2014

SUMMER UNDERGRADUATE RESEARCH FELLOWSHIP PROGRAM

A Partnership

between the

UW-SUPERIOR FOUNDATION

and the

UW-SUPERIOR CENTER for UNDERGRADUATE RESEARCH, SCHOLARSHIP, and CREATIVE ACTIVITY
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Program Overview

The Summer Undergraduate Research Fellowship (SURF) Program at UW-Superior was initiated in 2012 and is now in its third year of operation. The purpose of the SURF program is to provide opportunities for students and faculty/staff to collaborate on an in-depth research, scholarly, or creative project during the summer. Summer Fellows and mentors both receive a stipend for working on their project for a ten week period during the summer. Students and mentors work together on all phases of the project, from proposal development to designing the project, carrying it out and presenting the results.

Ten (10) student/mentor teams were selected from nineteen (19) proposals received this year. The scope of this year’s projects truly reflects the broad spectrum of the liberal arts at UW-Superior, and the projects address a wide variety of issues – some are global in nature and others are very locally focused. In addition to their project work, Summer Fellows met as a group twice a month to discuss their progress, hear about other research opportunities, and learn about how to share the results of their work. For the first time since the program began, all participants presented the results of their work at a campus SURF Symposium on October 22. Several of the students plan to submit their work for publication in undergraduate or disciplinary journals as well.

The SURF recipients, mentors, and staff of the Center for Undergraduate Research, Scholarship, and Creative Activity thank the many generous supporters and donors to UW-Superior and the UW-Superior Foundation for making this program possible. Thanks are due to the faculty and staff who reviewed proposals (Michelle Arnhold, Sergei Bezroukov, Peter Cook, Amy Eliot, Suzanne Griffith, Daniela Mansbach, Eleni Pinnow, Ralph Seelke, and Zamira Simkins), and numerous others who support undergraduate research, scholarship, and creative activity by serving on the advisory committee, reviewing proposals, mentoring students, and in countless other ways.

2013-2014 Undergraduate Research, Scholarship, and Creative Activity Committee:
Co-chairs Michelle Arnhold Davies & Kristin Riker-Coleman; Lynn A Goerdt, Marsha Francis, Deborah Schlacks, and Gabriela Theis

URSCA Program Manager: Julie O’Leary
Domain Coloring

Student: Christopher Anderson
Mentor: Dr. Chad Scott

Chris Anderson’s project was the creation of oil paintings depicting complex-valued functions. Students dealing in algebra and calculus are frequently called upon to create sketches of real-valued functions for the insight that visualization can provide, but similar graphs of complex-valued functions are not easily shown due to their four-dimensional nature. The technique of domain coloring utilizes color (both hue and brightness) to achieve this visualization. Chris chose this technique because our eyes are great at noticing big-picture patterns and an artistic depiction forces the viewer to really look at the subject, in this case the painting of mathematical structures. Chris compares solving problems and writing proofs to writing a fine piece of poetry in that both strive to capture the essence of an idea in concise, communicable language. He refers to mathematics as the "language of patterns" for this reason.

Chris is a senior studying Mathematics and Physics and is from Duluth, Minnesota. He graduated from high school with a disdain for mathematics that he didn’t question until he found himself in a math class with a professor who emphasized understanding and appreciation over “lining up his equal signs.” Once he began to see the creative, abstract, and imaginative side of mathematics that he had shut himself off from, the history and evolution of mathematics, as well as its continuing progress, has become a source of great joy to him. Chris is grateful for the opportunity his SURF provided in allowing him to explore and articulate these ideas.

“Mathematical analysis and mentorship is expensive in expertise, and painting is expensive in supplies; both are expensive in time. The guidance and experience I received from my mentor, Dr. Chad Scott, this summer were invaluable to my growth as a student and a person.”
Randy Bender worked with Dr. Maria Cuzzo analyzing the influence of the United States on Japan’s post-World War II constitution. The theme of this project was centered on constitutionalism and how constitutional engineering techniques can be beneficial to a nation in rebuilding, how those techniques should be carried out, and what effects they might have if poorly executed. Randy looked at diplomatic interactions between the U.S. and Japan from 1932 to 1950, exploring the history, social and political backdrops, and legal concepts embedded in Japan before and after World War II. His research took him to the Douglas MacArthur Archives in Norfolk, Virginia where he sifted through nearly 500,000 documents, making over 800 copies to bring back for further analysis.

