



INTERNSHIP MEETING

Eric Prebys



Before We Start

- The department has an internship page
 - <https://physics.ucdavis.edu/undergraduates/undergraduate-opportunities-activities-clubs/research-opportunities>

Research Opportunities

Home > Undergraduates > Undergraduate Opportunities, Activities, Clubs > Research Opportunities

But it's very out of date.

- I'm working on getting editing access, after which I'll add all the information from today and anything else I get later.



Why I decided to do this...

- Practical research experience is VERY important when applying for graduate school or industry jobs.
 - You won't get far with just your GPA, even if it's really high.
- Internships and other research experiences are a good way for you to figure out what interests you.
- Internships are a networking tool that will establish lifelong relationships.
- **IMPORTANT:** Deadlines can be very early.
 - A lot are in January in January, some possibly even in December.
 - Every year, students come to me around March and ask about summer research opportunities and I have to tell them that ship has sailed.
- Some have not opened yet, and the window to apply can sometimes be pretty short.
- Today's discussion is by no means exhaustive, but hopefully it will help you know where to start looking.



What Does a Summer Internship Consist of

- Internships are generally 10 weeks long.
 - Still a pain to make the schedule work with both semester and quarter schedules.
- Most are paid and include travel and housing.
- In most cases, an intern will be paired up with a research to work on a self-contained project that will benefit both the institution and the intern.
- There are often tours, talks and other enrichment and social activities organized for the interns.
- There will probably be some sort of presentation and/or paper at the the end.



Project Example

- Last summer, Evelyn Hamera (now a student here) designed, simulated, built, and tested an ionization chamber for the Crocker Nuclear Lab Cyclotron

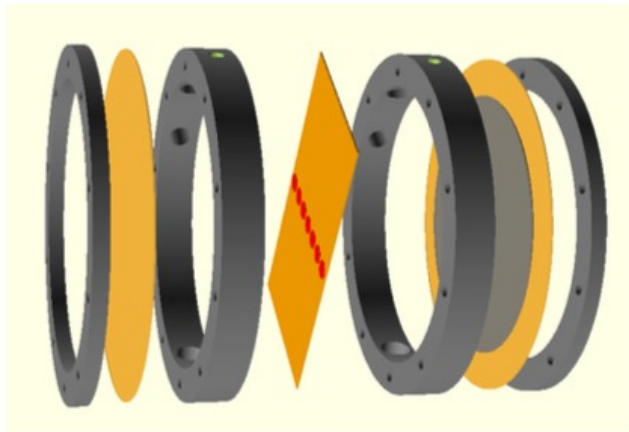
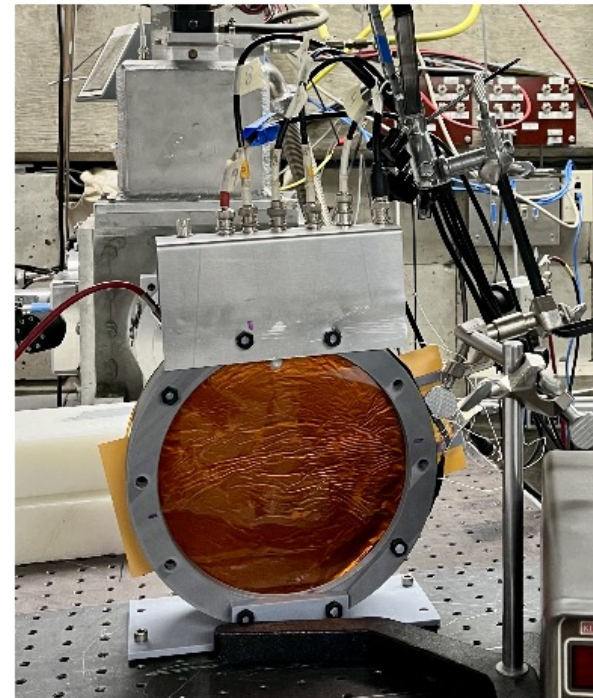
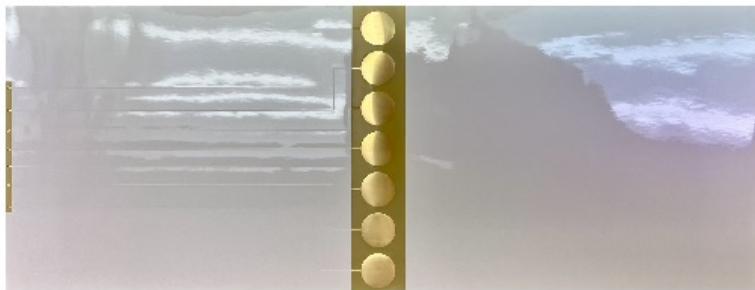


