THE NATIONAL SPACE GRANT COLLEGE & FELLOWSHIP PROGRAM

FISCAL YEAR 2020
ANNUAL PERFORMANCE REPORT (APR)

FUNDING SOURCE:
OFFICE OF STEM ENGAGEMENT
SPACE GRANT

MANAGING ORGANIZATION:
NASA HEADQUARTERS OFFICE OF STEM ENGAGEMENT

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MICHIGAN SPACE GRANT CONSORTIUM LEAD INSTITUTION:
UNIVERSITY OF MICHIGAN

MICHIGAN SPACE GRANT DIRECTOR:
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COOPERATIVE AGREEMENT/GRANT NUMBER:
NSSC20M0124

ACTIVITY DESCRIPTION: (100 – 250 words)

Michigan Space Grant Consortium's (MSGC's) strategic elements are derived from the needs of the state of Michigan, the nation, and from the guidance of Headquarters on NASA priorities. MSGC's suite of funding opportunities supports NASA's goal to develop the US STEM workforce, NASA Mission Directorates' needs, National Space Grant objectives, and Michigan's STEM strategies. Program elements that make up the MSGC portfolio include the following: **NASA Internships and Fellowships (NIF)** that support graduate students and faculty for research or public service activities related to the MSGC at any affiliate institution and internships at NASA Centers (MSGC's names for these programs are NASA Internships, Graduate Fellowships, and Undergraduate Research Grants); **Hand-On NASA-Oriented Experiences for Student groups (HONES)** that supports active participation by student groups in hands-on learning rooted in NASA-related, STEM-focused issues; **Research Seed Grants** that support research and instructional faculty members at MSGC affiliate institutions to build research expertise; the **Community College Collaborative Program Opportunity (C3PO)** that supports partnerships with community colleges with high percentages of underserved students; **Pre-College Education** grants that support programs aimed at the pre-college level and in-service teacher professional development for individuals; and **Informal Education** grants that support education in informal settings to increase learning and to educate students, educators, and the general public on STEM content areas in order to expand the nation's future STEM workforce. **Special Initiative** augmentation grants are available to supplement funding for programs that target women, underrepresented minorities, and people with disabilities. Proposals are welcome from outreach institutions and organizations throughout the state as well as from affiliate institutions. These programs are designed specifically to lay the seeds of STEM workforce development by focusing on our youngest students, as well as their parents, guardians, and mentors.

ACTIVITY GOALS: (Bulleted list)
State the Consortium Goals and Objectives from your base proposal and augmentation proposal. The objectives should express quantitative targets when appropriate.

Michigan Space Grant Consortium goals and objectives:

1. Promote a strong STEM education base from elementary through secondary levels while providing support to teachers in these grade levels toward more effectively improving student academic outcomes.
2. Create opportunities that enable student contributions to the development of solutions addressing NASA Mission Directorate challenges.
3. Establish and maintain a national network of universities with interests and capabilities in aeronautics, space, and related fields.
4. Create cooperative programs among universities, aerospace industry, and Federal, state, and local governments to foster STEM ecosystems.
5. Encourage interdisciplinary training, research, and public service programs related to aerospace.
6. Attract, recruit, and train US citizens, especially women, underrepresented minorities (URM), and persons with disabilities, for careers in aerospace science and technology.
7. Advance aerospace knowledge and expand related activities.

MSGC's suite of programs directly meets NASA's STEM Engagement Objective 3.3 from NASA Strategy 2018 by supporting Goal 1.0, Goal 2.0, and Goal 3.0 and accompanying objectives listed in the

solicitation. The tables below show the alignment between MSGC and NASA STEM Engagement Objectives; as well as the Michigan MiSTEM pillars.

