

SUMMER 2024 RESEARCH EXPERIENCE

Upper Mississippi Center for Sustainable Communities

The positions are full time paid positions (35-40 hours per week with an hourly rate of \$11.25) and will run for 10 weeks starting Monday, June 3rd.

Students will assist in the UMC Sustainable Watershed Project: The project involves assessing the overall health of several watersheds of the QC Region including water quality data (nutrients, metals, sediment, turbidity, salts, microplastics, etc.), aquatic habitat and channel geomorphology, aquatic and fish communities, and riparian zone plant community integrity. The project also involves assessing stakeholders' (residents, business owners, etc.) attitudes towards these watersheds. This project will end with deliverables to the City of Davenport through a report or presentation with generalized data analyses. Not only will field and lab skills be enhanced, but so will your ability to engage with the community. **Research Assistants will develop an independent research project related to one focus below.**

Personal Project Focus Opportunities:

1. Sustainable Watershed Project

- a. **Microbial Source Tracking Pilot:** The DNA Sequencer is a new DNA-based technology at Augustana that can determine whether microbial fecal contamination is from animals or human sources. This [microbial source tracking project](#) can be a reference for understanding the project. This project extends from past research in assisting the City of Davenport in identifying sewer leaks that affect water quality, environmental health, and public health. This project is for a student that has completed Genetics prior to the summer of 2024. Experience with molecular biology would also be helpful, but is not required.
- b. **Microplastics in Aquatic Systems:** Microplastic counts in local watersheds can be studied by counting microplastics in samples of water, sediment, and fish. These data methods are continuing to develop on various scales. An interest in growing our understanding of [microplastics in our nation's waterways](#) is best suited for this project. [Dr. McCall's](#) website has pictures and explanations that provide a glimpse into what this project's fieldwork will consist of. Lab work will also be a large part of this process, as well as gaining skills in aquatic sampling techniques, identification of aquatic species, proper handling and preservation methods, and lab skills with dissection, experimental design, and data management. If you are interested in this project check out [what students have done with a similar opportunity](#).
- c. **Nitrogen Uptake:** This project will take organization, fieldwork, and lab work. Understanding nitrogen uptake in relation to agricultural fertilization and runoff can paint a picture of what is happening in the nitrogen cycle in relation to human land use. [Calculating discharge of phosphorus and nitrogen with](#)

[groundwater base flow to a small urban stream reach](#) would be a good read if you are considering this personal project.

- d. **Comparative Case Study on Stream Daylighting and Stakeholder Identification:** Environmental Studies is not only ecological, but social. The decisions humans make can affect the environment and ecological function. Humans have buried streams as a technique to manipulate the land for the use of building structures, roads, and/or other human uses. A local creek in Davenport is buried underneath many impervious surfaces, such as the North Park Mall and a portion of the over 100 acre parking lot. Though this stream is buried currently the idea of daylighting is something for investigation. Along with understanding who stakeholders are and how best to engage with them about this topic. Check out [Bee Branch Creek Restoration | Dubuque, Iowa](#) to understand what the end goal can look like after this preliminary research is executed.
 - e. **GIS Watershed Management:** Connect past watershed data to GIS Database. Delineate watersheds and organize shape files. This project would be a continuation of GIS watershed data organization and incorporations of other factors such as stormwater drains, entrenchment ratio, fish population data and other related watershed factors. It is required that you have taken Introduction to GIS if you have an interest in this project. If you have any extra experience with GIS, please note that in your application.
 - f. **Photosynthesis and Respiration:** This project utilizes [HYDROLAB Series 5](#) to gain data on photosynthesis and respiration in local streams. This data can be compared to water quality, land use, lidar data, and more.
 - g. **Geomorphic Measurement Project:** Entrenchment ratio and flood prone area width are just two of many [terms commonly used in stream geomorphology](#) that would be worth researching if you want to understand more about how geomorphology data can be compared to other watershed data.
2. **Urban Wildlife Inventory Project:** A research project with neighboring cities to assess the abundance and diversity of wildlife populations in the riparian natural areas of urban and agricultural landscapes. The project involves using non-invasive camera traps to document the distribution and behavior of wildlife. The work involves a combination of ecological field work and computer lab work to compile and analyze collected data. [Urban wildlife Information network](#) can be a source to better understand this project.

RESPONSIBILITIES

The responsibilities of all research assistants will include:

- Participate in community-based field work including natural spaces, yards, streams, and local neighborhoods
- Keep detailed records of procedures and methods used to collect and analyze data and information

*Email application or questions to peytonheisch@augustana.edu or fill out the application on Handshake

- Participate in lab work with the expectation that by mid summer students can complete lab tasks confidently alone
- Work with a spreadsheet and/or database program to input and track information
- Prepare final reports, memos, and literature reviews; including annotated bibliographies summarizing research findings
- Use interpersonal skills and work as a team with students, professors, city staff and community members with a professional demeanor and work ethic
- Organize and manage multiple projects to meet milestones and deadlines
- Maintain resources for research with emphasis on cleaning and protecting lab space and field gear
- Depending on the project, work in outdoor environments and collect environmental samples, which may require working in steep, heavily forested terrain and under adverse (hot & humid, rainy) weather
- Clean, compile, and analyze data from a diverse array of sources, often in the face of substantial uncertainty and incompleteness
- Commitment to attention to detail by thoroughly collecting data and analyzing it to the best of your ability

APPLICATION PROCEDURE & DEADLINE

Applications will be accepted through Friday, February 23, but will be considered on a rolling basis until all positions have been filled. To apply, submit the following via Handshake.

1. A brief cover letter (1-page) that addresses: (1) paragraph describing your interests in the projects and how it relates to your career goals and experience relevant to the above-described responsibilities, and qualifications; (2) paragraph ranking your top three project focus interests in the above-described projects (#1 most interested); and (3) indicating whether you have Augie Choice funds available to support your participation.
2. Resume (1-page) describing relevant employment and academic experience and describe any of the above-mentioned specialized skills you possess.
3. Contact information for two references that can speak about your work ethic and experience relevant to the above-described responsibilities.

ADDITIONAL DETAILS ABOUT THE EXPERIENCE

- This faculty-mentored undergraduate research experience comprises a full-time (35-40 hrs per week) 10 week experience
- The expectation is for research students to take at most one week off during the experience and that week be scheduled prior to the start of the experience. Other necessary absences need to be scheduled ahead of time (minimum of two weeks) for planning purposes (obviously emergency situations are an exception to this policy)

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- The expectation is working M-F from about 7:30-4:30 (some weeks we may work longer hours).
- You will be reimbursed for any travel related expenses (driving your own car to field sites, etc.)
- Funding is available to cover supplies and equipment related to your individual research question.
- Personal projects require intrinsic motivation and dedicated efforts. This will be bolstered by a professor that has in depth knowledge about the project focus you choose.
- The experience comprises a balance of field work and laboratory work (the exact balance will depend on the nature of the individual research question you seek to pursue)
- Over the course of the summer, the expectation is that 75% of your time is spent conducting project related research with the remaining 25% is spent pursuing your individual research project
- The experience is structured like a graduate research lab with the expectation that all team members help each other with their related individual research projects when needed.
- Some of the fieldwork is conducted in rugged, dense-vegetation terrain in a range of weather conditions (extremely hot and dry to cool and wet). Hiking boots or shoes and light-weight long pants and shirts (quick dry) are essential. Lunch is often eaten in the field and is nearly always packed for the day.
- Aside from proper field and lab attire and bringing your own lunch and water you are not required to bring anything other than your attention and dedication for the entirety of the ten weeks.