FY2017 | Student Research Profile

Seek and Apply Knowledge

Office of Research
and Sponsored Programs
St. Cloud State University

Seek and Apply Knowledge

St. Cloud State University has a rich history of promoting research, scholarship, and creative activity that facilitates the advancement of disciplines. A hallmark of higher education is the persistent pursuit of information, understanding, and skills that are acquired by hands on experience and continuous study. At St. Cloud State, we embrace research and seek to improve collaborations across campus with the common goal of promoting learning by integrating teaching, scholarship, and research.

St. Cloud State celebrates student research each year by hosting an annual Research Colloquium, participating in the Minnesota Undergraduate Scholars Conference, and actively attending Posters at Saint Paul. In addition, limited travel and research funding is available to students as a competitive award. These funds allow selected students to gain valuable experiences in presenting their work at regional and/or national conferences.

Contents

> **"It was such an honor to be able to be part of the biggest undergraduate research gathering in the country. Participating at NCUR allowed us to learn what students have been researching on, particularly on subjects outside of our respective field of study. It gave me the opportunity to present on a topic that I am passionate about to fellow students and faculty from all over the country. This conference has significantly improved my self-confidence, and reinforced my decision to stay on a path towards a career in science and public health."**
>
> *– Shana Rogan*
>
> **St. Cloud State Graduate Student**

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Minnesota Undergraduate SCHOLARS

Minnesota Undergraduate Scholars is a consortium of institutions that supports the research, scholarly works and creative activity of undergraduates by providing avenues for funding, presentation resources and opportunities for undergraduates to present their work.

The consortium is committed to engaging undergraduate students throughout the Minnesota State system in scholarly activities that will enrich their collegiate experience, open doors to career opportunities and lead to a life-long love of learning.

Two events are currently supported by the Minnesota Undergraduate Scholars consortium

- The Minnesota Undergraduate Scholars Posters at St. Paul
- The Minnesota Undergraduate Scholars Conference

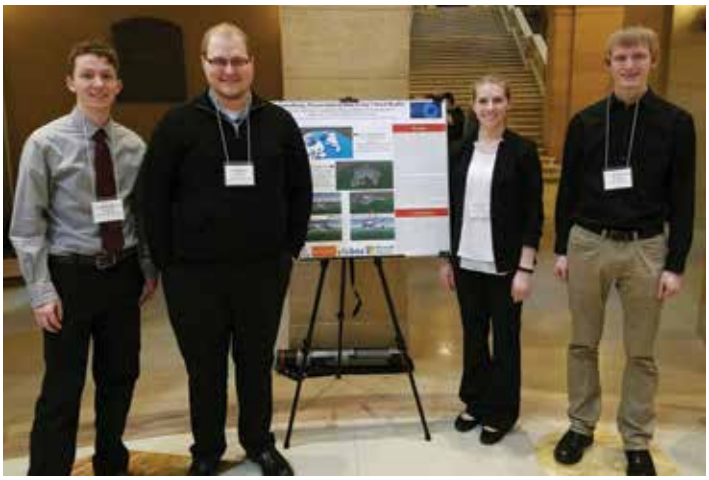
POSTERS AT ST. PAUL

On March 2, 2017, Minnesota Undergraduate Scholars, a consortium of Minnesota State institutions, hosted Posters at St. Paul, a multi-disciplinary poster presentation session at the Minnesota State Capitol. Outstanding undergraduate student researchers were identified and nominated by St. Cloud State faculty and academic administrators to participate in a competitive process to be selected to present their work at this prestigious event. Selected students traveled to the State Capitol, met with their legislators and then presented their work in a poster session for an audience of faculty, administrators, and state government leaders.

The purpose of this event is to provide undergraduate students the opportunity to share the results of their scholarly work with legislators and other leaders in state government. We believe the messages our students communicate to legislatures can impact the State of Minnesota and the broader global community.
This year, ten St. Cloud State University scholars proudly displayed their posters in the newly renovated Rotunda. Overall, presentations were conducted by 50 students representing six universities and two community and technical colleges. The schools represented at the event include:

Bemidji State University
Metropolitan State University
Minneapolis Community and Technical College
Minnesota State University, Mankato
Minnesota State University, Moorhead
Rochester Community and Technical College
Southwest Minnesota State University
St. Cloud State University
Winona State University

Congratulations to the students selected to represent St. Cloud State University!

