The Sensors, Energy, and Automation Laboratory (SEAL)

www.uwseal.com

WHAT IS SEAL?

SEAL stands for Sensors, Energy, and Automation Laboratory and is involved in the creation of new medical devices, consumer products, energy efficiency, and sensing systems for energy, transportation, and security. The team works under Professor Alex Mamishev in the Electrical Engineering Department at the University of Washington.

WHO ARE WE LOOKING FOR?

Students who are interested in:
- App development
- Computer programming
- Entrepreneurship
- Business processes
- Web development
- Technical writing
- Various fields of engineering
- Pre-med, pre-law
- Graphics designers
- Other specialties of high technology innovation.

EXPECTED STUDENTS

- **Freshmen and Sophomores**
  - who want to get into research early, so that they have enough time to go deep. Before graduation, they expect to amass substantial expertise and win numerous awards and will be well-positioned for graduate school or to become co-founders of successful high-tech start-ups based on their earlier projects within the lab.
- **Juniors**
  - who are interested in technologically advanced projects to hone their professional skills and bolster their project portfolio.
- **Seniors**
  - who bring industrial experience or other qualities critical to the lab.
- **Graduate students**
  - who are interested in developing a funded program who have already secured a strong publication record for themselves.
- **PMP graduate students**
  - who can complement lab expertise with their industrial experience. Participation in projects that can take place in the evenings and ability to participate remotely (this applies to a subset of lab projects).

BENEFITS WITH SEAL

**SEAL Can Offer:**
- Receive school credits
- Some work can be done off-campus
- Can be promoted to paid position based on performance and available funding
- Extensive prior experience may lead to an immediate paid position
- We Eat What We Kill principle
  - We don’t guarantee funding at entrance point, but there are many opportunities for students to earn funding
  - The more active and harder students work, the more likely they will end up in paid position
- Students will be expected to assist in grant applications and to apply for scholarships, awards, and business contests to expand their professional portfolio. We will actively guide this process and assist as needed.

HOW TO APPLY

- Before you apply, be sure to browse through the website materials (as well as review the PDFs on the apply page) to get a sense of our lab culture.
- When you are ready, submit a cover letter (using the cover letter template provided online), unofficial transcript, and resume as a single .pdf file.
- In the cover letter, specify your desired position, reflect on your grades, and highlight relevant activities to substantiate your interest.

LIST OF LAB POSITIONS

- **1) Design of electrical circuits.** This team designs circuits for wearable devices, which are used for the measurement of air pollution, dietary, and material properties, for medicine, security, and manufacturing.
- **2) Design of power electronics circuits and energy calculation.** Background in power and power electronics is helpful.
- **3) Signal processing.** Sensors generate intensive streams of data, which include sequences of numbers, sounds, images, etc. You will focus on data analysis and signal processing algorithms.
- **4) Mechanical engineers.** We build actual physical systems, and we need to model, design, and manufacture prototypes.
- **5) Engineering experiments** Systems we build need to be thoroughly tested, so that their performance is documented and the design can be improved in subsequent iterations. Examples of such devices include an electrostatic filter for indoor air quality, a wearable sensor for the monitoring of physical activity, and a high-reliability pump for the cooling of power electronics.
- **6) Technology commercialization.** Our lab is heavily engaged in the commercialization of new technologies. Many of these students will take on a leadership role in an individual project direction, so that they can coordinate writing business plans, conducting market analysis, securing angel investors, providing venture capital pitches, and assisting with the formation of new partnerships.
- **7) App and web development.** Some of our projects are focused on epidemiological studies. In order to test a medical hypothesis, a large number of people are given certain medical treatments and their conditions are monitored for an extended period. We partner with medics, for example, for monitoring of the behavior of children who live in highly polluted areas, toothbrushing habits, diet, exercise, etc. Each study requires the development of smart phone apps to collect and analyze the data. Also, our website needs a facelift.
- **8) Technical writing.** Every step of the research process requires the generation of reports, proposals, papers, and other rigorous manuscripts. We have a group of people who specialize in improving the skill set of all participants, consisting of English majors, programmers, and business majors.
- **9) Operations.** The lab is a complex organism and we need a “VP of Operations,” someone who will monitor and improve performance of individual team members. The position is a good fit for someone more interested in hands-on talent management than in the technical side of projects.