Randy’s final paper analyzing and describing the Japanese Constitution is 32 pages long and over 15,000 words. Randy hopes that his research describing the concepts used by Americans during the Japanese occupation might be utilized for the development of distinct but similar constitutional reforms abroad. He would like to continue his research on the implementation of constitutions by looking at other current examples.

Randy is from Duluth, Minnesota and is a junior majoring in Legal Studies with a minor in Modern Theory. He is also currently enrolled at the University of London-Birkbeck as a distance learning student studying philosophy. Randy participates in the Pre-Law Society and captains the Mock Trial team and plans to attend law school after he graduates.

“I am extremely thankful for my SURF experience, which has added the fuel necessary to advance inspiration and ideas which found important movements for change.”
Jordin Gegare completed a research project involving a cultural study of *The Jungle Book* by Rudyard Kipling. She began by reading the book, before creating a bias by reading other authors’ interpretations and analyses. Then, to establish a theoretical foundation, she read several publications about literary theory, almost all explaining and analyzing Postcolonialism. Jordin also read the major authors, such as Kaori and Randall, connected with Postcolonial studies of Kipling before, beginning to actively draw her own assertions and identifying the assertions of said authors. She composed a thesis and paper, to be submitted for publication, as the end product of her project. Jordin met regularly with her mentor, Dr. Hilary Fezzey, who helped her understand the intricacies theory and the groundwork for professional writing. While her SURF project has come to an end, Jordin hopes to continue to expand this work by creating a complimentary research paper involving Kipling’s most famous novel: *Kim*.

Jordin is a senior majoring in Legal Studies and English. Being a part of the SURF program was a life changing experience for Jordin, who learned more about herself and the potential she has for a career involving English. A native of De Pere, Wisconsin, she originally chose to attend UW-Superior because of her interest in a legal career, but is now looking into graduate English programs involving Postcolonial studies, and seriously considering becoming a college educator.

“The SURF grant and working with Dr. Fezzey has helped me realize there’s a deeper passion within me than just Law. Where I go from here is uncertain, but I know that English will always be my first passion, and I have the SURF grant and Dr. Fezzey to thank for helping me realize that.”
Students of Color at UWS: Effectiveness of Peer Mentoring Program

Student: Kang Her  
Mentor: Dr. Lynn Amerman Goerdt

Kang Her’s project was an investigation how the UW-Superior Peer Mentoring Program impacted the students of color who participated in the program, as well as how it impacted their educational experience at UW-Superior. In conducting this research, Kang wanted to understand and learn how and why being participants of the Peer Mentoring Program helped students with their academic success. Kang’s project built upon research she began as a McNair Scholar at UW-Superior, in which she used a secondary data collection method. She was interested in taking a different approach, using qualitative research methodology, to look at the same program. Her qualitative study consisted of collecting information through in-depth interviews and then analyzing it using a specialized software program created for use in qualitative research. Kang worked with her mentor, Dr. Lynn Goerdt, to learn the research methodology and the software. She created a poster to share the results of her project.

Kang is a senior and is majoring in Social Work. She is originally from Roberts, Wisconsin and came to UW-Superior because she liked the small campus and class sizes. She plans to attend graduate school to pursue a master’s degree in Social Work. Kang would like to work in student affairs because she has a strong passion to motivate individuals to understand the importance of higher education and why they need to pursue it.

“This SURF project was an amazing experience and really opened my eyes to learning different research methodologies. I am thankful for the donors who contributed to make this funding possible for students. “
Jami Konkler worked with Dr. Jamie White-Farnham, her mentor from the Writing Department, on a project that explored the rhetorical voice of gender throughout 70 years of the UW-Superior campus student newspapers. Jami was particularly interested in this subject because she plans to attend graduate school for Composition and Rhetoric. The project originally began with a focus on the genders and how their voices were represented in the newspapers; however, in the end, the importance of the female voice and its emergence was the main focus of her paper. This was apparent in Jami’s research of the student newspapers *The Peptomist* and *The Promethean* between the years 1920 and 1990.

