Chemistry (MS)

https://internship.uoregon.edu/

The Knight Campus Graduate Internship Program (KCGIP (https://internship.uoregon.edu/)) is an accelerated master's program with five focus areas that combines lab and lecture content with a 9-month paid internship. We train students to be successful in the fast-paced, team-driven environment typical of the industrial or government lab setting.

Polymer Science

Polymers are an unusual class of materials because they simultaneously exhibit both fluid and solid like behavior. Polymers play a critical part in the fields of optics, semiconductors and molecular sensors. Within the field of optics, OLED and LCD displays rely heavily on polymers as both part of the assembly and in the case of OLEDs, the functional light emitting material. Every integrated circuit (semiconductor) relies on polymers for the lithography and etching steps needed to create the patterning of the microchip. The molecular sensor used to detect traces of TNT is in fact a polymer. Students in the polymer track typically have a bachelor's degree in Chemistry, Chemical Engineering, Polymer Science, Materials Science, Biochemistry and related disciplines. Students will earn a Master of Science in Chemistry with Emphasis in Polymer Science.

Photovoltaics and Semiconductors

Situated at the intersection of chemistry, physics and chemical engineering, the semiconductor (microelectronics) industry enables greener, smarter, and more connected economy. The field has significant implications in society's ability to support technology innovations and address the global energy crisis through applications in microprocessors, photovoltaics, LEDs and power transistors. For students who love to stay connected, semiconductor technology has driven advancements in the internet, 5G and IoT. And for the tech geeks who love smart technology – iPhone, Fitbit, self-driving cars- this field is ripe with opportunities. The continued success of this vast, interdisciplinary, and sophisticated yet innovative industry is deemed critical to long term US national competitiveness, which translates into impactful and well-paid job opportunities for those who choose to join this sector. Given the highly interdisciplinary nature of this track, students are recruited from multiple backgrounds including physics, chemistry, chemical engineering, materials science and electrical engineering.

Molecular Sensors and Biotechnology

This is a specialized field of chemistry, has wide spanning applications in the areas of health diagnostics, environmental monitoring, and national security. Like designing a lock for a key, each molecular sensor is designed to interact, detect and produce a measurable signal in the presence of a specific analyte. Inexpensive, user-friendly, and mass producible devices employing molecular sensors include CO detectors, glucose monitors and pregnancy tests. Advanced applications also exist for the diagnosis of COVID-19, detection of explosives and identification of air and water contaminants. Students interested in the biomedical field can apply their knowledge in the development of sensors for fluorescent imaging, drug development, pathogen detection and early detection of diseases. Students in this focal area typically have a bachelor's degree in Chemistry, Biochemistry, Chemical Biology, Chemical Engineering and related disciplines. Students will earn a Master of Science in Chemistry with Emphasis in Molecular Sensors & Probes. Common industrial and national lab job titles and general descriptions of roles that span the consumer products, pharmaceutical, medical, life science, agricultural and defense industries are provided below.

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Have in-depth knowledge in a main subfield of chemistry. Students will acquire this knowledge by doing advanced course work in the field, reading scientific papers, and optionally performing original research in the lab.
- Students pursuing a research master's degree will learn how to carry out independent chemistry research. Students will learn literature comprehension skills, will properly cite and reference techniques and methods, will be able to place one's research in context of the field, and will be able to communicate research results through scientific publications and presentations. Students will be able to formulate scientific hypotheses, understand the scientific method and apply it to research design, will become proficient at data gathering and interpretation, and will be able to write a research proposal. Students will pursue a research problem culminating in a written thesis that makes a significant and original contribution to the understanding of chemistry.
- Have professional development skills and knowledge. Students will attend professional meetings and make oral or poster presentations. Students will learn how to get internships in governmental labs, in industry, or in teaching. Students will learn soft skills, such as leadership, problem-solving, teamwork, communication.
- Understand and have awareness of professional, ethical and safety applications of their knowledge. Students will develop and understand the ethical and social dimension of science and the role and responsibility of chemistry for the advancement of the society. Students will learn and put into practice the expectations of responsible conduct in the professional field. Students will learn about laboratory safety and best safety practices.

https://internship.uoregon.edu/bgmp_curriculum (https://internship.uoregon.edu/bgmp_curriculum/)

Requirements

Please visit the program's website.

- Polymer Science (https://internship.uoregon.edu/polymers-curriculum/)
- Photovoltaic and Semiconductors (https://internship.uoregon.edu/photovoltaics-and-semiconductors-curriculum/)
- Molecular Sensors and Biotechnolgoy (https://internship.uoregon.edu/sensors-curriculum/)