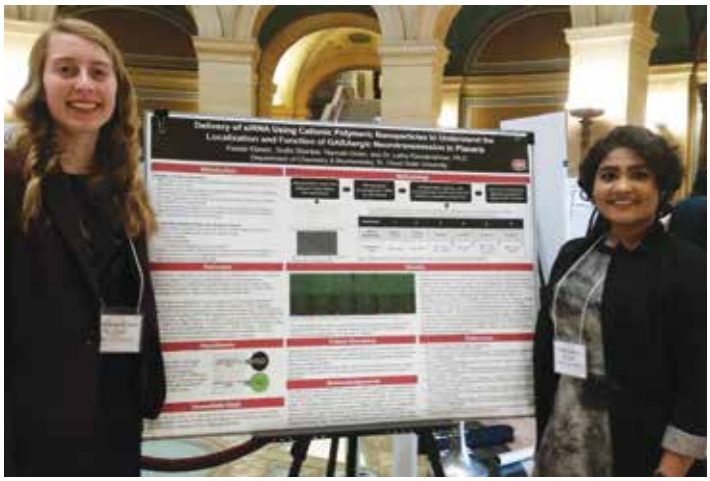


Joseph Kelzenberg, Josh Benoit, Emily Harrington, Austin Johannes

Visualizing Meteorological Data Using Virtual Reality

Faculty Mentors: Mark Petzold and Alan Srock

Abstract: The purpose of our research is to improve the way meteorological data is represented to students. Traditionally, weather is displayed through two-dimensional images of three-dimensional atmospheric concepts. Our goal is to make a simple, effective, and scientifically accurate way to visualize weather data in 3D. Our team of meteorologists and engineers work across disciplines and use our strengths in our respective fields to build a better visualization product. The engineers mainly code and deal with performance issues, while the meteorologists validate the output and discuss optimal ways to visualize the data. The software-development method used in this project is a spiral model employed in software engineering. The project starts with creating a simple weather feature. It is then deployed into virtual reality and the spiral begins: new components are added, and performance issues are fixed. Then to finish the iteration we deploy to virtual reality, to check and make sure we are properly displaying the data. Through that process, we built a basic working virtual-reality thunderstorm in a game engine called Unity3D. This high-resolution thunderstorm model has been output to 3D virtual-reality platforms including the Google Cardboard, HTC Vive, and Visbox.

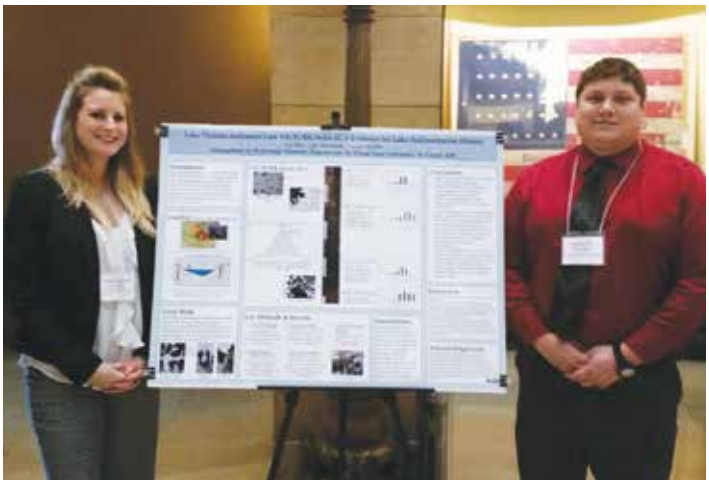


Kassandra Klasen and Sruthi Shankar

Delivery of SiRNA using cationic polymeric nanoparticles to understand the localization and function of GABAergic neurotransmission in planaria