NASA OSTEM OBJECTIVES	STATE OF MICHIGAN MiSTEM PILLARS				FEDERAL STRATEGY	SPACE GRANT OBJECTIVES						
	1	2	3	4		1	2	3	4	5	6	7
1.1				X	X	X	X	X	X	X	X	X
1.2					X			X				X
2.1	X	X				X	X	X	X	X	X	X
2.2				X	X		X				X	X
2.3	X	X	X	X	X		X			X	X	X
2.4			X		X				X			
3.1	X	X			X	X						
3.2	X	X		X	X	X	X			X		

NASA OSTEM OBJECTIVES	MSGC PROGRAMS								
	Internships	Fellowships	MSGC Scholarships	HONES	Research Seed Grant	C^3PO	Pre-College Education	Informal Education	Special Initiatives
1.1	X	X		X					
1.2					X				
2.1	X	X	X	X		X	X	X	X
2.2	X	X		X					
2.3	X	X	X	X	X	X	X	X	X
2.4	X	X	X	X	X	X	X	X	X
3.1							X	X	
3.2	X						X	X	

ACTIVITY CONTRIBUTIONS TO PERFORMANCE GOALS (PG) AND SUCCESS CRITERIA

List appropriate FY 2020 PGs and Success Criteria and write a brief description of the project activity's contribution to each.

NIF, HONES, Research SEED Grant, C3PO SMART GOALS
NASA Candidate Performance Goal 3.3.5 "Enabling contributions to NASA's work"

- **Goal:** Improve the quality of applications received for Internships and Fellowships.
  Measurement – Based on average reviewer scores.
- **Goal:** Increase the number of students applying for NASA Internships.
  Measurement – Compare the number of students from year-to-year.
- **Goal:** Increase the number of presentations/ papers reported by students and faculty awardees

Measurement – Compare the number of presentations/ papers reported by students and faculty awardees from year-to-year.

NASA Candidate Performance Goal 3.3.3 "Building a diverse, skilled future STEM workforce"

- **Goal:** Increase the % direct significant awards to underrepresented minority (URM) and women
  Measurement - Compare the number of applications from year-to-year
- **Goal:** Increase the number of applications each year from URM and women.
  Measurement - 22.7 URM and 53% women
- **Goal**: Increase the number of NIF applicants from MSGC affiliated (non-lead) universities
  Measurement - Compare the number of applicants from MSGC affiliates from year-to-year.

Pre-College Education, Informal Education, and Augmentation SMART GOALS
NASA Candidate Performance Goal 3.3.5 "Enabling contributions to NASA's work"

- **Goal:** Improve the quality of applications received.
  Measurement – Based on average reviewer scores

NASA Candidate Performance Goal 3.3.3 "Building a diverse, skilled future STEM workforce"

- **Goal:** Increase the # of educational programs that either (i) apply for augmentation or (ii) are continuing augmented programs, increasing target # of direct participants.
  Measurement - Compare the number of applications from year-to-year

All Programs combined SMART GOALS
NASA Candidate Performance Goal 3.3.3 "Building a diverse, skilled future STEM workforce"

- **Goal:** Increase the number of collaborations with industry partners
  Measurement - Compare the number of applications from year-to-year

PG 3.3.3: Provide opportunities for students to engage with NASA's aeronautics, space, and science people, content, and facilities in support of a diverse future NASA and aerospace industry workforce.

> **PG 3.3.3 Success Criteria: Meet or exceed the national average in two of the four categories** of student diversity for NASA STEM enrollees in internships, fellowships, or other student engagement opportunities. Diversity Categories: (1) students across all institutional categories and levels (as defined by the U.S. Department of Education), (2) racially or ethnically underrepresented students (Hispanics and Latinos, African Americans, American Indians, Alaska Native, Native Hawaiians and Pacific Islanders), (3) women, and (4) persons with disabilities at percentages that meet or exceed national averages for science and engineering enrollees, as determined by the most recent, publicly available data from the U.S. Department of Education's National Center for Education Statistics.