FIG. 3: Simplified diagram of ion chamber





Citizenship Requirements

- Many of the federally funded internships are only open to US citizens and Green Card holders.
- I'll give a few examples of ones I've found that accept foreign nationals.
- After I talk, Tony Tyson will talk about industrial internships, and those are much more likely to be open to foreign nationals.
- Sponsoring institutions will generally help with visa issues, but it's also good to stay on top of it yourself.
- If a student is on an F1 visa:
 - If their university agrees this is an integral part of their education, they will sign a Curricular Practical Training (CPT) waiver on their I-95
 - Otherwise, they have to apply for an Optional Practical Training (OPT) waiver through the INS
- If a student is on J1 visa:
 - It's much easier. The university just have to say it's related to their education, or even just that they need the money.



NSF Funded Research Experience for Undergraduates (REU)

- This is a HUGE program funded by the NSF
 - <https://new.nsf.gov/funding/initiatives/reu>
- A wide variety of scientific topics
- It is NOT centrally managed
 - Awards are given to individual universities and labs, and the application and hiring process is hired by them.
 - Only open to US citizens and legal permanent residents.
- There is a list at the site, which can be filtered by location and research area
 - <https://new.nsf.gov/funding/initiatives/reu/search>
 - Warning: a lot of the links are stale or even broken.
- Some have not opened yet, and application deadlines vary, but are mostly around January 31st.



Department of Energy SULI Program

Science Undergraduate Laboratory Internships (SULI)

Where Students Come To Change The World

- This is the DOE's version of REU program
- A single application system that supplies interns to the 17 DOE labs in the US
 - Diverse program, but not as diverse as the REU program
 - Students indicate their first and second choice for labs
- Open to US citizens or legal permanent residents at US universities or community colleges.
- Applications: open
- Deadline January 8, 2025



University of Michigan CERN REU

- Spend a summer at CERN
- Very competitive
- Also only open to US citizens
- Applications have not opened yet for 2025, but keep an eye on it
 - <https://cern-reu.physics.lsa.umich.edu/>



SUMMER UNDERGRADUATE RESEARCH EXPERIENCE
at CERN in Geneva, Switzerland

Students selected for the program will spend June and July working with active research groups at CERN, one of the world's premier international laboratories. CERN is the home of the web and the site of the Large Hadron Collider.

- Participate in the renowned CERN Summer Student Lecture Program
- Join active researchers at CERN
- Get support from an on-site coordinator from the University of Michigan
- Receive a stipend and travel reimbursement

For more information or to apply, visit our web site:
<http://www.um-cern-reu.org>

Eligibility: Students must be registered at an accredited 4-year institution, be in their junior or senior year with a concentration in physics, engineering or computer science. The program is open to U.S. citizens and permanent residents. The program will be administered by the University of Michigan Department of Physics with support from the National Science Foundation.

CERN photo: Simulation by the ATLAS experiment of the decay of a Higgs boson into 4 muons

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The University of Michigan is an equal opportunity/affirmative action employer.



Programs Open to Foreign Nationals

- Some REU program will accept non-citizens if there is a non-NSF source of funding.
- One explicitly non-NSF REU program is University of Colorado/JILA
 - <https://www.colorado.edu/physics-jila-reu/>





- Some useful sites have catalogued programs that are open to both citizens and non-citizens
- <https://www.macalester.edu/physics-astronomy/research-opportunities-for-international-students/>

RISE Germany →

MIT Summer Research Program →

Fermilab Summer Internships in Science & Technology (SIST) →

Caltech LIGO Summer Undergraduate Research Fellowships →

Space Telescope Science Institute Space Astronomy Summer Program →

Argonne National Laboratory Lee Teng Fellowship →

Arthur McDonald Canadian Astroparticle Physics Summer School →

Perimeter Institute Undergraduate Theoretical Physics Summer Program →



- <https://www.colby.edu/academics/departments-and-programs/physics-and-astronomy/resources/internships-for-international-students/>