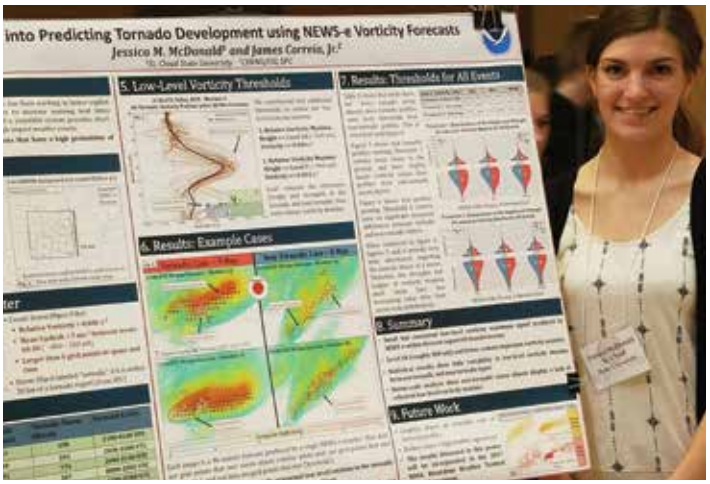
Faculty Mentor: Latha Ramakrishnan

Abstract: Imbalance of neurotransmitters within the human brain results in hyperexcitability which may be manifested as a seizure. Invertebrate flatworms (planaria) possess a primitive brain (considered as an ancestor to the human brain) and a bilaterally symmetric nervous system, which is analogous to the vertebrate nervous system. The planaria also possess components of GABAergic neurotransmission, the fundamental molecular machinery targeted by the majority of anti-epileptic drug development research. The planarian flatworms have shown significant seizure-like movements upon exposure to convulsive drugs such as picrotoxin (selective GABAA receptor inhibitor) and others; however, the structure and function of the GABAergic protein targets of these drugs have not yet been studied in the flatworms. In order to determine the expression and localization of the GABAergic neurons, a proof of concept experiment was first conducted to investigate whether polymeric nanoparticles can be viable modes for the transport of siRNA across the lipid bilayer which surrounds cells. Small interfering ribonucleic acid (siRNA) which targets green fluorescent protein (GFP) was introduced into Human Embryonic Kidney 293 (HEK 293) cells using polymeric nanoparticles (p (H2N-Ala-EMA)-b-PMMA). Examining the silencing of GFP mRNA by siRNA delivery will allow analysis of whether GABAergic genes in planaria can also be silenced by the use of the polymer nanoparticle complexed with appropriate siRNA. The success of this proof of concept study will allow investigation of how GABAergic proteins are expressed and localized in the flatworms' simple nervous system. Studies elucidating the functional properties of GABA in the planarian flatworm will provide clues in identifying the evolutionary mechanisms of GABAergic neurotransmission from flatworms to higher vertebrates. Further, these studies will help us to understand the molecular basis of seizures-like movements exhibited by the worms upon exposure to convulsive drugs.



Catherine Knudsen and Andrew Ray
Lake Victoria Sediment Core VICSURK16-4A-1C-1: Evidence for Lake Sedimentation History
Faculty Mentor: Kate Pound

Abstract: A series of lake cores were retrieved from Lake Victoria, Alexandria, Minnesota using a piston-coring method. The aim of this research is determination of the sedimentation history for Lake Victoria from the lake sediment core, so that the context for an archeological bison-bone discovery is known. Data collected and interpretations will be integrated with a parallel research project using three of the Lake Victoria Cores. The initial technique used to collect data was the use of a multi-use coring contraption (MUCC) to retrieve the core. This core is 74 centimeters long and was extracted from a water depth of 11.34 meters at the location 45° 52' 20.73" N, 95° 20' 43.50" W. Within the sample collected, composition, grain size, organization, and bedding were all observed. Lab work includes sieving, and extended grain size analysis. 1-2mm diameter grains are separated out and observed under a binocular microscope to help determine the source area of the sediment. Smear slides are used to discover what the silt and clay fractions were composed of. Geophysical data was collected at the University of Minnesota at the Limnological Research Center provide gamma-ray density data, magnetic characteristics, and resistivity of the core. The results of this data will assist with interpretation of sediment source, and depositional history within Lake Victoria. The data will be integrated with a larger parallel research project evaluating the context for the bison bones.

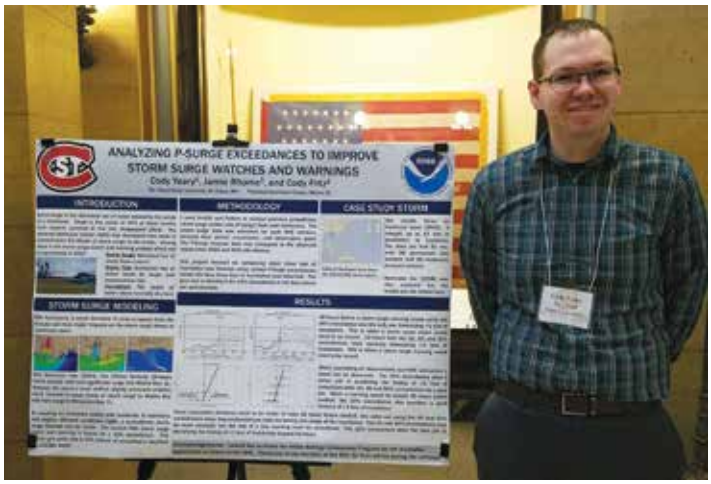


Jessica McDonald
Insights into Predicting Tornado Development Using NEWS-e Vorticity Forecasts
Faculty Mentors: Tony Hansen and Alan Srock

