College of Engineering

The College of Engineering enthusiastically embraces its unique role as the singular intellectual and cultural resource for engineering instruction, research, and outreach within the state. It provides the people of Nebraska with comprehensive engineering academic programs to fulfill their highest aspirations and ambitions.

The mission of the College of Engineering is to:

- deliver relevant and challenging educational programs to attract an outstanding diverse student body
- prepare graduates for rewarding careers in their chosen professions and encourage graduates to extend their level of knowledge through lifelong learning
- conduct leading edge research advances engineering science and stimulate the intellectual development and creativity of both students and faculty
- extend exemplary engineering service and transfer knowledge that contributes to the well-being and betterment of society.

Examples of research jobs in engineering:

- Developing novel 3D printing methods
- Growing and studying cells
- Developing hardware and software to track the usage of electronic cars adapted/retrofitted for children with mobility issues
- Analyzing and improving current crash test reporting methods

FYRE Jobs for 2020-2021

<table>
<thead>
<tr>
<th>Advisor Name:</th>
<th>Dr. Brittany Duncan</th>
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<tbody>
<tr>
<td>Advisory Department:</td>
<td>Computer Science and Engineering</td>
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<tr>
<td>Job Title:</td>
<td>Foundational interaction research with Drones</td>
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<tr>
<td>Project Description:</td>
<td>This project explores how users with and without experience using drones will interact with them in various scenarios. The goal of the project is to develop an understanding about how closely people will physically approach these systems and how the systems might communicate internal state or information when considering various situations, environments, and vehicle designs. As drones move out of the labs and into everyday use, the findings from this work will become more important to drone designers, end-users, and policy makers to ensure safe and effective interactions with these platforms.</td>
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<tr>
<td>Potential Student Tasks:</td>
<td>Students will learn to fly drones both manually (using a controller) and programmatically (through a computer), as well as understand the</td>
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</table>
expectations for human subjects testing, before beginning to run studies with actual users. Depending on student background and interest, projects will include some or all of: noise modeling, gesture design and testing, experiment design, and field studies.

<table>
<thead>
<tr>
<th>Student Qualifications:</th>
<th>Students with an interest in computer science, computer engineering, mechanical engineering, software engineering, sociology, psychology, or related fields would be well suited to perform this research. Most skills will be learned in the lab, so please apply if interested.</th>
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<tbody>
<tr>
<td>Available positions:</td>
<td>2 openings</td>
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<tr>
<td>Additional Comments:</td>
<td></td>
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### Advisor Name: Dr. Sri Kidambi  
**[www.focuslab.unl.edu](http://www.focuslab.unl.edu)**  
**Advisory Department:** Chemical Engineering  
**Job Title:** Undergrad Researcher  
**Project Description:** Disease in a Dish: Our lab focuses on developing disease models in a dish by recreating the tissue microenvironment at various stages of diseases. We have developed models for breast cancer, glioblastoma, liver fibrosis to name a few. We use a multidisciplinary approach incorporating biology and engineering tools to address challenging medical questions.  
**Potential Student Tasks:** Student will learn the methodologies by initially working with a graduate student in the lab and then be independent with their own project.  
**Student Qualifications:** Passion to address challenging medical questions; Eager to learn  
**Available positions:** 1  
**Additional Comments:**

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### Advisor Name: Dr. Forrest Kievit  
**[https://kievit.unl.edu/](https://kievit.unl.edu/)**  
**Advisory Department:** Biological Systems Engineering  
**Job Title:** Nanoparticles for the Neurosciences  
**Project Description:** The Kievit lab in the Biological Systems Engineering Department is utilizing engineering strategies to tackle neuroscience problems. Our research harnesses expertise in nanoscience, chemistry, biology, and medicine to create nanomaterials that interact with the body in specific ways to reduce the burden of disease. FYRE students will work as part of Dr. Kievit’s research team to explore the effects of nanoparticle characteristics on their behavior in treating in vitro and preclinical models of neurological diseases including traumatic brain injury, neurodegenerative disease, and brain cancer. Research efforts will contribute to the development of novel nanomaterials that improve the treatment of these diseases with the goal of eventually translating into clinical use. Come help us improve the medical field by engineering novel solutions!  
**Potential Student Tasks:** Students will have the opportunity to synthesize and characterize cutting-edge nanoparticles, conduct cell culture of various cell lines used to test...
the efficacy of these nanoparticles, and/or assess cell/tissue lysates for treatment mechanism of action. Students will be expected to work closely with a graduate student mentor to plan experiments and collect/analyze data, attend weekly lab meetings to present data, and assist with general lab duties shared by everyone.

