UDRAW Spring 2020

Chemical Engineering

Job Description:
The Fromen Lab studies inhaled drug delivery in the lung. Under the direction of the Principal Investigator, Prof. Fromen, and her graduate students from the Chemical Engineering Department, the undergraduate research assistant will perform a number of experiments involving the design of new inhaled medicine and development of new preclinical testing equipment. Depending on the student interest and/or fit, the undergraduate student may work on one of two projects:

Project A. The Fromen lab is designing an elastic "breathing lung" replica from 3D-printed parts of human CT scans. If joining this team, the student would learn skills of CAD, CT segmentation, and 3D-printing on an M1 Carbon printer, as well as assisting in the assembly and motorization of the lung replica.

Project B. The Fromen lab is creating polymeric nanoparticles to develop the next generation of inhaled vaccines, specifically by controlling the rate of nanoparticle degradation. If joining this team, the student would learn skills of nanoparticle synthesis, characterization, degradation studies, and basic cell culture assays.
Working with a graduate student mentor, the undergraduate student on either project area will maintain a research notebook, participate in experimental design and research discussions, execute research experiments, and interpret research results. The student will be responsible for maintaining a clean workspace, reporting results, and attending regular research meetings. We are looking for a student who is punctual, a self-started, and interested in learning new research skills.

Approximately 8-12 hrs required per week. Contact Prof. Catherine Fromen cfromen@udel.edu for more information

Education

Job Description: The undergraduate research scholar will work with Dr. Bryan VanGronigen's research program, which centers on (a) how to improve schools and (b) how to prepare educational leaders. Depending on interest and/or fit, the scholar is welcome to work on one or more of the following three projects:

- *Project A* is a study working with educators who are participating in a teacher leadership for school improvement program in a Midwestern state. We're interested in learning about their experiences in the program along with how they plan to enact what they're learning in their own schools. If joining this project team, scholar responsibilities could include helping review the literature, assisting with data management, interviewing educators, cleaning and analyzing data, and/or writing up findings.
- *Project B* is a study focusing on faculty members, current students, and recent graduates who are associated with five nationally recognized educational leadership preparation programs. We're interested in their assessments of their courses and assignments, specifically on the extent to which those courses and assignments have influenced their mindsets and leadership types. If joining this project team, scholar responsibilities could include cleaning and analyzing data and writing up findings.
- *Project C* is a study examining how state departments of education assist schools in developing school

improvement plans, especially schools labeled as "underperforming." We're interested in understanding how states "frame" school improvement planning. If joining this project team, scholar responsibilities could include assisting with data gathering, cleaning and analyzing data, and/or writing up findings.

A number of other projects are either in progress or under development, so if a scholar is interested in the research program in general, feel free to reach out to explore potential alignment among interests and work needed.

Required Skills: The scholar will join a multi-site research team, and our only required skill is your ability to work collegially, professionally, and independently.

Preferred Skills: While our team will mentor you with what you need to know, we can move faster if you have a working proficiency of Microsoft Word and Excel and the Google Apps suite (Docs, Sheets, Forms). Moreover, while not required, we'd hope you have an interest in education and educators, even if you're not an education major or minor. All are welcome!

Approximately 3 to 10 hours per week dependent on project workload needs.

Contact Dr. Bryan VanGronigen for more information and/or to apply – bvg@udel.edu

Education

Job description: Dr. Barbieri's research program centers broadly on instruction for students who struggle in math. Specifically, her work focuses on the evaluation and application of learning principles to improve mathematical competencies and motivation for math, especially for students at risk for low mathematics achievement. Dr. Barbieri studies mathematical competencies from preschool to adulthood. A core part of her work aims to understand how common mathematical errors can be used most effectively to reduce misconceptions and improve learning in math content areas that students commonly struggle with. Recently this has involved both algebra and fractions, both gateway topics for success in STEM disciplines and careers. Dr. Barbieri also considers the role of motivation and attitudes towards mathematics in student learning.