Abstract: This project seeks to determine if the low-level vorticity forecasts generated by the NSSL Experimental Warn-on-Forecast System for ensembles (NEWS-e) offer clues for predicting tornadic activity. The vast amount of data produced by NEWS-e requires filtering to provide meaningful results that can be used in forecast decision-making. Here, the authors create a "storm object" filter and apply it to forecasts provided by NEWS-e for six (6) different severe weather events. Candidate storm objects must exceed a maximum relative vorticity of 0.006 s-1 and a mean updraft speed of 5 ms-1. They are classified as tornadic if any part of the storm object is within 30 km of a tornado report. The vertical profiles of vorticity in each storm object reveal consistent mid-level vorticity maxima that vary little in height and strength across all storm objects. Any low-level vorticity maxima exhibited by the storm objects have much greater structural variability. Analysis of these structures show that the low-level maxima in tornadic storm objects are slightly lower in height and stronger than those in non-tornadic objects. At the storm-scale, the profiles that contain low-level vorticity maxima in tornadic storm objects tend to be grouped together in a cohesive manner, whereas the profiles containing these maxima in non-tornadic storm objects are infrequent and randomly distributed. It is hoped that this study will provide information on how to best utilize the NEWS-e vorticity forecasts for short-term tornado prediction.

Student Research Impacts

Empirical research shows that undergraduate research has significant positive impact on students, particularly in the following areas: rates of persistence, graduate school enrollment, and satisfaction with education.



Cody Yeary
Analyzing P-Surge Exceedances to Improve Storm Surge Watches and Warnings
Faculty Mentors: Tony Hansen and Alan Srock

Abstract: Storm surge accounts for nearly half of all direct tropical cyclone fatalities in the United States. In recent years, the National Hurricane Center's Storm Surge Unit has developed products to help communicate the threat of storm surge. A probabilistic storm surge model (P-Surge) is used by perturbing various characteristics of a tropical cyclone such as intensity, size, forward speed, and direction to create an ensemble. Previous research was performed in an attempt to identify which exceedance(s) could be used operationally for a storm surge watch and warning. This research is expanded by using P-Surge model runs that were run retroactively for a handful of Atlantic hurricanes. By combining Python with Esri's ArcGIS software, I was able to effectively process surge values for tens of thousands of grid points. Comparisons between model outputs at various exceedances over time and observed values at landfall were used to compare accuracy. In particular, an attempt was made to find if the onset of significant storm surge (> 3 feet inundation) could be accurately forecast in P-Surge. Initial findings suggest that using a ten percent exceedance 36 to 48 hours before landfall is ideal. However, as landfall approaches a twenty or even thirty percent exceedance may be the most useful. More storms will need to be analyzed to yield a statistically significant sample size.

Minnesota Undergraduate Scholars CONFERENCE

The Minnesota Undergraduate Scholars Conference was held at Winona State University on April 3rd, 2017. The conference was open to all disciplines for both oral and poster presentations. Students went through a process of selection after being nominated by faculty/staff and deans.

Caroline Bang, Jessica McDonald, Russell Manser, and Kaleab Worku

Caroline Bang
A Class of Gnomon
Faculty Mentor: Peiyi Zhao

Abstract: A gnomon G is a geometric object that, when added to an object F, creates a new object that is similar to F. Rectangles with square gnomons, golden rectangles, are mathematically pleasing, giving rise to the fascinating golden number. This research looks at two generalizations of the golden rectangle - both in n-dimensions and in two dimensions as gnomon to n-gons whose side lengths are in geometric progression. As one moves into higher dimensions, we get more fascinating numbers. In two dimensions, we were able to fully classify isosceles gnomons to n-gons whose side lengths are in geometric progression.

Jessica McDonald

Insights into Predicting Tornado Development Using NEWS-e Vorticity Forecasts

Faculty Mentors: Tony Hansen and Alan Srock

Abstract: This project seeks to determine if the low-level vorticity forecasts generated by the NSSL Experimental Warn-on-Forecast System for ensembles (NEWS-e) offer clues for predicting tornadic activity. The vast amount of data produced by NEWS-e requires filtering to provide meaningful results that can be used in forecast decision-making. Here, the authors create a "storm object" filter and apply it to forecasts provided by NEWS-e for six (6) different severe weather events. Candidate storm objects must exceed a maximum relative vorticity of 0.006 s-1 and a mean updraft speed of 5 ms-1. They are classified as tornadic if any part of the storm object is within 30 km of a tornado report. The vertical profiles of vorticity in each storm object reveal consistent mid-level vorticity maxima that vary little in height and strength across all storm objects. Any low-level vorticity maxima exhibited by the storm objects have much greater structural variability. Analysis of these structures show that the low-level maxima in tornadic storm objects are slightly lower in height and stronger than those in non-tornadic objects. At the storm-scale, the profiles that contain low-level vorticity maxima in tornadic storm objects tend to be grouped together in a cohesive manner, whereas the profiles containing these maxima in non-tornadic storm objects are infrequent and randomly distributed. It is hoped that this study will provide information on how to best utilize the NEWS-e vorticity forecasts for short-term tornado prediction.

