

**SUMMER UNDERGRADUATE
RESEARCH FELLOWSHIPS
2013**

A PARTNERSHIP
BETWEEN
UW SUPERIOR FOUNDATION
AND THE
UW SUPERIOR
UNDERGRADUATE RESEARCH, SCHOLARSHIP,
AND CREATIVE ACTIVITY COMMITTEE

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the UW-Superior Foundation***

From the 12 Summer Undergraduate Research Fellowship Students and
their 11 Mentors, and the

**2012- 2013 Undergraduate Research Scholarship
and Creative Activity Committee:**

Michelle Arnhold Davies & Kristin Riker-Coleman, Co-Chairs,
Beth Austin, Lynn A Goerdts, Zamira Simkins, Marsha Francis, Gabriela Theis and
Friends of the Committee: Serguei Bezroukov, Mary Balcer, Richard Stewart, Shon
Schooler, Kaelene Arvidson-Hicks, and Suzanne C. Griffith

Human Trafficking in Minnesota and the Institutionalization of Human Rights

Student: Rebecca Joyce Anderson

Faculty/staff: Dr. Daniela Mansbach



Rebecca's Research Fellowship project involved examining the evolution of sex trafficking laws in Minnesota through a framework of socialization of human rights into domestic politics. By comparing the evolution of trafficking laws in Minnesota to a previously existing theoretical model of what human rights change should look like, Rebecca was able to expand the model beyond its intended scope into international politics as well as generate insights about the possibility of human rights change in the United States. Rebecca's interest in human rights and trafficking was piqued by her involvement in the Amnesty International student organization on campus. The project represents one part of a series of undergraduate research projects Rebecca has conducted on the subject of domestic trafficking and provided an excellent opportunity to link her interest in human rights theory to a practical problem in the Northland. Rebecca is currently working on a proposal to bring the project to the Midwest Political Science Association conference in Chicago in April, 2014.

Originally from Brandon, Minnesota, Rebecca is a senior in Legal Studies and Political Science: Peace Studies; President-UWS Amnesty International; Academic Resource Coordinator-Crownhart Hall; and Gender Equity Resource Center Lead Student - Women's Topics. After completing her undergraduate work, Rebecca plans to pursue a joint J.D./Ph.D. with a focus on linking human rights theory and action in the United States. She hopes to continue her research on trafficking and human rights at the graduate level, eventually working in the non-profit sector to bring about sustainable change. Funding for this project allowed Rebecca time to pursue a larger project on trafficking than she has before while also completing a certificate in Mediation and Conflict Resolution at UW-Superior.

The Effects of Distractors during a Sustained Attention Task

Student: Kelly Bergstrom

Faculty/staff: Dr. Eleni Pinnow



This is a cognitive study that looks at how distractors affect attention (measured by response time) throughout the duration of a task. Kelly and Eleni wanted to know whether distractor type, serial position of a trial after a distractor, and elapsed time of a study affect response time. Participants in this study used a response pad to indicate whether or not the middle character in a string was an odd number or not (most strings were number strings only, but “distractor strings” had some letters).

Kelly and Eleni found that strings that contained both letters and numbers (“mixed strings”) slowed response time more than word or pseudo-word distractors. They also found that response time slowed significantly at one serial position after a distractor, but this effect faded by the second serial position after a distractor trial. Another statistical analysis will be run to look at the effect of elapsed time within a study. They anticipate that at some point in the study, participants’ response time would have slowed due to fatigue.

Kelly was born and raised in Superior and chose to come to UW-Superior because she wanted to get a quality education close to home. She is majoring in biology and psychology and will graduate in May 2014 and hopes to eventually go on to study Clinical Psychology, with a focus in Neuropsychology. This grant has given her the opportunity to begin gaining research skills that she will continue to build off throughout graduate school and her career. She will present this research at URSCA events on campus in April and May. She also hopes to present at the Twin Ports Undergraduate Psychology Conference in Duluth in the spring and at the Midwestern Psychological Association Conference in Chicago in May.

