

Segrè Internships for summer 2019

June 24th through August 19th

Stipend: \$5,760

Students are invited to apply for the Segrè Internship, to be awarded to undergraduate or graduate students who have taught in, completed or are completing the 111-Advanced Laboratory course. Interns will use research techniques as they collaborate with faculty and staff to improve experiments and develop new ones. Working in the 111-Lab 8 hours a day for eight (8) weeks. This benefits students with work experience and job references for Graduate school.

Responsibilities include:

- Researching underlying physics of the experiments
- Participating in building and repairing apparatus
- Hand annotating/sketching
- Drawing with Adobe Illustrator
- Programming computers to acquire data and control experiments,
- Testing and trouble-shooting experiments
- Improving the write-ups for the experiments.

Planned projects list for summer 2019: (not in any order)

1. Trying out draft lab manual with new Nitrogen Vacancy Centers experiment developed for 111B
2. Determining nominal NVC operating parameters, suggesting realistic scope for 9-day experiment, adding acrylic enclosures to limit adjustments thus keeping future students within realistic experiment scope
3. Expanding data analysis options to include Python (as begun last year) and tools familiar in Data Science
4. Programming the FPGA pulse-blaster (used for NV Centers) with serial I/O and MatLab interface, using Quartus Prime Lite software and MatLab
5. Making a mini magnetometer for general display using Ensemble NV Centers
6. Testing Windows 7 ability to reach fileserver and license server for LabVIEW, MatLab etc. via SheevaPlug or other hardware firewall and learning from colleagues' experience at NanoLab
7. Playing with flux pinning in liquid nitrogen cooled type II superconductors for educational demos in the lab
8. Drafting design(s) to water-cut permanent magnet and/or electromagnet core for NV Centers and maglev
9. Responding to occasional 111A requests and knowing where to find their parts and tools
10. Checking and fixing LabVIEW programs to work with new version of LabVIEW software
11. Adding measured nominal operating values to diagrams of existing Advanced Lab experiments
12. Run the Beta Ray experiment with Cs-137 and baffle, upgrade source to meet learning objectives
13. TBD

This award is provided in memory of Emilio Segrè (1905-1989).

Born in 1905, Segrè was the first student to earn his doctoral degree under the sponsorship of Italian physicist Enrico Fermi, his friend and collaborator for more than three decades. Upon immigrating to this country in 1938 (he later became an U.S. citizen), Segrè accepted a position at the University of California, Berkeley. There, he commenced one of his most productive periods in nuclear physics, working with Glenn Seaborg, a chemistry professor, on methods of separating nuclear isomers. In the period following World War II, the antiproton, an atomic particle that sought to prove nature's symmetry still eluded scientists. In 1955, using Berkeley's powerful new cyclotron, Owen Chamberlain and Emilio Segrè made the first observation of the anti-proton. This discovery signaled a major leap in the study of matter and antimatter. Emilio G. Segrè received the Nobel Prize in 1959 for his work with Anti-Protons.

The Physics Department gratefully acknowledges the generous gifts of Douglas C. Giancoli that have made this internship possible.

Application for summer 2019 Segrè Internship

Last Name _____ First Name _____ Initial _____

Home Address: _____

E-mail address: _____ Birthdate: ___/___/___

Phones: Cell (____) _____ Home (____) _____ Campus _____

SID# _____ CalNet Login Name: _____

Student Status: Undergraduate ___ Graduate ___ Major _____

Do you currently hold a fellowship? No ___ Yes ___ Title: _____

Have you now or ever, during your attendance at UC Berkeley, received any kind of financial aid
Yes/ No _____

If yes you must contact the Financial Aid Office (124 Sproul Hall) at UC Berkeley and check to see how this stipend may affect your financial aid money.

Submit this application to Winthrop Williams AFTER you have done so: _____

I have checked with Financial Aid Office Yes/ No _____ Your Signature _____

111 Lab Experience: Semester completed 111A BSC: _____

Semester completed 111B Advanced: _____

What was your 111A BSC Final Project: (If you need more space add sheets) Did it work? Y/N _____ explain

111B ADV Experiments performed: Atom Trapping (MOT), Nuclear Magnetic Resonance (NMR), Optical Pumping (OPT), Compton Scattering (COM), Atomic Physics (ATM), Non-Linear Dynamics (NLD), Quantum Entanglement (QIE), Muon Lifetime (MUO), Josephson Effect (JOS), Atomic Force Microscope (AFM), Hall Effect in a Plasma (HAL), Optical Tweezer (OTZ), Low Light Signals (LLS), Brownian Motion in Cells (BMC), Hall Effect In a Semiconductor (SHE), Gamma Ray (GMA), CO2 Laser (CO2), Rutherford(RUT)



Other relevant coursework:

Other lab/research experience:

Programming experience/knowledge/languages:

Shop and Tools experience (work with hand tools, soldering electronic circuits, etc.):

Please also attach resume describing work experience, and a sample of your schematic drawing or mechanical sketching, by hand is best, or by computer

Submit completed application to: Winthrop Williams
(offices 282E LeConte, mailbox 366 LeConte)
winthrop@berkeley.edu (Subject line = SEGRE111LAB);

Closing date: Monday, May 6, 2019