Russell Manser

Modeling Stratosphere-Troposphere Exchange within Extreme Extratropical Convection

Faculty Mentors: Tony Hansen and Alan Srock

Abstract: Stratosphere-troposphere exchange via extreme extratropical convection has implications for climate change and is not well understood. In situ trace gas observations in convection from aircraft are limited due to hazards associated with turbulence near the core of a storm. Modeling allows us to examine the processes responsible for irreversible transport of gases into the stratosphere on the convective scale. Previous studies have examined if numerical models can represent the physical characteristics of tropopause-penetrating convection. Here, we test the ability of the ARW-WRF model to simulate the physical aspects of a real case of extreme extratropical convection that injected cloud particles into the stratosphere. We find that the model resolves storm structure sufficiently, but initiates convection in a different geographical location than that observed, a common limitation of convective-scale modeling. Despite the incorrect location, we proceed to examine the representation of trace gas transport in the upper troposphere and lower stratosphere within the same case of convection using ARW-WRF coupled with chemistry. Model output shows evidence of irreversible transport of tropospheric air to the stratosphere. Tropospheric pollutants, such as carbon monoxide or CO, are limited to altitudes 1 to 2 km above the tropopause, while transport of water vapor is found up to 5 km above the tropopause.

Kaleab Worku

Performance Evaluation of Embedded Networked Systems using WirelessHART

Faculty Mentors: Tirthankar Ghosh and Yi Zheng

Abstract: Wireless HART network has been widely used for reliable information transfer from sensors and a control center in industrial monitoring applications. It uses multi-hopping approach to extend the coverage distance and collect information from multiple sensors. The project investigates how WirelessHART network protocol stacks are implemented, and how multi-hopping can be used to transfer data in the network. An experimental testbed is deployed on campus, and network performance is evaluated by setting up multihop communications. The project has been funded by a grant from Emerson Process Management. The project also includes interdisciplinary senior design projects with electrical engineering students including integrating WirelessHART components with custom embedded systems.

Celebration of Student Research: An Evolution at St. Cloud State University

On April 28, 1998, the Inaugural Undergraduate and Graduate Student Research Colloquium showcased 75 students presenting 36 scholarly projects. The 10th annual Student Research Colloquium, held on April 24, 2007, hosted 355 students presenting 180 scholarly projects. On April 18, 2017, the 20th annual Student Research Colloquium showcased 442 students presenting 255 scholarly projects with more than 550 students in attendance representing all eight schools and colleges.

2017 Student Research COLLOQUIUM

The 20th annual Student Research Colloquium (SRC) was celebrated on April 18, 2017. Patterned after professional conferences, the SRC engages students in activities that enhance their success and learning.

Throughout the day, 442 student presenters showcased their work on 255 projects including, poster presentations, oral presentations, and performance/ creative works. A total of 93 faculty members were engaged as mentors, collaborating with students on their research, scholarship and creative activities. Student participants represented a variety of disciplines across all colleges and schools on campus and showcased their work for an audience of faculty, staff and community members.

By participating in this signature St. Cloud State event, students experience growth and development along multiple dimensions of Our Husky Compact. Promoting research, scholarship and creative work in collaboration with faculty is a vital component of higher education at St. Cloud State University.

UNDERGRADUATE POSTER COMPETITION

1st Place
Aman Das, Saklan Karim, and Jose Tabora
Harvesting Energy Box (HEB)
Faculty Mentor: Aiping Yao, Electrical Computer and Engineering, School of Computing, Engineering and Environment

2nd Place
Niki Anderson
Reconfiguring the Disjointed Geography of Weather Warning Systems in Minnesota
Faculty Mentor: Gareth John, Geography and Planning, School of Public Affairs

3rd Place
Emily Donahue, Chryssa King, Kaitlyn Mailhot, Jacob Walling, and Hayley Zappa
The Effects of Garcinia Kola Extract on Blood Glucose Levels in a Mouse Model of Type 1 Diabetes
Faculty Mentor: Marina Cetkovic-Cvrlje, Biology, College of Science and Engineering