The Economic and Environmental Impact of the Gogebic Taconite Mine in Northern Wisconsin

Student: Aleksei Bogdanov

Faculty/staff: Dr. Zamira Simkins



The objective of this research project was to study the potential economic and environmental impacts of the Gogebic Taconite iron ore mine proposed within the Penokee Range in Ashland and Iron counties of Northern Wisconsin. The mine proposal sparked heated public debates, as it may become the largest open-pit iron ore mine in the world. The company hired consultants to conduct economic and environmental impact studies, but no formal public opinion studies had been conducted. Through literature review and comparative analysis of similar mines, Aleksei was able to verify the economic impact findings of a GTAC-commissioned economic study. A GTAC environmental study will be undertaken next and must address areas of environmental concerns identified by the public.

Much of Aleksei's summer was dedicated to developing and carrying out a public opinion survey on the mine. From July 16, 2013 to August 19, 2013, a total of 862 self-reported and 102 randomly selected household responses were collected, analyzed, and publicly disseminated through multiple media outlets. The primary finding of the survey was that the mine has little local public support, with most respondents expecting a "mostly negative" impact on the region's transportation infrastructure; "only a negative" impact on the environment in general, and more specifically on outdoor recreation, air quality, soil quality, surface and underground water quality, forestry and wetlands, and fish and wildlife; and a "somewhat positive" impact on the local economy, businesses, and employment opportunities. Aleksei will present his research at the 2013 Wisconsin Economic Association Annual Meeting and other venues.

Aleksei was born and raised in Angarsk, Russia (southeastern Siberia on Lake Baikal). He came to Superior because of its Transportation and Logistics program. He is currently a senior and double-majoring in Transportation & Logistics and Economics. He plans to pursue a graduate degree in transportation and hopes his empirical research experience will set him apart. Aleksei says he is "very grateful for this rare opportunity of being awarded a summer research fellowship."

Is Your Weight Stressing You Out? Interaction between Weight and the Stress Response

Student: Bailey Burns

Faculty/staff: Dr. Michelle Arnhold Davies



Over the summer, Bailey worked on a project to look for a possible correlation between a participants' weight and the stress response. The research was questioning if a participant is overweight or obese, will more cortisol be released when the stress response is activated through physiological or psychological stress. Bailey ran several participants over the span of a month. Each participant was given the physiological stress (cold presser test) or psychological stress (math test). A saliva, heart rate, and blood pressure sample was taken before and after the stress was induced. Samples were later analyzed in order to find if there was a difference in cortisol levels between the two samples. Data was statistically analyzed to look for a difference between the pre and post sample as well as a difference in data due to weight status. Bailey will present the results of her research during the UW-Superior Department of Natural Sciences Research Spring Symposium.

Bailey is a junior from Wascott, Wisconsin. After graduating, Bailey plans to continue on to graduate school in order to become a Physician Assistant. She states she had "a great experience with my research and my mentor this summer, and the experience helped me to discover what research requires when working with human subjects and the great things research can lead to." She would like to conduct further research as she continues her education and continues on to graduate school.

The Superior Way Mural Project

Students: Autumn Gray and Darrin Stewart

Faculty/Staff: Allison Gerland and Gloria Eslinger



The Superior Way Mural project began in May with surveying students in various focus groups and tabling sessions to see what the students wanted on the mural. They were asked one question: “What does ‘The Superior Way’ mean to you?” Responses congealed around one image: a beautifully rich, natural area; somewhere they could call their home. From this, Darrin and Autumn conducted research on natural scenery: including grasses, rock formations, rivers, trees, and native species to create a conceptual representation. “We adventured around the northland, taking pictures of the natural scenery, including some imagery of favorite landmarks, such as Wisconsin Point Lighthouse.” In a collaborative effort, they cut out, painted, and experimented with various art styles, techniques, and textures to create dimension and interest. “The Superior Way” is currently hanging in the Yellowjacket Union, at an astounding 18 feet tall, for all of the campus to enjoy for years to come.

