

EMBEDDED COMPUTING SYSTEMS

W ELECTRICAL & COMPUTER
ENGINEERING
UNIVERSITY of WASHINGTON

OVERVIEW

Computing is now embedded into almost all facets of our lives, including our homes, cars and mobile devices. Many of these computers aren't visible since they are embedded in and run in the background sensing, analyzing, and interpreting signals. For example, the modern automobile has hundreds of micro-computers coordinating with each other. Many safety innovations like anti-lock braking or lane assist are the direct result of embedded systems engineering. The embedded systems concentration combines a focus in software programming, digital electronics, computer hardware, and electrical systems to prepare students for roles in companies large, small, and startup. Embedded Systems is the most flexible concentration, enabling students to enter careers at the intersection of hardware and software.

AREAS OF IMPACT

- Air & Space
- Computing Data and Digital Technologies
- Environment Sustainability and Energy
- Health and Medicine
- Infrastructure Transportation and Society
- Robotics and Manufacturing

STUDENTS MIGHT BE INTERESTED IN THIS CONCENTRATION IF THEY ENJOY:

Computers & software programming, computer hardware, electronics, robotics. Working in teams with a variety of different skill sets, on a wide variety of problem types.



WHAT RESEARCH OPPORTUNITIES ARE AVAILABLE TO UNDERGRADUATES IN THIS CONCENTRATION?

Embedded systems provides a skillset in software, computer hardware, and electronics, that fits into many research groups. These include projects in high-performance computing, robotics, image processing, software development, and similar tasks. There is also significant research in the application of embedded systems to high-impact areas like health and sustainability. The best approach is to excel in your classes and then approach faculty in the relevant labs.

WHAT KIND OF INTERNSHIPS DO STUDENTS PURSUE?

Students in their 3rd (and sometimes 2nd) summer have done internships in a wide range of software and hardware companies, including large companies such as Microsoft, Google, Amazon, Medtronics, Intel, Micron, F5 and others, as well as smaller companies (including startups) and national research labs.

WHAT CLASSES OUTSIDE OF ECE WILL HELP STUDENTS LEARN RELATED AND USEFUL SKILLS?

Students should take as many software classes as they can to supplement their embedded knowledge. Also, gaining familiarity with users of their technologies is also helpful, including ECE courses from other concentrations such as: networking, controls, machine learning, DSP, and devices.

WHAT KIND OF PROJECTS DO STUDENTS COMPLETE IN THEIR CAPSTONE?

In the past, students have completed a broad range of projects including developing the embedded code to control autonomous drones, designing an embedded system for a heart pump, and developing safety and inspection robots for buildings. Recent projects integrated machine learning, computer vision, and front-end development in designing and implementing smart devices such as a smart wheelchair, shopping cart, a quadcopter, or devices for COVID-19 scenarios.

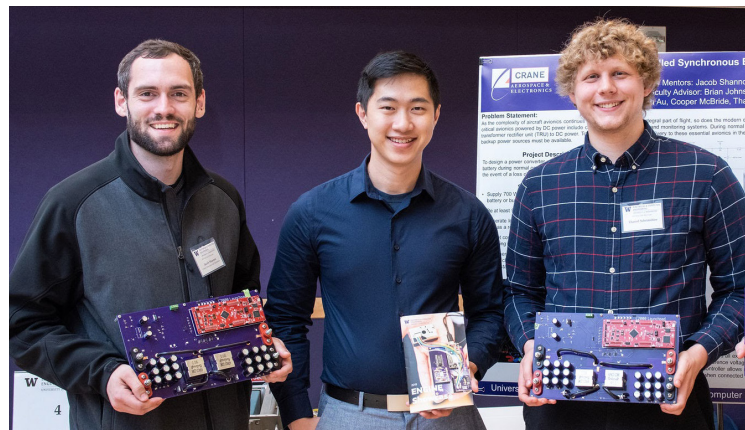
DO STUDENTS NEED A GRADUATE DEGREE SPECIALIZING IN THIS AREA TO BE MARKETABLE IN INDUSTRY?

Although a graduate degree is always an option, students can easily get a good job with only a bachelor's degree. However, an MS in the area is a strong option, and tends to increase the amount of hands-on design students can do in their first job.

WHAT KINDS OF JOBS DO STUDENTS GET AFTER GRADUATING?

Pretty much any hardware or electronics company will employ an embedded systems student, as well as many software companies. A student might join Microsoft to develop the next generation of high-performance computing systems and applications, or Micron to help develop new electronics systems. They might go to a startup developing embedded computing boards, a novel high-end espresso machine, or even Blue Origin to help develop spacecraft. Many students get internships or full-time opportunities as firmware engineers, embedded software engineers, or hardware/FPGA engineers.

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QUESTIONS? Contact us at: undergrad@ece.uw.edu or attend a prospective drop in session: bit.ly/eceadvising