Finalists:
Michael Rogers
Photophysics of Organic Materials by Pump-Probe Spectroscopy
Faculty Mentor: Russ Lidberg, Physics and Astronomy, College of Science and Engineering

James Oman
Managing Construction
Faculty Mentor: Mark Schroll, Environmental and Technological Studies, School of Computing, Engineering and Environment

Nathan Porttiin
Commuting Patterns of St Cloud State University Students
Faculty Mentor: Gareth John, Geography and Planning, School of Public Affairs

GRADUATE POSTER COMPETITION

1st Place:
Anthony Kunkel
Light from Freezing Quarks
Faculty Mentor: Kevin Haglin, Physics and Astronomy, College of Science and Engineering

2nd Place:
Michel Tchang
Biodistance analysis between Classic Neanderthal populations using non-metric features of the dentition
Faculty Mentor: Matthew Tornow, Anthropology, College of Liberal Arts

3rd Place:
Wesley Davis
Mosquitoes: A Threat to Minnesota Public Health
Faculty Mentor: Ryan Fink, Biology, College of Science and Engineering

Finalists:
Jenny Popernack and Nathaniel Stoll
Navigating the Academic Seas
Faculty Mentor: Judith Kilborn, English, College of Liberal Arts

UNDERGRADUATE ORAL PRESENTATION COMPETITION

1st Place:
Angela Mundis
Squaw in the American Landscape: The Place-Politics of Pejorative Toponomy
Faculty Mentor: Gareth John, Geography and Planning, School of Public Affairs

2nd Place:
Gene Studniski and Heather VanSlyke
SAE Clean Snowmobile Project
Faculty Mentor: Kenneth Miller, Mechanical and Manufacturing Engineering, School of Computing, Engineering and Environment

3rd Place:
Shaela Rabbitt
Inordinate Appetites and Ingenious Schemes: Alcohol Use and Availability in the United States Army Infantry, 1861 – 1865
Faculty Mentor: Mary Wingerd, History, College of Liberal Arts

Finalists:
Rachel Sakry
Histological Evaluation of Fish Tissues Collected from Wastewater Exposed Fishes in the Chicago Waterways
Faculty Mentor: Heiko Schoenfuss, Biology, College of Science and Engineering

Marcelo Locaelli, Laura Markham, and Joshua Stadem
Automated Tinning Machine
Faculty Mentor: Ahmet Sezen, Mechanical and Manufacturing Engineering, School of Computing, Engineering and Environment

Jonathan Blumhoefer, Casey Zimmerman, and Waqas Muzammil
ATV Trailer Fixture
Faculty Mentor: Steven Covey, Mechanical and Manufacturing Engineering, School of Computing, Engineering and Environment

GRADUATE ORAL PRESENTATION COMPETITION

1st Place:
Molly Tast
Exploring First-Year College Students Attitudes Toward Disability: Assessment of Disability Inclusion Training
Faculty Mentor: Seth Christman, Community Psychology, Counseling and Family Therapy, School of Health and Human Services

2nd Place:
Shana Rogan
The effect of Garcinia kola extract on the T-cell composition and function in experimental type 1 diabetes
Faculty Mentor: Marina Cetkovic-Cvrlje, Biology, College of Science and Engineering

3rd Place:
Eryn Ebinger
Study of Garcinia kola extracts antidiabetic properties in a mouse model for type 1 diabetes
Faculty Mentor: Marina Cetkovic-Cvrlje, Biology, College of Science and Engineering

Finalists:
Angelica Carnero
ESL students, plagiarism and acknowledgement of sources
Faculty Mentor: Michael Schwartz, English, College of Liberal Arts

Aaron Bauer
Image as an Obstacle in Orientation
Faculty Mentor: Holly Schuck, First Year and Transition Programs, University College

PERFORMANCE/CREATIVE WORKS

Outstanding Performance/Creative Work:
Alexandria Koning
Operation: Performing the Anxious Performatives
Faculty Mentor: Tami Spry, Communication Studies, College of Liberal Arts

Finalists:
Amila DeSilva, Eu Sheng Chung, and Dareck Tamariz
Vision System for Factory
Faculty Mentor: John Sinko, Physics and Astronomy, College of Science and Engineering

Grace Mertz
Birch Bark Rhapsody
Faculty Mentor: Jennifer Tuder, Communication Studies, College of Liberal Arts

Student Research Colloquium competition winners along with their faculty mentors and St. Cloud State University administrators who attended the awards ceremony.