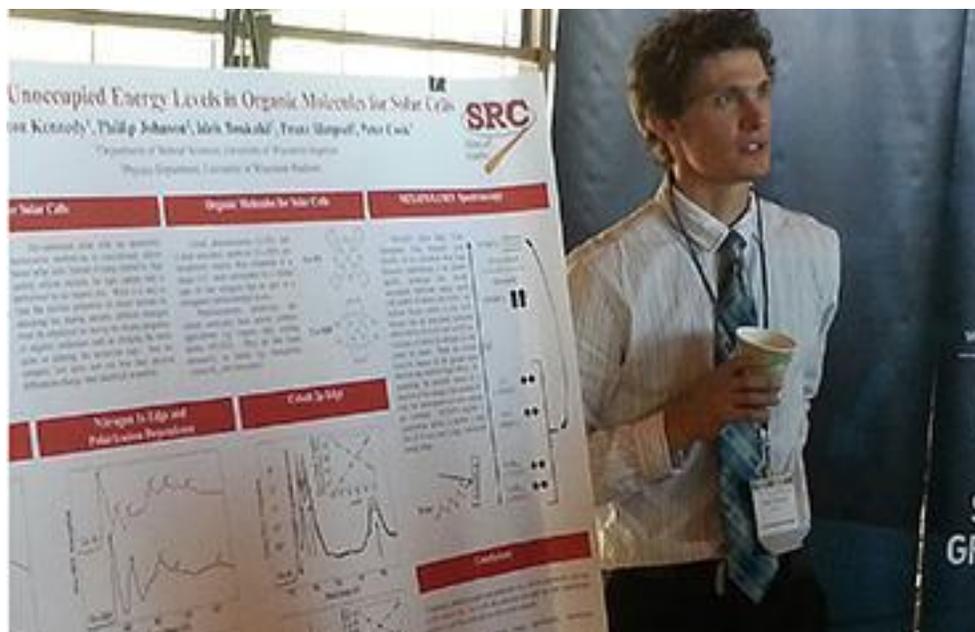
Autumn Gray is a junior from Bloomer, Wisconsin, who designed her own major for Creative Advertising. The main reason she came to Superior is for the people; everyone here is so friendly and open that she immediately felt comfortable with expressing originality, which was the goal of the mural; a creative original piece in which students could find themselves represented somewhere inside the mural and at UW-Superior. “After I graduate I hope to use the experience gained to build a career in marketing as a marketer.”

Darrin is a theatre major from Oulu, Wisconsin, and a transfer student from the University of Wisconsin-Eau Claire. When Eau Claire couldn’t meet his artistic needs, he transferred to UW-Superior where he could combine fine arts, theatre, and studio art together. This project furthered his knowledge in mixed media, learning to adapt digital art and design onto a large canvas, as well as from a collaborative effort. “Nothing makes me happier than creating something people can truly enjoy. If my art can touch at least one person, my work is successful.”