Response to PG 3.3.3 and/or PG 3.3.3 Success Criteria goes here:

NIF, HONES, Research Seed Grants C3PO

MSGC will use three metrics to measure the increase in diversity of aerospace science and technology workforce from activity derived from Fellowship, Internships and faculty applications and awards. The first metric includes the percent of significant, direct awards for URM and women. The target is to meet or exceed the percentage enrollment of those populations in higher education institutions in Michigan, reported by DoE, NCES. A second metric includes the number of applications each year from URM and women. The target is to increase that number each year. Thirdly, MSGC's efforts to build a broad, skilled future STEM workforce will be measured by the number of applicants from MSGC affiliated (non-lead) universities. The target will be to increase that number each year.

Benchmarks for diversity within the MSGC Fellowship and Internship Programs have consistently been met. Historically, approximately 40% of fellowship and internship, award recipients were women and 20% were underrepresented minority students. MSGC's new goal is to secure at least 53% women and 22.7% underrepresented minority students.

Pre-College Education, Informal Education and Augmentation

To measure the increase in diversity of aerospace science and technology workforce from activity derived from **Pre-College Education, Informal Education and Augmentation** MSGC will compare the number of proposals that either (i) apply for augmentation or (ii) are continuing augmented programs, increasing target # of direct participants. The target is to increase that number each year.

All Program Combined

MSGC aims to grow strategic partnerships with industry to enhance and extend the impact of NASA's efforts in STEM engagement. The number of collaborations will measure success from year to year.

PG 3.3.4: Enhance the effectiveness of education investments using performance assessment and evaluation-driven processes.

> **PG 3.3.4 Success Criteria:** Discuss how the Consortium has or plans to implement evaluation-driven processes to assess the overall impact of the Consortium and its activities.

Response to PG 3.3.4 and/or PG 3.3.4 Success Criteria goes here:

The assessment of all the programs directly involving college/university students and faculty (NIF, HONES, Research Seed Grant, C3PO); including programs aimed at supporting of K-12 student and teacher education (Pre-College Education, Informal Education, and Augmentation) revolve around two overarching goals (i) enabling contributions to NASA's work ***(PG 3.3.5***) and (ii) building a diverse, skilled future STEM workforce (***PG 3.3.3).***

Data are gathered from applications and annual reports. The metric related to augmented funding (Special Initiatives) can be analyzed directly from applications for funding. The numbers of papers/presentations and NIF demographics are gathered through both applications and annual reports. Reporting requirements are clearly conveyed to applicants through downloadable pdfs on the MSGC website. MSGC's Annual Progress Document will report the results of the data analysis for all SMART goals referenced above. In Year 1, the data will form the baseline. In order to show

improvement over time, subsequent year reports will contain the (i) data for that year, (ii) data from the previous year and (iii) notes whether the target was met.

PG 3.3.5: Provide opportunities for students to contribute to NASA's aeronautics, space, and science missions and work in exploration and discovery.

> **PG 3.3.5 Success Criteria:** Number of paper presentations and peer-reviewed research publications (and beginning in FY2021 to include student proposed solutions and products) resulting from STEM engagement investments. (Target number is 1,300)

Response to PG 3.3.5 and/or PG 3.3.5 Success Criteria goes here:

NIF, HONES, Research Seed Grants C3PO

MSGC has three metrics under this criterion. The first metric for applications submitted in response internships and fellowships opportunities includes increasing the quality of applications measured by the average reviewers' scores on applications. The second metric includes increasing the number of students applying to MSGC for NASA internships, measured by number of applications received from year to year. The third metric includes increasing the numbers of papers/presentations and award demographics gathered through both applications and annual reports.

Pre-College Education, Informal Education, and Augmentation

The single metric under this criterion for applications submitted in response to Pre-College Education, Informal Education, and Augmentation funding includes increasing the quality of applications received measured by the average reviewers' scores. The target will be to increase the quality each year.