In Spring 2020, Dr. Barbieri's various projects on mathematical cognition and learning will have a range of activities for an undergraduate scholar to receive mentoring in, such as analyzing students' problem-solving skills and explanations, creating databases, and preparing conference submissions.

Approximately 10 hours of work required per week

Contact Dr. Christina Barbieri for more information - barbieri@udel.edu

Fashion and Apparel Studies

Second Generation Textile Production (Fashion Design and Product Innovation)

The undergraduate research assistant would be responsible for maintaining lab, processing materials and developing textile samples as well as assisting faculty sponsor with related lab tasks such as sourcing textiles in collaboration with community partner Goodwill of DE.

Design and creative interest/ability as well as interest in sustainable textile innovation.

Approximately 5 hours of work required per week.

Contact Dr. Kelly Cobb – kcobb@udel.edu

Geology

Job Description: Student will work with the Mantle Processes Group, which uses rock samples to understand the interior of the earth. We are looking for a student to participate in cataloging and organizing field samples, organizing data in Excel spreadsheets, and assisting with keeping the research laboratory in order. Student will participate in weekly lab meetings to gain familiarity with geoscience research.

Required Skills: Strong organizational skills and experience with Microsoft Excel. We would like you to have an interest in rocks, as a project can be developed from this introductory lab work.

Approximately 3 hours of work required per week.

Contact Dr. Jessica Warren – warrenj@udel.edu

Material Engineering and Composite Materials

Job Description: Student will conduct characterization experiments for fibers and resins that are used to manufacture composites. Student will also assist in experiments to manufacture composites.

Required Skills: We will teach you everything else you need to know to about working in the lab and our research projects. Safety trainings will be provided.

Approximately 8-10 hours of work per week.

Contact Dr. Suresh Advani – advani@udel.edu

Job Description: Student will conduct characterization experiments for fibers and resins that are used to manufacture composites. Student will also assist in additive manufacturing experiments.

Required Skills: We will teach you everything else you need to know to about working in the lab and our research projects. Safety trainings will be provided.

Approximately 8-10 hours of work per week.

Contact Dr. Suresh Advani – advani@udel.edu

Mechanical Engineering

Post-processing research results with MATLAB

Job Description -- We are looking for a few students to help us post-process and conduct some literature search. The area of research involves nanoscale materials, machine learning, computational modeling, electronic materials, biomaterials, photovoltaics, and solid-state battery. We have fully developed MATLAB codes for performing the required post-processing tasks. Familiarity

with MATLAB will be helpful. Students with an interest in fundamental research and/or an interest in making contributions to manuscript preparation for journal publications are encouraged to apply. The student will work in the Department of Mechanical Engineering at the Laboratory of Mechanics and Physics of Heterogeneous Materials. If there are any questions regarding the position, please send an email to zubaer@udel.edu with a subject UDRAW-Application.

Requirements -- Background and interest in physics, chemistry, biomaterials, mechanics, or materials.

Time commitment -- Approximately 5 to 10 hours per week, depending on the student's availability.

Medical and Molecular Sciences

Parashar laboratory at Department of Medical and Molecular Sciences

Position 1: Protein expressionist

Job Description: Student will work with faculty member in the lab to conduct protein techniques used in protein expression workflow. The student's responsibilities will include: (1) making and sterilizing bacterial growth media, (2) large-scalebacterialcultureharvestingbycentrifugation,(3)makinggelsandperforming protein electrophoresis, (4) protein gel scanning and documentation, (5) dish washing using automatic dishwasher. Trainingswillbegivenforeachoftheabovetasks.

Required Skills: Theoretical knowledge in Microbiology will help. Previous experience performing any of the above-mentioned tasks is a plus. Strong interpersonal skills are necessary.

Approximately 10 hours of work required per week.