Revealing Unoccupied Energy Levels in Organic Molecules for Solar Cells

Student: Colton Kennedy

Faculty/Staff: Dr. Peter Cook



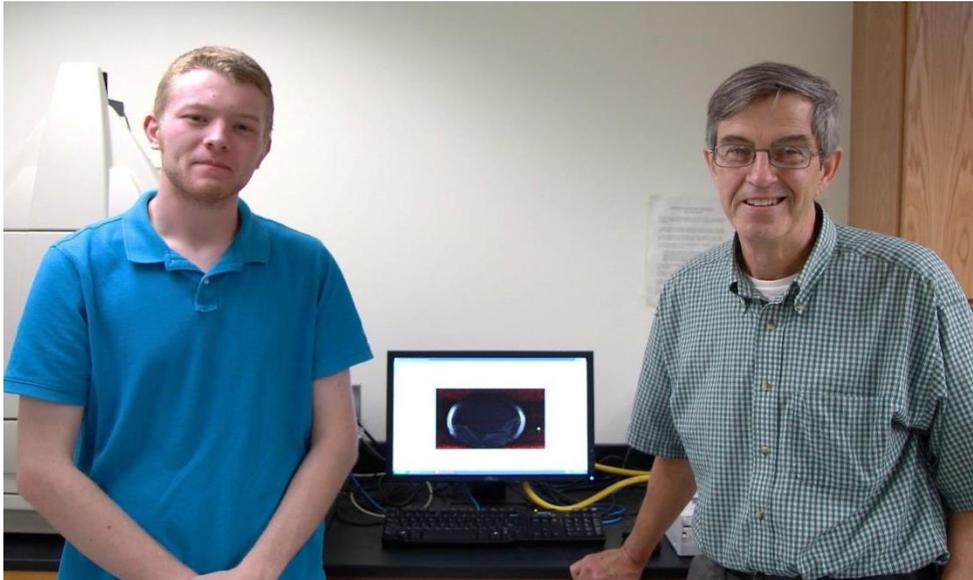
Colton spent the summer collecting and analyzing data that revealed information about the unoccupied states of select organic molecules. This was being done in collaboration with a project that Dr. Peter Cook has been working on which studies organic molecule as potentially inexpensive replacements for current silicon-based solar cells. Colton spent three weeks during June/July at the Synchrotron Radiation Center in Stoughton, WI where he collected data via x-ray absorption spectroscopy. Colton analyzed a portion of the data and produced a poster that was presented at the Wisconsin Science and Technology Symposium on July 22-23, 2013 at UW-Superior (pictured above). Colton is currently continuing to analyze data using computer simulation and will present his research to his peers at the Department of Natural Sciences Research Symposium in spring 2014.

Colton is a senior at UW-Superior who is majoring in chemistry with a minor in physics. Colton is from Kenora, Ontario, Canada and originally came to UW-Superior to major in biology and play for the varsity hockey team. In his first two years at UW-Superior he shifted his focus from biology to chemistry and was forced to leave the hockey team due to injury problems. Colton has applied to medical schools in both Canada and the U.S. and plans to become a physician.

Searching for Development of a New Gene during Long-term Evolution

Student: Joseph Madison

Faculty/staff: Dr. Ralph Seelke



The “Seelke laboratory” is interested in how evolution works - what it can and cannot do. They use the bacterium *Escherichia coli* to study evolution. Others in the Seelke lab had evolved a strain of *E. coli* that had a single gene, *hisB*, which was essential for producing both histidine (it’s normal role) and serine (an artificial role, but one required for this strain to survive). Conventional evolutionary theory would predict that this gene would specialize, becoming two genes. Joe reports that “My project this summer was to test whether this prediction was true. Our results showed that the *hisB* gene has **NOT** become two genes; rather, it has become a generalist, and has evolved to become better able to participate in both serine and histidine production.” This is a long-term study and there is still much more work to be done. Dr. Seelke will be recruiting other students to participate in this study. Joe was able to present their work at a regional meeting of the American Society for Microbiology in October, 2013, where he won an award for his presentation.

Joe Madison is from Brillion, Wisconsin, and is a senior completing a second BS degree, this one in chemistry, having completed his first one in biology last May. Upon completion of this degree, Joe plans to continue on to graduate school to further pursue his interest in evolution, biology, and chemistry. Joe expressed his belief that this summer’s undergraduate research fellowship and project would provide strong support in pursuing his graduate studies and he appreciates the opportunity the Foundation and his mentor provided.

Analyzing Known Watershed Data to Predict Potential Water Quality Degradation

Student: Josh Mutchler

Faculty/Staff: Amy Eliot



The idea to conduct this research came from an article published in the local newspaper concerning the construction of the Gogebic Taconite (GTAC) mine within the Penokee Mountain range located in Northeastern Wisconsin. The proposal for the development of this mine has been a controversial subject. The watersheds surrounding the proposed mine contain all classifications of trout streams. Based on the conditions area trout need to survive, such as cold water and high levels of dissolved oxygen, it was assumed that the mine might change the water quality. Through this research Josh explored the potential environmental risks the GTAC mine could impose on adjacent watersheds and valuable ecosystems downstream from the mining site. “This research opportunity has allowed me to further my skills within the GIS software and enhance my critical thinking towards a field that I am passionate about.” In the future Josh plans to expand on and continue to update his research while he continues to learn about the interactions between land cover of watersheds and the quality of the water within them.

