

**Strategic Plan of the [Iowa Space Grant Consortium](#)
2020 – 2024 Program Years 31 - 34
22 June 2020 – 21 June 2024**



Vision

The vision of the Iowa Space Grant Consortium (ISGC) is that Iowa's future citizens are empowered to pursue STEM and aerospace science and technology; and assist NASA in achieving their objectives.

Mission

The ISGC's mission is to coordinate opportunities in the **Science, Technology, Engineering and Math (STEM)** disciplines in pursuits aligned with the Space Grant Program's objectives and NASA's strategic priorities; by inspiring, engaging, educating, and helping to employ a diversity of Iowans through stimulating research, education, and outreach programs.

Purpose and Scope

This plan establishes the general goals and activities of the ISGC for the next four-year period from June 2020 through June 2024. It is divided into sections in response to the following: Charting a Course for Success - America's Strategy for STEM Education, the Federal STEM Initiative, NASA's Strategic Plan 2018, the vision and intent of the executive committee and affiliates, and current state STEM and economic development goals.

This plan relates only to the broad objectives of the ISGC. Specific strategies are developed for each Program Year (PY) based on funding availability and NASA priorities. The director is given broad authority to act in the best interest of the ISGC under the oversight of the executive committee. This allows the ISGC to adapt to rapidly changing priorities and opportunities. Based on the comments from the ISGC PY31-34 proposal review, NASA's 2018 strategic plan, and Iowa's STEM priorities, the following areas will be given special emphasis for the next four years:

- Promote and support student experiences through internships, fellowships, and scholarships.
- Promote the involvement of women, underrepresented minorities, and persons with disabilities.
- Engage applied research at higher education institutes to assist in solving NASA Mission Directorate challenges.
- Educate and engage pre-college STEM students and educators to prepare the next generation of explorers.
- Educate the public to understand the impacts and benefits of NASA in their daily lives.
- Expand participation with ISGC, particularly from industry and community colleges.

- Elevate the impact of the ISGC across Iowa.

Based on NASA's requirements, the strategic plan is divided into four major program areas:

- 1) Internships, Fellowships, and Scholarships
- 2) NASA Mission Directorate Projects
- 3) Competitively Awarded Projects
- 4) Consortium Management

STRATEGIES and GOALS

Strategic Area 1: Internships, Fellowships, and Scholarships

Goal 1: To award and administer competitive Internships, Fellowships, and Scholarships which provide student research, educational, and work-based learning (WBL) opportunities in the STEM fields that align with NASA's mission in order to grow a larger and more diverse STEM workforce.

Objective 1.1: Implement a competitive fellowship program statewide that: is effective at retaining graduate students in STEM fields, supports students performing research aligned with the NASA strategies and Mission Directorates, and meets all of NASA's requirements.

- **Strategy:** Awards will be granted annually through a competitive, online process and selected jointly by the director, in consultation with the associate director, and campus coordinators. The graduate student must be enrolled in a STEM discipline, whose research directly aligns with NASA's Mission Directorate and strategic objectives. Women, underrepresented minorities, persons with disabilities, and U.S. military veterans will be encouraged to apply. U.S. citizenship is required.
- **Outcome and Evaluation:** Based on funding availability, up to 18 fellowships will be awarded. The respective campus coordinator and consortium director will monitor student progress. Surveys will be conducted with recipients to determine data required for NASA reports, including but not limited to: progress of research toward supporting/achieving the goals of the NASA Mission Directorates.
- **Alignment:** This objective (1.1) aligns with NASA Strategic Objective 1.1, 1.2, 2.1, 2.2, 3.1, 3.2, 3.3 and all Mission Directorates.

Objective 1.2: To support student internships at NASA Centers that enable a diverse pool of students who will: contribute to NASA's work and engage in hands-on experiences to promote skill development important for STEM careers.