BASE AWARD ACCOMPLISHMENTS: ***(250 – 500 words)***

NIF, HONES, Research Seed, C3PO
NASA Candidate Performance Goal **3.3.5 "Enabling contributions to NASA's work"**

- **Goal -** Improve the quality of applications received for Internships and Fellowships.
  Measurement – Based on average reviewer scores.
  Approach – Create opportunities for additional guidance and mentorship at the affiliate and lead institution level prior to proposal submission and provide an administrative review of proposals upon receipt, prior to sending to reviewers; ensuring proposals include all of the required components; such as matching funds and letters of support.
  Accomplishment – Year 1 sets the baseline that subsequent years will be compared against. In year 1, 58 out of 87 applications or 67% received a score of 80% or higher. 20 applications or 23% received a score of 90% or above.

- **Goal -** Increase the number of students applying for NASA Internships.
  Measurement – Compare the number of students from year-to-year.
  Approach - Provide marketing materials to all MSGC affiliate representatives to supplement the other ways (newsletter, website, postings, and e-mails) in which we announce the MSGC Internship opportunities.

Accomplishment – Year 1 sets the baseline that subsequent years will be compared against. This year, NASA received approx. 275 applications from MSGC's 11 affiliate institutions.

- **Goal -** Increase the number of presentations/ papers reported by students and faculty awardees
  Measurement – Compare the number of presentations/ papers reported by students and faculty awardees from year-to-year.
  Approach – Increase visibility around this goal; highlighting the expectation in Notices of Awards and Reporting Requirements documents; providing our Acknowledgement Statement with grant number for easy reference on our website and MSGC signature lines, etc.
  Accomplishment – Year 1 sets the baseline that subsequent years will be compared against. Since results for projects awarded in year 1 are not available at the time of this report, the activity for year one presentations/ papers will be included as part of our year two annual performance report.

NIF, HONES, Research Seed, C3PO
NASA Candidate Performance Goal **3.3.3 "Building a diverse, skilled future STEM workforce**"

- **Goal -** Increase the number of applications each year from URM and women.
  Approach - Provide marketing materials (newsletter, website, postings, and e-mails) announcing augmented support for those proposals that target underrepresented minorities and women. To be considered for augmented support, applicants are required to submit an additional page describing in detail why additional funds are necessary to assure the success of program targeting underrepresented minorities and/or women.
  Measurement – Target indicated in our proposal was (22.7 URM and 53% women)
  Accomplishment – In year 1, women represent 55% of the applications received; whereas, URM represent just 16%, 5% shy of our goal. It is difficult to say, for sure, what is driving this lower number. The one variable, unique to this year is the altered academic landscape due to COVID-19.

- **Goal -** Increase the % direct significant awards to underrepresented minority (URM) and women
- **Approach –** If we succeed at our first goal to increase the number of applications received each from URM and women, the % of direct significant awards should follow.
  Measurement - Compare the number of applications from year-to-year. Year 1 will set the baseline that subsequent years will be compared against.
  Accomplishment – in year 1**,** of the 55% of applications submitted by women 100% were awarded Same with URMs. Of the 16% of applications submitted by URMs, 100% were awarded.

- **Goal** - Increase the number of NIF applicants from MSGC affiliated (non-lead) universities
  Approach - Provide marketing materials to all MSGC affiliate representatives to supplement the other ways (newsletter, website, postings, and e-mails) in which we announce the MSGC Fellowship and Internship opportunities.
  Measurement - Compare the number of applicants from MSGC affiliates from year-to-year.
  Accomplishment – Year 1 sets the baseline that subsequent years will be compared against. The number of MSGC affiliated (non-lead) universities proposals submitted by NIF applicants

in year was 62 (4 Calvin, 1 EMU, 8 GVSU, 15 Hope, 2 MSU, 17 MTU, 2 Oakland, 1 SVSU, 8 WSU & 4 WMU).

Pre-College Education, Informal Education, and Augmentation
NASA Candidate Performance Goal **3.3.5 "Enabling contributions to NASA's work**"

- **Goal -** Improve the quality of applications received.
  Measurement – Based on average reviewer scores
  Approach - Create opportunities for additional guidance and mentorship prior to proposal submission.
  Accomplishment - Year 1 sets the baseline that subsequent years will be compared against. In year 1, 6 out of 18 applications or 33% received a score of 80% or higher. 3 applications or 16% received a score of 90% or above.