Jami’s project included three phases of research: archival research of the newspapers, literature review and scholarly research outside of the newspapers, and drafting and revising her paper. In the end, an article discussing her research and an analysis of her findings was completed. Since completion, she has been working on sending her written piece to undergraduate journals for publication.

Jami is a senior working towards a double major in English and Writing. She is from the small town of Brule, Wisconsin and decided to attend UW-Superior because she was intrigued by the idea of smaller class sizes and more one-on-one work with professors. This SURF project has helped her realize that writing is something that she wants to pursue in the future. She plans to further her education in writing by pursuing her graduate and doctorate degrees in Composition and Rhetoric. She hopes to become a writing professor and help future students fall in love with writing.
Evaluating the Water Quality of Faxon Creek, Identifying the Sources of Contamination, and Assessing the Potential Threat to Superior Bay

Student: Benjamin Olson
Mentor: Dr. William Bajjali

Ben Olson studied the water quality of two streams in Superior: Faxon Creek, which runs through campus, and an unnamed tributary to the St. Louis River that runs through the Superior Municipal Forest. Ben and Dr. Bajjali were interested in learning what is affecting the water quality of the streams and how they, in turn, impact the water quality in Superior Bay. Their major interest was how urban development affects water quality, so the tributary was used as a control for analyzing Faxon Creek. Ben determined the water quality through weekly water sampling at four sites on each stream. He then used ArcGIS to determine the watersheds of the streams, and to identify the land uses in each watershed. The sampling revealed Faxon Creek to be contaminated, while the tributary was not. Using the land use map created in GIS, the contamination could be attributed to the urban development and runoff that Faxon Creek is exposed to. Despite the contamination, Ben determined that there is no immediate threat to Superior Bay because the creek water is so heavily diluted when it enters the bay that all parameters are returned to safe levels.

Ben grew up in Brainerd, Minnesota, where he spent the majority of his time fishing. He transferred to UW-Superior from UW-Whitewater to be near the kind of ecosystem he always loved. He is majoring in Biology, with an emphasis on aquatic ecosystems and a minor in Geographic Information Systems (GIS). Ben’s project was a perfect fit with his love for the water, his interest in the aquatic ecosystems of the region, and his skill with computers. He learned to conduct his own research, and he gained experience in using the ArcGIS program in real-life research. Since completing his project, Ben has become a student assistant in his mentor’s classes.
Experiments with Local Clay

Student: Daniel Paulson  
Mentor: Mike Maguire

Dan Paulson’s research explored the use of local clay to make one-of-a-kind art work. His interest in this subject began when he looked into starting his own clay studio and realized that the cost of raw material, such as clay, can be a significant expense. Dan wanted to know whether it was feasible for schools and pottery studios to use locally harvested clay to lower their cost of materials and to add a unique element to their work. Dan collected clay from five different clay bodies in the region, processed it, and made ceramics and glazes with the clay to evaluate its characteristics.

Dan learned that clay from the Lake Superior area can contain calcium in the form of limestone, which causes the clay body to break apart after it is fired. This is a major reason why local clay is not commonly used. It was possible to process the clay to get rid of the limestone, but this was time consuming. Dan found that clay bodies that are high in limestone made wonderful glaze. Each type of clay he collected had unique qualities. Some made a good raku or pit firing clay body, while others were really good for making glazes. Dan also experimented with mixing different types of wood ash with local clays to create glazes. Ash is abundant in the Northland due to the use of wood to heat homes, but the unique qualities of each type of ash are mostly unknown. Dan would like to continue his research to learn more about the different types of ash and their potential for use in glazes.

