union in New York City and supported by IIT Gandhinagar Professors Vineet Vashista and Nithin George.

Who is the "we" you keep referring to?

Eric Lima is a Professor of Mechanical Engineering at Cooper Union and an avid DIY builder. He teaches several of the design classes in mechanical engineering department at Cooper Union. He holds several patents. You can learn more about him and some of his projects at https://engfac.cooper.edu/lima2.

Alan Wolf is Professor and Head of the Physics Department at Cooper Union. He is a registered patent attorney and has courses in patent law and patent litigation at Cardozo Law School and at Cooper Union. You can learn more about him and his activities at https://engfac.cooper.edu/wolf.

Professors Wolf and Lima are also the founders of the Invention Factory program in the U.S.

Nithin George is an Associate Professor of Electrical Engineering at Indian Institute of Technology Gandhinagar (IITGN) in Gandhinagar, India. He teaches undergraduate and graduate students and conducts research in active noise control, adaptive signal processing and hearing aid design. You can learn more about him and his work at http://www.iitgn.ac.in/faculty/electrical/nithin.htm. His email is nithin@iitgn.ac.in

Vineet Vashista is an Assistant Professor of Mechanical Engineering at Indian Institute of Technology Gandhinagar (IITGN) in Gandhinagar, India. He teaches undergraduate and graduate courses and conducts research in Design and Control of Mechanical Systems, Human Centered Robots and Human locomotor adaptation. You can learn more about his work at http://www.iitgn.ac.in/faculty/mechanical/vineet.htm. His email is vineet.vashista@iitgn.ac.in

Additional FAQ

Who will own my work?

You and your partners will be co-inventors in the eyes of the Patent Office. While the Invent@IITGN donor funds will pay the nominal cost of filing your provisional patent application, IIT Gandhinagar will not retain any interest in your invention or any obligation to help you develop it further (e.g., underwriting the cost to file a non-provisional patent application if you choose to do so in the future). Please note that the provisional patent application expires one year from the date of filing. If you and your partner intend to pursue filing a full patent application, you should do so within a year of the provisional patent filing.

When will I receive 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, creation of your video. Raw video will be shot in the sixth and final week of the program, but some post-production work may run into the following semester.

Do I have to pay taxes on my stipend?

The students participating in the program on successful completion will receive a stipend of Rs. 10,000. As per our understanding of Indian income tax regulations, this stipend will not be taxed.

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

You and your partner will have a budget of up to Rs. 50,000 for materials. Anything you purchase from that budget that does not appear in your final prototype will remain the property of IITGN. You are free to retain your final prototype, once we have completed all photography and videography required for promoting the program and its students.

Must I work with a partner?

Yes. If you want to work with a friend, the two of you should apply separately and there is no guarantee that we will accept both of you. Teams will be formed by the end of the first week of the program proper.

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

Yes, we can expect some of these issues to arise, just as they do in real life. We have experience resolving such problems.

Can I work in a group of 3?

No.

Is this program only open to engineering students?

Yes. It is open to any undergraduate engineering or design student studying at any of the IITs in India.

Will there be 'formal' classes?

There will be a few sessions in which we will discuss writing a patent application, teach you how to use a laser cutter and a 3D printer (if you haven't already done that) and similar skills. These will be informally structured, without tests or grades, and they will mostly take place in the preliminary week and the first week of the program proper. We may offer a few additional classes 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.

Can I get academic credit for participating?

No.

Can I continue working on a project that I am already working on?

No.

During the program can I also …. (Work at a job, or, take summer course at IITGN or participate in another externship)?

No. Not even if the work/course/etc. takes place before or after the "official" program hours from 10 am to 5 pm. Not if the job/course/etc. has ANY overlap with the period May 16 through June 28 (orientation and the six weeks of the program proper).

Do I have to sign a photo/video release to participate in the program?

Yes. Videos and still images of the program participants, their inventions and their presentations help to promote the program concept in India, to promote IIT Gandhinagar and the overall program founded by Professors Wolf and Lima.

Do I really need to be there from 10AM to 5PM every weekday?

Yes, at a minimum. Winning teams often put in substantially longer hours. And one late night every 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 Wednesday evening or on Thursday evening. These sessions may run as late as 7:30 PM.

I must leave a week early, or mid-day each (some day of the week). Is that okay?

No.

What will I be judged on?

Identifying a need, meeting that need, and meeting the need practically and pitching your invention effectively. While there may be a need for an improved can opener, it probably shouldn't weigh 50 kgs., cost Rs. 10,000 or emit gamma rays.