Contact Vijay Parashar - parashar@udel.edu

Position 2: Gene cloner

Job Description: Student will work with faculty member in the lab to conduct genetic techniques used in molecular cloning workflow. The student's responsibilities will include: (1) setting-up PCR reactions, (2) plasmidisolationfrombacteria,(3) runningagarosegelelectrophoresis,(4) performinggelextractionofnucleicacids,(5) performinggenetictransformationsinbacteria. Trainingswillbegivenforeachoftheabovetasks.

Required Skills: Theoretical knowledge in molecular biology and cloning will help. Previous experience in performing any of the above-mentioned tasks is a plus. Strong interpersonal skills are necessary.

Approximately 10 hours of work required per week.
Contact Vijay Parashar - parashar@udel.edu

Position 3: Protein Purification Specialist

Job Description: Student will work with faculty member in the lab to conduct techniques used in protein biochemistry. The student's responsibilities will include: (1) setting-up SDS-PAGE runs, (2) scanning SDS-PAGE gels and labeling gel pictures, (3) Preparingsolutions forproteinpurification. Trainingswillbe givenforeach oftheabovetasks.

Required Skills: Theoretical knowledge in protein biochemistry will help. Previous experience in performing any of the above-mentioned tasks is a plus. Strong interpersonal skills are necessary.

Approximately 10 hours of work required per week.
Contact Vijay Parashar - parashar@udel.edu

Neuroscience

J**ob Description**: Neuroscience major with high GPA to become involved in randomized clinical trial studying parenting intervention effects on children's behavioral and biological outcomes.

Contact - Dr. Mary Dozier – mdozier@psych.udel.edu

Sociology and Criminal Justice

Job Description: This would be a great opportunity for a student interested in the law and/or disaster research and practice. Professor Sanders is an attorney and the Director of the Bill Anderson Fund (baf.udel.edu). The research assistant ("RA") will assist Professor Sanders with identifying national researchers and practitioners involved in the area of disaster law. The RA will help research the various doctrinal and experiential courses and writings in the area. The RA will help Professor Sanders create a listserv or social media community to help researchers and practitioners share articles, courses and other ideas as a community involved in disaster law.

Contact: msanders@udel.edu

Required Skills: Web based research skills and some database creation experience, but we are willing to help. Must have the maturity to work independently and remotely at times.

Plant and Soil Sciences

Job Description: Urban Ecology Lab – Research Assistant. The student will work in an active Urban Ecology Research Lab in the Plant and Soil Sciences Department at the University of Delaware as a part-time research assistant. The position provides experience in urban ecology and global change research. Duties will include assisting graduate students with field sample collection and tree planting, and with plant and soil sample preparation for isotope analysis. The position is for 5-10 hours per week and starts immediately continuing through the fall semester. Renewal of position in the spring is contingent on performance.

Required Skills: All required skills will be taught for the position; however, ability to work independently and collegially is required. This position is for eligible students with work-study funding.

To apply: Please send letter of interest, unofficial transcript, and one letter of recommendation to Dr. Tara Trammell (ttram@udel.edu).

Psychology

Job Description: Seeking a research assistant who can assist with near-infrared immunohistochemistry and run behavioral procedures such as fear conditioning and extinction training in rats. Person should be comfortable performing euthanasia and know basic bench chemistry and how to use a cryostat. We are seeking 10-15hrs/ week for this individual.

Contact – Dr. Dayan Knox - dayank@udel.edu

Web and Social Media Development

Job Description: The Bill Anderson Fund (baf.udel.edu) is looking for an art and design student interested in expanding their portfolio while learning more about inclusion and innovation in the disaster sciences. The research assistant ("RA") will be engaged in some web development and content creation, but mainly focused on understanding response rates and "stickiness" of the Fund's various outlets. Over the course of the semester, the RA will have a portfolio of web pages and social media content as well as quantitative research outcomes about how the Fund's target audiences' digital engagement. Contact: msanders@udel.edu

Required Skills: Intermediate to advanced WordPress and coding skills (optional) and some exposure to quantitative research. Must have the maturity to work independently and remotely at times.