Programs in the US:

- [APS/IBM Research Internship for Undergraduate Women](#)
- Caltech – [SURF](#) and [LIGO](#)
- [Fermilab](#)
- [Glenn T. Seaborg Institute](#)
- [Lehigh University REU](#)
- [MIT Summer Research Program](#)
- [National Radio Astronomy Observatory](#)
- [SPS National](#)
- [Space Telescope Science Institute](#)
- [UC Davis REU](#) (requires funding from home institution)

International programs:

- [CERN](#) in Geneva, Switzerland
- [Cerro Tololo Inter-American Observatory](#) in Chile (requires funding from home institution)
- [DAAD RISE Program](#) in Germany
- [RWTH Aachen University](#) in Germany
- [Leiden Observatory](#) in the Netherlands
- [The Netherlands Institute of Radio Astronomy](#)
- [Perimeter Institute for Theoretical Physics](#) in Canada



Specific Examples

- Caltech Summer Undergraduate Research Fellowship
 - <https://sfp.caltech.edu/undergraduate-research/programs/surf>
 - VERY competitive
 - Application is complicated
 - Announcements of Opportunity (AOs) are posted at the site
 - Some are only open to CalTech Students
 - If it's open to non-Caltech students, you contact the mentor directly and work out the details of applying.
 - Professor Aggarwal did this program as an undergrad, so she can probably answer questions about it.



- Lee Teng Undergraduate Fellowship in Accelerator Science



- Focus on accelerator science
- Started in 2008 (by me!) as a joint internship between Fermilab and Argonne Lab
- Now just at Argonne
- Applications open. Deadline January 6th.
 - <https://www.anl.gov/aai/lee-teng-undergraduate-fellowship>
- Fun fact: the Argonne person running the Lee Teng Program was a former Lee Teng Intern



UC Davis Resources

- The Campus Career Center is an excellent resource for all things career related
 - <https://careercenter.ucdavis.edu/>
 - Near the bottom is a link the Handshake, which is kind of like LinkedIn for students
 - You already have an account, you just need to activate it
 - Lots of training videos at <https://www.youtube.com/@ucdaviscareercenter/videos>



Other Resources

- The MIT SPS have a very useful page with internship opportunities
 - <https://sps.mit.edu/summer-research-opportunities>

In the United States

- **NSF Research Experience for Undergraduates (REU)**
 - Complete listing of projects funded by the NSF. REU are like UROPs, but at universities and laboratories throughout the country.
- **Los Alamos National Laboratory**
- **Department of Energy's SULI Program**
 - Offering paid internships at various different DOE labs including Fermilab, SLAC, Brookhaven, & Princeton Plasma Physics Lab
- **Caltech SURF**
 - Caltech's equivalent of UROP for the summer
- **Harvard-Smithsonian Center for Astrophysics REU**
- **U. of Colorado/JILA REU**
- **University of Washington REU (Inst. for Nuclear Theory)**
- **Caltech LIGO REU**
- **NASA's Jet Propulsion Laboratory (JPL)**
- **Summer Student Program at Space Telescope Science Institute**

Abroad

- **MISTI**
 - MIT's resource for studying/working abroad
- **DAAD-RISE**
 - Summer internships at research institutions across Germany. Available to American and Canadian students.
- **DESY**
 - Germany's largest particle accelerator. Located outside Hamburg. Summer research program for undergraduates from around the world.
- **CERN Summer Students Program**
 - Half of each day is spent in physics lectures, the other half is spent building parts for CERN.

Other sites to check

- **SPS Internships**
 - Internships for various organizations in Washington D.C.
- **U. Iowa — Astronomy & Physics Summer Internship Webpages**
- **Purdue University**



Preparing and Applying

- There's a Catch-22 that the best way to get an internship is by having had one in the past.
- Failing that, try to get involved in research in the department
 - Don't be afraid to bang on doors!
- At the very least, talk to your professors about their research!
 - It will make it much easier for them to write letters of recommendation.
- Work on your CV!
 - Keep it short and to the point
 - Lots of resources out there for this. Check with the Career Center
- Personal statement
 - Keep it short!
 - Say something unique about yourself
 - Say something specific about the internship you're applying for and why you're interested in it.
 - Don't just cut and paste from other applications.