Pre-College Education, Informal Education, and Augmentation
NASA Candidate Performance Goal **3.3.3 "Building a diverse, skilled future STEM workforce**"

- **Goal -** Increase the # of educational programs that either (i) apply for augmentation or (ii) are continuing augmented programs, increasing target # of direct participants.
  Measurement - Compare the number of applications from year-to-year
  Approach - Provide marketing materials (newsletter, website, postings, and e-mails) announcing augmented support for those proposals that target underrepresented minorities. To be considered for augmented support, applicants are required to submit an additional page describing in detail why additional funds are necessary to assure the success of program targeting underrepresented minorities and/or women.
  Accomplishment – Year 1 sets the baseline that subsequent years will be compared against. Ten educational program proposals out of a total of eighteen applications (56%) applied for augmentation or continuing augmented programs.

All Programs combined
NASA Candidate Performance Goal **3.3.3 "Building a diverse, skilled future STEM workforce**"

- **Goal -** Increase the number of collaborations with industry partners
  Measurement - Compare the number of applications from year-to-year
  Approach - Reach out to industry partners who are seeking collaborations to provide internships opportunities for our audience; pre-college and college age students from our network of non-profit community partners and our affiliates.
  Accomplishment – Year 1 sets the baseline that subsequent years will be compared against. This summer, nine graduate students received virtual Internships as part of a new collaboration between MSGC and Orbital Effects, a small satellite startup focused on addressing critical U.S. national security challenges using its cutting-edge radar satellite technologies. Efforts to secure additional collaborations with industry partners are planned for year 2.

NOTE: For the following categories, complete if applicable to your base award. If not applicable, indicate "Not Applicable".

NCAS AND SPACE GRANT PILOT ACCOMPLISMENTS (If applicable): ***(250 – 500 words)***

N/A

BIG Idea FY2020 ACCOMPLISHMENTS (If applicable): ***(250 – 500 words)***

On February 14, Michigan Tech was chosen by the BIG Idea Challenge 2020 judges as one of 8 finalist teams and awarded $162,637 to build and test the Tethered permanently shaded Region EXplorer (T-REX) which will connect communication and power generated by a CLPS lander via a 2 km super-conducting tether to any other rovers or stationary equipment in a PSR and also serve as the local wifi node in the PSR. The team, consisting of 8 undergraduate students and two graduate students under supervision of Faculty Advisor Dr. van Susante, worked in Michigan Technological University's (MTU) Planetary Surface Technology Development Laboratory (PSTDL) to build the test facilities and T-REX's Mark 1, 2 and 3 rovers and subsystems. Due to COVID, university closures and delays were experienced, but the team adapted and adjusted schedules and managed to complete T-REX mark 1 and 2 as planned. All subsystems, such as the conventional tether spool deployment, the superconducting tether deployment system and tether tension adjustment system, the power and data systems, software, mobility and structural systems were analyzed, built and tested before integration and testing. A lunar regolith sandbox and enclosure was built and filled with MTUs own lunar regolith simulant, a gravity off-loading system and a 45 degree ramp was also built in the sandbox enclosure to test T-REX at 1/6 weight and on a 45 degree crater descent while deploying the super-conducting tether. On January 6, 2021, we gave our NASA BIG Idea Forum presentation to the judges and on Friday January 8 we were declared the winner of the 8 finalist teams and were awarded 'The Artemis Award' by NASA administrator Jim Bridenstine for the project with the best potential to contribute to the Artemis program. Building of the Mark 3 prototype is continuing so it can be tested in the now operational dusty thermal vacuum chamber at MTU. We are working on further development of the technology with industry partners.