Council on Undergraduate Research

The mission of the Council on Undergraduate Research (CUR) is to support and promote high-quality undergraduate student-faculty collaborative research and scholarship. The Council on Undergraduate Research, founded in 1978, is a national organization of individual and institutional members representing over 900 colleges and universities.

The student based events are currently hosted by the Council on Undergraduate Research

- Posters on the Hill – Washington D.C.
- Research Experiences for Undergraduate Symposium (REUS)
- National Conference on Undergraduate Research (NCUR)

National Conference on Undergraduate Research

The Council of Undergraduate Research hosted a multi-disciplinary research conference at the University of Memphis, April 3-6, 2017. Outstanding undergraduate scholars were nominated by St. Cloud State faculty and academic administrators to participate in a competitive process to be selected to present their work at this prestigious event.

The purpose of the conference was to celebrate the research, scholarship, and creative work of undergraduate students and their faculty mentors from around the world. Students then had an opportunity to join in an interdisciplinary conversation with fellow researchers in their same field, as well as other intellectual communities.

Josh Benoit, Joseph Kelzenberg, Shana Rogan, Alan Srock, Emily Harrington, Marina Cetkovic-Cvrlje, Cody Yeary, and Austin Johannes

Josh Benoit, Emily Harrington, Austin Johannes, Joseph Kelzenberg

Visualization of Meteorological Data

Faculty Mentors: Mark Petzold and Alan Srock

Abstract: The goal of this project is to advance the visualization of meteorological weather data. This allows for better representations of weather for research and instruction in meteorology. Traditionally weather data is displayed through mostly flat representations of three dimensional data. With the advent of 3D technology such as: HoloLens, GEAR VR, and VIVE it is possible to represent data in a truly three dimensional environment, which gives the users a more realistic understanding of weather, rather than a two dimensional understanding. Using Unity3D as our platform gives us the great opportunity to deploy our program to many styles of devices based on what's available and what works well for different situations.

Shana Rogan

Can baby bottles and cans contribute to the development of autoimmune type 1 diabetes?

Faculty Mentor: Marina Cetkovic-Cvrlje

Abstract: Type 1 diabetes mellitus (T1D), one of the most common chronic diseases in childhood, is caused by insulin deficiency following autoimmune destruction of the insulin-producing pancreatic beta cells by own autoreactive lymphocytes called T cells. Severely elevated blood glucose levels (hyperglycemia) result from a complete lack of insulin, which is a crucial hormone in regulation of glucose metabolism. T1D has becoming a more prevalent disease in recent years. Its frequent occurrence cannot be explained solely by known genetic predisposition. Instead, environmental pollutants, such as bisphenol A (BPA), which is commonly found in plastic products, such as baby formula bottles, dental sealants, and cans' linings, have been proposed as a potential trigger for T1D development. The objective of this study will be to determine the effects of BPA exposure on the development of autoimmune T1D in chemically-induced mouse model for T1D. Mice will be exposed through drinking water to low (1 mg/L) and high (10 mg/L) doses of BPA daily, from four to 16 weeks of age. Glucose levels, body weights, composition of different immune cell types (including several T-cell subtypes), as well as histopathological lesions in pancreata, will be studied at two time points during the study. This study will for the first time provide an insight about the diabetogenic potential of BPA and its mechanism of action in the context of immune cells in a murine model of T1D.

Cody Yeary

Analyzing P-Surge Exceedances to Improve Storm Surge Watches and Warnings

Faculty Mentors: Tony Hansen and Alan Srock

Abstract: Storm surge accounts for nearly half of all direct tropical cyclone fatalities in the United States. In recent years, the National Hurricane Center's Storm Surge Unit has developed products to help communicate the threat of storm surge. A probabilistic storm surge model (P-Surge) is used by perturbing various characteristics of a tropical cyclone such as intensity, size, forward speed, and direction to create an ensemble. Previous research was performed in an attempt to identify which exceedance(s) could be used operationally for a storm surge watch and warning. This research is expanded by using P-Surge model runs that were run retroactively for a handful of Atlantic hurricanes. By combining Python with Esri's ArcGIS software, I was able to effectively process surge values for tens of thousands of grid points. Comparisons between model outputs at various exceedances over time and observed values at landfall were used to compare accuracy. In particular, an attempt was made to find if the onset of significant storm surge (> 3 feet inundation) could be accurately forecast in P-Surge. Initial findings suggest that using a ten percent exceedance 36 to 48 hours before landfall is ideal. However, as landfall approaches a twenty or even thirty percent exceedance may be the most useful. More storms will need to be analyzed to yield a statistically significant sample size.