Student Qualifications: Successful students should be enthusiastic about the research with a willingness to gain an in-depth knowledge of the field through independent reading of relevant literature, self-motivated, able to work with a team of other undergraduate and graduate students as well as independently on individual tasks, and able to manage their time effectively. Remember, research is hard. You just won’t believe how vastly, hugely, mind-bogglingly hard it can be (yes, this is a revised Douglas Adams quote). But this is also what makes it fun and rewarding! If you work on what you’re passionate about, work hard at it, and are proud of it, you will find yourself in a career that keeps you happy, engaged, and fulfilled. You can learn to love the process, not just the outcome. Therefore, successful student should have the grit it takes to enjoy the process of research, not just the outcome.

Available positions: 2

Additional Comments:

Advisor Name: Dr. Tiffany Messer
https://engineering.unl.edu/messerresearch/

Advisory Department: Biological Systems Engineering

Job Title: Laboratory / Field Assistant

Project Description: Per- and polyfluoroalkyl substances (PFAS) are persistent environmental contaminants that have been recently detected in many environmental compartments including soil and water. Exposure to PFAS has been associated with human health impacts due to their carcinogenic nature. A potential transport route for PFAS to surface water is through land applied biosolids. Although numerous benefits are gained from biosolids applications, contaminants occurring in biosolids, such as PFAS, can be introduced to soil and water adjacent to fields with land-applied biosolids after precipitation events. To date, there is limited information regarding the fate of PFAS in agricultural systems including the factors that influence the transport of PFAS from agricultural fields with biosolids to adjacent surface water or via uptake into plants. Therefore, the primary goal of the proposed research is to investigate the occurrence and implications of applying PFAS laden biosolids into Nebraskan agroecosystems and provide one of the first evaluations of potential exposure to PFAS contamination from biosolid applications in the Midwest.

To accomplish this the proposed project will: 1. Assess PFAS fate and transport from waste water treatment plants (WWTPs) to surface water and agroecosystems receiving biosolids; 2. Quantify PFAS fate in agroecosystem receiving biosolids (i.e., runoff, agricultural crops).

Outcomes from this project will include: 1. Improve understanding of the upstream prevalence and downstream contribution of PFAS from WWTPs
to surface waters; 2. Quantify the contribution of PFAS from biosolids to agricultural fields; and 3. Identify the fate and transport of PFAS on agricultural fields receiving biosolids.

**Potential Student Tasks:** Assist graduate students in collecting and processing water quality samples, conducting experiments in the mesoLab ([https://engineering.unl.edu/messerresearch/updates/](https://engineering.unl.edu/messerresearch/updates/)), visiting field sites in Lancaster County, NE, and potentially working remotely (depending on the COVID19 status) for processing data.

**Student Qualifications:** Candidates must be open to learning or have experience in general programming skills (e.g., Matlab, R Studio, SAS) and enthusiasm for research both in the laboratory and outside in wetlands and rivers. Dr. Messer and her team are committed to an inclusive lab environment and encourage students from underrepresented groups to apply.

**Available positions:** 1

**Advisor Name:** Dr. Can Vuran

**Advisory Department:** Computer Science and Engineering

**Job Title:** Rural Wireless Connectivity with Software Defined Radios

**Project Description:** Rural farms, ranches, and communities lack adequate broadband connectivity. This project will be a part of a large effort to develop model rural broadband connectivity platforms for farms, ranches, and communities in rural Nebraska.

**Potential Student Tasks:** Rural farms, ranches, and communities lack adequate broadband connectivity. This project will be a part of a large effort to develop model rural broadband connectivity platforms for farms, ranches, and communities in rural Nebraska.

**Student Qualifications:** Eager to work in a large team setting. Programming background and/or hardware development background.

**Available positions:** 3

**Additional Comments:**

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**Advisor Name:**

**Advisory Department:**

**Job Title:**

**Project Description:**

**Potential Student Tasks:**

**Student Qualifications:**

**Available positions:**

**Additional Comments:**