https://www.nasa.gov/feature/langley/tech-designed-by-university-students-could-shine-light-on-extreme-lunar-environments

http://bigidea.nianet.org/

https://www.mtu.edu/news/stories/2021/january/mtu-students-shoot-for-the-moon-and-win.html

https://www.uppermichiganssource.com/2021/01/13/michigan-tech-robotics-team-continues-work-on-moon-rover/

FIRST NATIONS LAUNCH (If applicable): ***(250 – 500 words)***

N/A

ACTIVITY IMPROVEMENTS MADE IN THE PAST YEAR:

(*e.g. activity management, cost efficiencies) (100 – 250 words)*

MSGC continues to refine our new website and other online and virtual resources, required to evolve and make the most of our current climate in response to COVID-19 restrictions. Applications for

funding, review and participant data are now collected on a single online platform using Submittable. Despite the pandemic, MSGC funded twice as many awards than anticipated this year; incorporating a new Virtual Fellowship opportunity for students across eleven affiliate institutions; including a special Virtual Learning Program to support MSGC's community partners doing K12 and non-profit STEM education. The response was overwhelming. MSGC received more proposals for the off-cycle virtual fellowship and learning program opportunities offered this summer than our traditional annual call for proposals each fall. MSGC's first ever Virtual Fall Conference was also a huge success; complete with captivating Keynote Dr. Andrew Klesh and over 150 attendees, the fall conference included over 65 presenters who provided 5-minute slide presentation in advance of the meeting and 1-minute lightening talks during the live session.

MSGC continues to establish and expand our non-profit STEM educational collaborations and industry partners. This summer, nine graduate students received virtual internships as part of a new collaboration between MSGC and Orbital Effects, a small satellite startup focused on addressing critical U.S. national security challenges using its cutting-edge radar satellite technologies. We are also excited to announce that our collaboration with the Michigan Science Teachers Association will provide an opportunity for fifty K-12 teachers from the state of Michigan to attend MSTA's annual professional development workshop this year. Efforts to secure additional non-profit STEM community collaborations and industry partners is underway; including with the Michigan Aerospace Manufacturing Association (MAMA) and St Clair County Community college, future site of Michigan's first Challenger Learning Center.

Lastly, after two years in transition, the MSGC administrative team has been finalized. The MSGC Program Manager role was redefined this year to encompass a wider range of programmatic responsibilities than traditionally defined under this title. In collaboration with Dr. Moldwin, MSGC's new Program Manager, Debra Warrick, provides program leadership, analysis and evaluation of program goals; responsible for the day-to-day administrative and financial operations she is a Certified Research Administrator, who fulfills all of the financial duties necessary to oversee MSGC's large portfolio of awards, contracts and collaborators. Debra contributes to the vision and direction of the program; helping identify and manage key competencies and implementing innovative solutions that address a wide variety of customer service and program challenges. Katie Klink, MSGC Marketing and Communications Specialist was made a permanent member of the team where she spends 80% of her time coordinating the application and review process for each round. She also provides the necessary creativity and expertise required to manage MSGCs website, execute communication and event planning. An essential member of team Katie provided the necessary expertise required to navigate the 2020 virtual landscape with ease and proficiency. The third member of MSGC's administrative team includes Administrator, Laura Hopkins who provides 25% effort in order to accommodate the rising administrative and transactional responsibilities necessary to support MSGC's growing program. A couple of short-term temporary appointments provided additional value to MSGC this year. Kaleb Clover, MSGC's work-study intern supports communications activities and projects with Katie while Rachel London, UM Art alum, is working with MSGC to bridge the gap between science and art; piloting a new effort to incorporate art in Science, Technology, Engineering and Mathematics (STEM) research.

ACTIVITY PARTNERS AND ROLE OF AFFILIATES IN ACTIVITY EXECUTION:

Bulleted list or table. Should include a brief description of how affiliates were involved in the project activity.