Student Research FUNDS

St. Cloud State University considers research, scholarship, and creative works performed under the direction of a faculty member, as vital components of higher education. Each semester the university provides student research funds to undergraduate, graduate, and doctoral students. This academic year, a total of 59 projects were awarded approximately $40,000 to help support their research and scholarly activities.

Deb Abrams - $497

Faculty Mentors: Younsook Yeo and Patience Togo, Social Work

Home care service use: Living arrangement and its interaction effects with Medicare

Mariam Afolabi - $740

Faculty Mentor: Oladele Gazal, Biology

Effect of Methanolic extract of Mucuna pruriens on GnRH, LH, FSH secretion in female Sprague Dawley rats

Hodan Ahmed - $165
Faculty Mentors: Shu-Ching Wang and Yuh-Jen Guo, Community Psychology, Counseling and Family Therapy
Explore Mental Health Stigma between Two Somali Generations

Jane Elizabeth Anderson - $500
Faculty Mentor: G.N. Rangamani, Communication Sciences and Disorders
Treatment of Underlying Forms and Constraint Induced Auditory Training in Anhasia - A Single Case Study

Tyler Baxter - $872
Faculty Mentor: John Sinko, Physics and Astronomy
Laser Astronaut Retrieval

Tyler Baxter - $1,000
Faculty Mentor: John Sinko, Physics and Astronomy
Laser Induced Carbon Doped Carbonate Propellant Decomposition for Beamed Energy Propulsion

Travis Birr - $500
Faculty Mentor: Gareth John, Geography and Planning
Minnesota Identity Through Film

Brittany Campion, Chinkumbi Wauna and Nicole Mueller - $879
Faculty Mentor: Louise Millis, Medical Laboratory Science
Isolation of Plesiomonas shigelloides from fish samples

Satya Vani Chinnamaneni - $398
Faculty Mentors: John Sinko, Physics and Astronomy, and Kannan Sivaprakasam, Chemistry and Biochemistry
Synthesis of Iron doped Ti02 for photo catalytic and optical applications

Eu Sheng Chung - $932
Faculty Mentor: John Sinko, Physics and Astronomy
Vision system for Factory

Megan Coffman and Teresa Gonia - $500
Faculty Mentor: Janet Tilstra, Communication Sciences and Disorders
First Steps to Increase Wellness: A Survey of SLP Graduate Students

Alexis Corbett - $500
Faculty Mentor: John Sinko, Physics and Astronomy
Diffuse Reflectance Study of Thermochromic Materials for Sustainable Energy Coatings

David Lee Corgard - $455
Faculty Mentor: John Sinko, Physics and Astronomy
Novel Wavelength Solid State Laser

Christopher Crawford - $999
Faculty Mentors: Elisha Polomski and John Sinko, Physics and Astronomy
Supernova Shockwave Propagation through a Nebula like Plasma

Wesley Davis - $1,000
Faculty Mentor: Ryan Fink, Biology
Mosquitoes: A Threat to Minnesota Public Health

Devon Dell - $458
Faculty Mentor: Brian Olson, Biology
Identification of Human Cells lacking Smurf1 protein

Samuel Ellis - $538
Faculty Mentor: Christopher Kvaal, Biology
Functional Complementation of the Histidine Biosynthetic Pathway in Thiomicrospire crunogena

Joshua Faust - $500
Faculty Mentor: Mark Schmidt, Information Systems
Forensics Analysis of UNIX based systems

Erin Flynn - $601
Faculty Mentor: Rob Mann, Anthropology and Sociology
Halls Swamp Archaeological Site Radiocarbon Dating and Species Identification

Javier Galeano - $700
Faculty Mentor: John Sinko, Physics and Astronomy
Identification of compounds using light absorption spectroscopy in the 405nm to 500 nm wavelength range

Hannah Ginter, Kassie Klasen and Sruthi Shankar - $808
Faculty Mentor: Latha Ramakrishnan, Chemistry and Biochemistry
SiRNA Delivery Via Polymeric Nanoparticles to Elucidate the Function and Localization of GABA

Joshua Gordon - $1,000
Faculty Mentor: Marina Cetkovic-Cvrlje, Biology
Quantification of innate immunity genes of fathead minnows exposed to aquatic pharmaceutical polluntants

Danielle Hall - $977
Faculty Mentor: Thomas Gardner, Chemistry and Biochemistry
Synthesis of Aromatic Hemiporphyrazines

Sam Hartman - $810
Faculty Mentor: John Sinko, Physics and Astronomy
Torison Pedulum for Laser Thrust Detection

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