2022-2023 Award Recipients

Faculty Led Fellowships for Undergraduate Student Participants:
Alexopoulos, Christopher - Oakland University
Balk, Gabriel - Hope College
Callebs, Jacob - Wayne State University
Clem, Dylan - Hope College
DeWitt, Skylar - Hope College
Cagnier, Bridget - Hope College
Grimes, Sarah - Hope College
Harville, Brendan - Michigan Technological University
Jankowski, Lindsey - Hope College
Jansen, Ethan - Hope College
Kaipainen, Nicholas - Hope College
McGuire, Hale - Hope College
Miller, Grace - Grand Valley State University
Okros, Grace - Grand Valley State University
Ruiz Fachin, Joseph - Grand Valley State University
Thomas, Evan - Hope College
Vance, William - Hope College
Williams, Sierra - Michigan Technological University
Zimmer, Gavin - Saginaw Valley State University

Graduate Fellowships:
About Halloun, Jihan - Wayne State University
Barnes, Jackson - Michigan State University
Benson, Mikayla - Michigan State University
Chanakian, Sevan - Michigan State University
Clugston, Jadon - Western Michigan University
Essig, Espree - Michigan Technological University
Forest, Erika - Grand Valley State University
Foster, Emily - Oakland University
Hanson, Anthony - Western Michigan University
Kaminski, Caleb - Michigan Technological University
Kur, Justin - Oakland University
Langeland, Katherine - Michigan Technological University
LeMahieu, Tyler - Michigan Technological University
McClusky, Bridle - Grand Valley State University
Nathan, Gabriel - Michigan State University
Nieman, Kip - Wayne State University
Pease, Allison - Michigan State University
Rivera Gonzalez, Paola - Michigan Technological University
Robinson, David - University of Michigan
Santiago, Erican - Michigan Technological University
Sargent, Hannah - Western Michigan University
Schweibert, Kyle - Michigan Technological University
Sebasco, Nick - Michigan State University
Sell, Jakob - Western Michigan University
Van Buskirk, Chelsea - Eastern Michigan University

Research Seed
Bahrzadeh, Mehdei - Oakland University
Beetham, Sarah - Oakland University
Boles, Brett - Grand Valley State University
Chen, Jun - Oakland University
Christians, Jeffrey - Hope College
Gomez, Pablo - Western Michigan University
Jaiswal, Surabhi - Eastern Michigan University
Jin, Qingyu - Michigan State University
Ronald, Kelly - Hope College
Ye, Xinyu - Michigan Technological University
Yoon, Yongsoon - Oakland University

PreCollege Program
Linday, Hayrettin - Eastern Michigan University
Maas, Sara - Grand Valley State University
Narayanan, Krish - Eastern Michigan University
Thomkins, Gerald - The Engineering Society of Detroit
Turney, Jannnah - Michigan Technological University

Public Outreach
Gipson, Karen - Grand Valley State University
Sterner, Anna - Michigan Science Center
vandijk, Deanna - Calvin University

Teacher Training
Lioubimtseva, Elena - Grand Valley State University

Multiple Programs
DeVilliers, Virginia - Plainwell Aviation and STEM Academy
Gochis, Emily - Copper Country Intermediate School District
Ipi Brown, Susan - Hope College
Kobus, Chris - Oakland University
Pachala, Kris - Grand Valley State University
Wubb, Mario - Detroit Area Pre-College Engineering Program

NASA Interns
De La Rosa, Diego - University of Michigan
Hart, Taylor - Saginaw Valley State University
Kasapis, Spyros - University of Michigan
Stevens, Adam - Michigan State University

Industry Interns
De Ungue, Tomas - University of Michigan
D’Urso, Eric - University of Michigan
Jackowski, Filip - University of Michigan
Lawson, Bennett - University of Michigan
Rulison, Forest - University of Michigan

MESSAGE FROM THE DIRECTOR
This will be an exciting year as NASA MSGC’s increased funding enables us to expand our impact with new community and industry partners and increased funding to support research experiences for students across our eleven affiliate institutions and NASA Centers.

At our Fall 2022 Conference held at the University of Michigan, we learned about the success of last year’s programming from over 100 presenters and attendees. The talks – including our Keynote from NASA’s Cindy Hasselbring describing her career path from math teacher in Milan Michigan, to Einstein Fellow, to helping lead NASA’s STEM engagement efforts, are available on our MSGC YouTube channel.

Please join us on October 21, 2023 at our Fall Conference at Western Michigan University in Kalamazoo. We look forward to expanding our partnerships, collaborations, and programming across Michigan in 2023.