Josh Mutchler is a senior at UW-Superior and from Duluth, Minnesota. He started in college with a slight interest in biology and music. After four years, he is two semesters from graduating with a major in biology and broad field science, and a minor in chemistry. For the past two summers he has worked with the Lake Superior Research Institute (LSRI) and came to appreciate the many pristine watersheds within the Lake Superior Basin. He says, “The everyday exposure to beautiful streams and healthy watersheds was the motivation for the research I conducted over the summer of 2013; I learned to value the natural environment of the region as I grew up here.” Josh is grateful for the summer research and “for rewarding me with a great opportunity and providing funding for this research project.”

Creating a UW Superior Weather Station

Students: Sam Reiswig and Brentton Paulus

Faculty/staff: Dr. Sergei Bezrukov



Sam and Brenton worked on creating a weather sensor for the University. They were interested in this project because it allowed them to work with micro-controllers and other devices, such as the CP2112. Dr. Bezrukov, they report, was easy to work with and kept interest in the project over the course of the summer. This current project contains a remote sensor that transmits to a receiver base. The receiver base sends the weather data to a server which can be accessed as a web page at <http://cs2.uwsuper.edu/~weather/>. They report that greater details about this project can be seen at <http://mcs.uwsuper.edu/sb/Electronics/Weather/ind.php>. Sam and Brentton are not quite done: they recently acquired some new hardware that may be used to replace part of the system and make the receiver station more compact. "We plan on testing this hardware sometime in the future." (In the photo Sam, Dr Bezroukov, and Brentton stand by their weather station outside Swenson.)

Sam Reiswig was born in Phoenix, Arizona. He moved to the area while in high school and graduated from Superior High School. He proceeded to UW-Superior because of "the small class sizes, nice environment, and to save money." He reports that the summer undergraduate research fellowship and project "gave me a chance to study the assembly language of a micro-controller and to practice some web design. Sam plans to graduate from UW-Superior and plans on doing more projects with Dr Bezroukov in the future."

Brentton Paulus was born in Superior, Wisconsin and lived here his entire life. He says about the summer, "I have learned so much more about micro-controllers, low-level design concepts, and even higher level design concepts through this project. I would have done the project even without funding, but thanks to the funding I was able to make this my full-time focus over the entire summer." Brentton plans to continue his studies in Mathematics and Computer Science and look for a local internship for next summer. He thanks the Foundation for making this experience possible.

Improving the Efficiency of Snow Removal Operations in the City of Duluth

Student: Bradley Roy

Faculty/staff: Dr. Mei Cao



Bradley Roy worked on a project to research the feasibility of improving the fuel efficiency of the snow removal operations in Duluth, Minnesota. In the process of research he found out specifically what types of vehicles Duluth used and how much area across which the city is required to complete snow removal operations. He also took into account where the city located their equipment and whether they could improve on the locations. Other factors Bradley considered were both the snow removal that occurred during the snow storm, where it was pushed to the side of the road, as well as when the snow was removed to a remote location by dump trucks. He reports that he became interested in this topic last spring when the snow kept falling and he heard a news report about the city being over budget on their snow removal. Bradley put together a report with major recommendations for the city as part of his summer research project.

Bradley Roy grew up in New Hampshire and is an eight year US Air Force vet who worked as an air transportation specialist and was going to collage online at the same time studying transportation and logistics. He decided to come to the Superior area because of the Transportation and Logistics program offered by the University of Wisconsin-Superior. "The summer research project has expanded my knowledge and", he says, "it has made a significant improvement to my resume. This project will improve my chances of landing an internship with an airline as well as add to the breadth of knowledge that I have acquired in my four years here at UW-Superior."