Dan is from St. Clair, Minnesota and is enrolled in the Art Education program at UW-Superior. He plans to teach high school and looks forward to incorporating his research into his teaching.
Investigating the Causes of Low Dissolved Oxygen in the Pokegama River

Student: Joseph Ripley
Mentors: Dr. Shon Schooler and Tracey Ledder

Joe Ripley’s project, a collaboration with the Lake Superior National Estuarine Research Reserve (LSNERR), was designed as a summer follow-up to a two year study of under-ice low dissolved oxygen (DO) levels in the Pokegama River. The under-ice study was initiated after anecdotal reports of “dead zones” in Pokegama Bay by local ice fisherman, and it did in fact turn up areas of low DO. Joe's question was whether or not the areas with low DO in the winter also had low DO in the summer. He answered this question by going out in a canoe with a GPS unit and a water quality meter, and taking readings from the headwaters of the river near Wrenshall, MN all the way to the mouth where it joins the St. Louis River. He did both an early summer sampling and a late summer sampling to see if there were any notable differences between the two. Joe’s project confirmed that areas with low DO in the Pokegama River exist year round. The data gathered in this study will be added to the two years of under ice data, and will be available for further research. Joe had the benefit of two excellent mentors from the LSNERR staff. LSNERR provided the use of a boat, canoe, and water quality meter for the project, as well as access to twenty-four hour water quality data for the river.

Joe is a senior at UW-Superior, majoring in Chemistry. He was born in Montana, and grew up in north central Minnesota. He chose UW-Superior because he has family in the area, lives nearby, and heard that UW-Superior offered small class sizes in addition to a strong natural sciences program. Joe hopes to find a job in the environmental arena after graduation.

“This summer project and the funding for it made a huge impact on me as a senior who is still a little unsure about a definite career path. It has given me very valuable experience in applying the scientific method to a real world project. Being responsible for the entire project was even more beneficial since it required careful planning, communicating, coordinating with others, and hard work.”
The research conducted by Mariel Santos and Tim Cleary was the process of art through problem-solving by building an interactive sculpture. The methodology of the sculpture included multiple sculptural processes with an emphasis on metal work. Through the process of building the sculpture, questions arose and decisions were made. As an art education student, this sculpture helped Mariel better understand the processes of creating art and solving problems. This project also increased her knowledge of working in three-dimensional form, and all of these concepts are things she will be able to use as an educator. She hopes to pass this knowledge on to her future students and be able to encourage her students to explore, create, and think outside the box.

Mariel is a senior majoring in Art Education. She came to Superior from Las Cruces, New Mexico because she wanted to study art therapy and UW-Superior is one of the few universities in the country to offer this major for undergraduates. Once she started in the program, she switched to Art Education, which she adores. Her first experience working with metal was in a small metals class with Tim Cleary last year. She enjoyed the class so much she wanted to pursue this interest with her SURF project. Throughout the course of working on her project, Mariel has discovered a passion for sculpture, and hopes to continue on to graduate school to receive an MFA in sculpture and eventually teach sculpture at a university.

“This research project helped me learn and grow tremendously as a student and artist, and for that I would like to thank the university and donors greatly for this opportunity.”
Identifying Highbush Cranberry Fruit Extract Components with Antiviral Properties

Student: Augustin Tegaboue Tchouassi
Mentor: Dr. James Lane

Augustin Tegaboue Tchouassi spent the summer separating and isolating natural compounds with antiviral activity from American highbush cranberry fruit extracts. This research is part of a larger, ongoing project led by his mentor, Dr. James Lane, in collaboration with Dr. Michael Hoffman at UW-Lacrosse. Previous research by this team identified significant antiviral activity of the fruit extract. Augustin’s research goal was to isolate the components responsible for the antiviral activity. He was able to use the knowledge and skills he has gained as a chemistry student in a research setting while learning the various natural compound separation and isolation techniques. In addition to gaining laboratory research experience, he learned teamwork and improved his communication skills.

Augustin, a senior majoring in Chemistry, is from Bafang in Cameroon, Central Africa. He came to UW-Superior upon his brother’s recommendation and because he was searching for undergraduate research experience that would prepare him for graduate school. Augustin feels that UW-Superior has provided him with the opportunity and the environment to both develop his skills and further his education. His SURF experience will help him achieve his career goals, which include a career in the field of therapeutic drug research and working to isolate therapeutic compounds from medicinal plants found in Cameroon.