Professor Gonthier Steps Down
Longtime Hope College MSGC Board Member and Campus Representative, Professor Peter Gonthier has stepped down in 2023 in preparation of his retirement. Last year, Professor Gonthier helped onboard a familiar face as he took on Professor Brian Yark as his Deputy Campus Representative. Brian is now the acting Hope College MSGC Board Member and Campus Representative taking over for Peter after shadowing him for over a year. We thank Peter for his significant contributions and wish him the best of luck in their next adventures.
Observing the Dark Sky in Alpena

The Besser Museum and Planetarium is an educational institution that brings the culture of art, history, and science to the northeast Michigan community of Alpena. After receiving a MSGC Virtual Learning Program Award, the Besser Museum was able to purchase a Unistellar eVscope smart telescope along with an iPad to operate it. The goal of their award was to expand their digital presence and interaction with local underserved communities and schools.

One way that they did this was by holding several community outreach events. During these events, the telescope is brought to a local Alpena Dark Sky park, Rockport State Recreation Area where community members are able to use the telescope to observe various celestial bodies like comets, nebulae, stars, and galaxies. One such event was a meteor shower watch party where planetarium coordinator, John Winckowski invited locals out to bring their own telescope (and chairs) or take a turn using the smart telescope where he guided them on viewing various objects in the night sky.

Alpena is home to three of Michigan’s Dark Sky parks. Rockport State Recreation Area is Michigan’s 100th state park nestled along Lake Huron and happens to be a 300-acre abandoned limestone quarry. Thompson Harbor State Park consists of 5,000 acres of sand dunes, upland and marsh. Including 6 miles of rustic trails. Negwegon State Park consists of one of the most beautiful beaches along Lake Huron’s coast. Lake Huron does not have a major city on its shoreline enabling wonderful dark skies.

The museum is working with local school districts and Alpena Community College to develop educational materials and events using the telescope. With the goal of setting up their own astronomy research programs using the eVscope and the astronomy database programs. These programs can be streamed online as well as right to their phones using the app.

Located in a community where the poverty rate is high, they are able to bring much-needed scientific outreach and education to many communities.

Prepared for Potential Emergencies on Other Planets

Kip Nieman is a graduate student at Wayne State University who has been conducting research to determine the best method for manufacturing emergency equipment for human colonies on other planets. If humans establish colonies on planets like Mars, transportation of materials and equipment from the Earth will take months. This takes far too much time if the colony is facing an emergency situation.

One method for emergency equipment production is Powder Bed Fusion (PBF). PBF is a type of "additive manufacturing" that uses a laser to melt thin layers of material in a bed of powder. This has an advantage over other methods because it can produce metal objects. A drawback of the PBF method is the fact that each completed object has internal stresses that weaken the overall structure. These stresses can only be relieved through a process called heat treatment which is demanding in time and energy and can both be limited in an emergency situation on another planet.

Kip Nieman’s research has been to try to improve the PBF process so that the internal stresses are minimized without having to complete the heat treatment process. Methods to improve the PBF process include optimization and the use of model-based controls. Kip and his team have been focusing on refining a model for the PBF process with the help MSGC funding for several years and most recently had the opportunity to present this work at the MSGC Fall Conference in 2022.

LiftOff Experience for 7th Grade Science Teacher Leads to MicroGravity Experiments

Texas Space Grant Consortium hosts an aerospace workshop every summer called LiftOff, a weeklong professional development training for teachers emphasizing STEM. Teachers are given information through a series of speakers, hands-on activities and field investigations. Last summer MSGC helped send Colleen Cain, a 7th grade science teacher from Larson Middle School in Troy, MI to attend LiftOff. Highlights from her trip included “meeting Apollo 13 astronaut Fred Haise, Clayton Anderson sharing stories about his time on the ISS, meeting and learning from NASA scientists and engineers, getting behind the scenes tours at NASA and meeting incredible teachers from all over the country!” While in Texas, Colleen learned about the Embedded Teacher Program hosted by the Wisconsin Space Grant Consortium. Colleen participated in this program last September with the help of MSGC, and is ging in a microgravity flight with student designed research projects this May. Once she returns home, Colleen uses these experiences to share what she learned not only with her students but with her school and community as well.

FY2022 MSGC Funding Addressing NASA Mission Directorates

<table>
<thead>
<tr>
<th>Mission Directorate</th>
<th>Funding Amount</th>
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<tbody>
<tr>
<td>Aeronautics Mission</td>
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<tr>
<td>Human Exploration Mission</td>
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<tr>
<td>Science Mission Directorate</td>
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<tr>
<td>Space Technology Mission</td>
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</table>
Hart flourished at NASA eClips

Taylor Hart is a current undergraduate student at Saginaw Valley State University, and recently had the opportunity to intern at NASA’s Langley Research Center where she worked as a Science Communicator. In this role, Hart, with mentorship from the NASA eClips team, developed interactive multimedia content meant to showcase NASA’s educational resources. Developed for K-12 classrooms around the country, they are available through various eClips sites.

Some of Taylor’s projects included working with the James Webb Space Telescope Social Director to develop a compilation of art videos for the “Unfold the Universe” competition. As well as working with NPR’s “Science Matters” team to publish articles about her experience interning as a science communicator for NASA. Taylor and her partner were also able to greatly boost the eClips social media presence using holidays, anniversaries, and important milestones as ways to connect cultural interests with educational resources.