The MSGC Executive Board consists of the campus representatives at the following member institutions; as well as board members representing local K-12 and Teacher Training Programs. Campus representatives have the same general role within MSGC, achieving ultra-high equity among the board members. The campus representatives further MSGC's mission and vision on their campus, helping students and ensuring that administrative procedures are followed during the application process. They evaluate and advise MSGC leadership on policies and procedures. They review individual funding applications; their varied individual expertise provides the ability to evaluate applications across a broad spectrum of subject areas. They also meet in February to arrive at final decisions on awards.

Calvin University • Private four-year liberal arts college: Dr. Jason Smolinski is an Assistant Professor of Physics and Astronomy with research in the field of globular star clusters.

Ann Arbor Public Schools • Tom Pachera is the STEAM Coordinator for Ann Arbor Public Schools, has also joined the MSGC executive board this year as an expert in K-12 education. He has taught Technology Education for 29 years and currently teaches Introduction to Engineering Design, and Engineering Design & Development courses for Skyline High School. Key figure in evaluation of Precollege programs.

Eastern Michigan University • Public Ph.D.-granting university: Dr. Roxanne Katus is a Professor of Mathematics and Statistics.

Eastern Michigan University • Public Ph.D.-granting university: Dr. James Sheerin is a Professor of Physics and Astronomy. Key figure in evaluation of Precollege programs.

Grand Valley State University • Public Master's-granting university: Dr. Bopaiah Biddanda is an Aquatic Microbial Ecologist interested in the Carbon Biogeochemistry of natural waters.

Hope College • Private four-year liberal arts college: Dr. Peter Gonthier is an astronomer and Professor of Physics.

Michigan State University • Public Ph.D. granting university: Dr. Virginia Ayers is a Professor of Electrical and Computer Engineering at Michigan State University. Her research investigates both inorganic and organic nanostructures.

Michigan Technological University • Public Ph.D. granting university: Dr. Will Cantrell, is the Associate Provost and Dean of the Graduate School at Michigan Technological University, as well as a professor of physics. His research includes atmospheric science, cloud and aerosol physics and chemistry as well as nucleation.

Oakland University • Public Ph.D. granting university: Dr. Laila Guessous is an Associate Professor of Mechanical Engineering with research in the field of computational fluid dynamics and computational heat transfer.

Saginaw Valley State University • Public Master's-granting University: Dr. Khandaker Abir Rahman is the Chair and Associate Professor of Computer Science & Information Systems.

University of Michigan (lead institution) • Public Ph.D. granting university: Dr. Mark Moldwin is the MSGC director, Arthur F. Thurnau Professor of Climate and Space Sciences and Engineering within the University of Michigan's College of Engineering. He is also Faculty Director of UM's M-STEM's M-Engin program, and President of the American Geophysical Union's (AGU) Education Section.

Wayne State University • Public Ph.D. granting university: Dr. Ed Cackett is a professor of Physics and Astronomy.

Western Michigan University • Public Ph.D. granting university: Dr. Massood Atashbar is Professor of Electrical and Computer Engineering and the director of Advanced Smart Sensors and Structures and the Sensor Technology Laboratory.

CURRENT AND PROJECTED CHALLENGES:

Identify any current or projected challenges in the implementation or execution of activities. Explain how the management team is working to address the challenges identified and/or how National Program Staff can assist.

The evolving landscape due COVID-19 and associated restrictions is the projected challenge for 2021. However, MSGC's network of affiliates and community partners proved resilient and determined in 2020. Identifying creative ways to stay connected and involved, they overcame unanticipated obstacles due to limited face-to-face interactions and restricted travel; getting the research, community engagement and learning objectives accomplished in spite of being in the middle of a global pandemic. Based on the success of this last year, we remain encouraged and are optimistic that MSGC will successful meet or exceed all of its funding and collaboration goals planned for 2021.

Lastly, because MSGC's original proposal included a 5yr timeline, with the first round of programs to be awarded at the end of our year 1 project period, MSGC is working on an off-cycle round again this Spring/Summer 2021 in an effort to catch up to our year 2 budget.