During the time of her internship, Hart was able to promote educational resources through three in-person events. The first event was a professional development event designed to show educators activities developed by NASA that can be used in the classroom. The second event was created to show families fun activities that they can do at home to learn more about aerospace. The final event was held at a local library and it encouraged families to come and participate in activities that taught about things like the life cycle of a star.

Hart describes that she enjoyed being able to flourish creatively in the development of these projects, and she valued learning how to manage feedback about the projects from different perspectives. This internship has positively changed her future career path, and she is excited to apply her newly learned design strategies to future projects.

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Working Collaboratively for Cleaner Water

Allison Romanski, an undergraduate student at Grand Valley State University (GVSU), was able to work with a team of researchers during the summer of 2021 to repeatedly sample and test the water quality of various locations along the Grand River over a short period of time under different flow conditions.

The team collected over 120 samples during the time in the field, and in collaboration with the Allendale Wastewater Treatment Plant and the GVSU Honors College Lab, the team was able to immediately take the samples to the lab and test for attributes such as nitrate, total phosphate, ammonium, chloride, E. Coli, etc. Romanski and her team were then able to apply a value ranging from 1 to 100 for the quality of the water using the water quality index (WQI) which is determined based on the concentration of the various attributes they tested for.

By the end of the study, some noticeable trends became apparent. First, the WQI of the Grand River remained consistent around 70 during August 2021 which places it under the “Good” label. The next conclusion was that many of the nutrients that were tested for were in higher concentrations where the flow rate was highest.

When working with the Allendale Wastewater Township Treatment Plant, Romanski was asked to present her research proposal to the Allendale Township Board. She was asked questions on the purpose of her research and asked to return following the results for another presentation in the following months.

Allison reflected on how engaging her MSGC fellowship has affected her future career path, and she explained that she learned many important values that will allow her to be a successful water scientist. This project has allowed her to learn the value of working in a collaborative scientific environment. It has also taught her the proper method for sampling bodies of water and what attributes can affect the health of a body of water.

MSGC Calendar

May 9, 2023: Funding starts for 2023-2024 Awards
August 25, 2023: Registration opens for Fall Conference
September 1, 2023: Applications open for 2024-2025 Awards

October 21, 2023: Fall Conference in Kalamazoo
November 15, 2022: Applications due for 2024-2025 Awards
Forest Rulison is a masters student at the University of Michigan studying Aerospace Engineering. He was given the opportunity to work with an Aerospace company, Meta Orbital Effects (MOFX) located in Ann Arbor working at developing software for the Attitude Determination and Control System (ADCS) for several satellites. ADCS is the system that is in charge of recognizing and maintaining a spacecraft’s orientation compared to the earth providing stability to the instruments onboard the satellite.

Rulison worked on the “concept of operations” (ConOp) for the ADCS. Forest completed trade studies to determine the suitability for the satellite his team was working on. Building instrumentation from scratch requires a combination of hands-on work and work with computer models which led Forest to develop three tool kits. One to combine data from hands-on work to the model for accuracy. Another tool kit which turns analog data into digital data during the mission. The spacecraft uses that data to then make attitude adjustments. Lastly, a tool kit that characterizes the performance of the new spacecraft part in the model. The last tool kit helps scientists and engineers determine the quality of the performance of their new instruments within the model before they build it and put it on the satellite.

MOFX’s internship helped Forest apply his knowledge from his coursework while also learning new concepts. He stated that this internship solidified his interest in pursuing a career working with ADCS systems for satellites.

Industry Intern Builds Toolkits for Satellites

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GV Moon Miners go from Testing Their Instrument in Houston to Teaching in MI

A team of students known as the Grand Valley Moon Miners, from Grand Valley State University recently traveled to Johnson Space Center to learn how to design, build, and test instruments that are meant to address challenges that NASA currently faces with their Artemis Program. This was a part of the annual NASA Space Exploration Challenges which are designed to encourage undergraduate students to pursue careers in STEM through outreach events and hands-on activities.

GV Moon Miners worked on a project housed in Houston’s Neutral Buoyancy Lab that is meant to retrieve samples of the lunar surface using a core bit, a stabilizing jig, and a sample containment mechanism that attaches to a handheld drill. They learned about the importance of understanding the composition of the moon’s surface and the difficulties that come with performing scientific experiments on other celestial surfaces.

Once the students left Johnson Space Center, they brought the knowledge they acquired to the 11th and 12th-grade classrooms at Reeths Puffer High School in Muskegon, Michigan. They discussed the difficulties that astronauts face when taking core samples on the surface of the moon. Afterwards they divided the students into teams and gave them the challenge of building the tallest tower with newspaper and masking tape. Another portion of the team put together a video that was shown during the annual Roger That! Symposium held in Grand Rapids. Roger That! is a conference to educate locals, students and the public on space science and exploration. Lastly, the device was displayed in the Grand Rapids Public Museum to highlight local research.

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