- **Strategy:** Fund students from academic affiliates at NASA Centers or with Consortium internship opportunities. Women, underrepresented minorities, persons with disabilities, and U.S. military veterans will be encouraged to apply. Students must be enrolled in a STEM discipline, with a minimum GPA of 3.0, and be U.S. citizens.
- **Outcome and Evaluation:** The ISGC director will work with NASA Centers to fund student internships. Based on annual funding availability for summer vs. academic

year internship placements, an estimated 10 internships will be awarded. Surveys will be conducted with recipients and internship mentors to determine data required for NASA reports, including but not limited to: quality of the work provided by the intern, and assistance the intern was able to provide toward advancing the NASA Mission Directorate goals.

- **Alignment:** This objective (1.2) aligns with NASA Strategic Objectives 1.1, 1.2, 2.1, 2.2, 3.1, 3.2, and 3.3 and all Mission Directorates.

Objective 1.3: Implement a competitive scholarship program across all ISGC academic affiliates for undergraduate students engaged in STEM disciplines to promote retention and attraction of students in STEM related fields, and to inspire, educate, and engage the next generation of explorers.

- **Strategy:** Awards will be granted through a competitive, online process and selected jointly by the director, in consultation with the respective campus coordinator. The student must currently be enrolled in a STEM discipline within one of the ISGC academic affiliates. Student research involvement is a positive in the review, but is not required. If the student is involved in research, the research must align with one of the NASA Mission Directorates. Women, underrepresented minorities, persons with disabilities, and U.S. military veterans will be encouraged to apply. U.S. citizenship is required.
- **Outcome and Evaluation:** Based on the funding availability, up to twenty scholarships will be awarded. The respective campus coordinator, as well as the ISGC director and associate director, will monitor student progress. Surveys will be conducted with recipients to determine data required for NASA reports, including but not limited to: progress of research toward supporting/achieving the goals of the NASA Mission Directorates.
- **Alignment:** This objective (1.3) aligns with NASA Strategic Objective 1.1, 1.2, 2.1, 2.2, 3.1, 3.2, and 3.3 and all Mission Directorates.

Strategic Area 2: Mission Directorate Projects

Goal 2A: To build and support research and student activities at Iowa's institutions of higher education, which help accomplish the NASA mission by supporting research and activities directly aligned with the NASA Mission Directorate research priorities, while strengthening STEM education.

Objective 2.1 (Base Programs): Support the development of competitive, self-sustaining research programs at each core academic institution, which combine student involvement with active and innovative research aligned with the NASA Mission Directorates. This program will support student recruitment and retention efforts in the STEM fields, at each campus.

- **Strategy:** A base program is a higher education research program that is centered in a field relevant to the NASA strategic objectives as well as to the state objectives. This will be a Competitive Award within a core academic campus, with each campus having a different NASA Mission Directorate focus, as outlined in the budget. To be considered for selection, a program must be conducting innovative research directly

aligned with one or more of the research priorities of the four NASA Mission Directorates {Aeronautics Research ([ARMD](#)), Human Exploration Operations ([HEO](#)), Science ([SMD](#)), and Space Technology ([STMD](#))}. Each program will receive sustained funding for at least four years and seek: continual improvement of the alignment with NASA Centers, Mission Directorates, and priorities/strategies; and improving their research sustainability after ISGC funding ends. Programs must include the involvement of students in research, with an effort to include undergraduates, supported either through ISGC scholarships or internal funding, as well as a recruitment strategy for women, underrepresented minorities, and persons with disabilities. Higher consideration will be given to proposals which collaborate with other affiliates.

- ***Outcome and Evaluation:*** The director and the respective campus coordinator review the performance of these programs annually. The programs will be evaluated based on the number of: papers, presentations, patents, student and non-student participants, and collaborations with and outside of NASA. Progress and annual reports are required. Sustainability of the research beyond ISGC funding is an important evaluation factor. Subsequent year funding is contingent on successful completion of prior year grant requirements. New competitions will be conducted as required.
- ***Alignment:*** This objective (2.1) aligns with NASA Strategic Objective 1.1, 1.2, 2.1, 2.2, 3.1, 3.2, and 3.3 and all Mission Directorates.

Objective 2.2 (Academic Projects): Fund awards to researchers at the non-core academic affiliate campuses, conducting research aligned with either the NASA Science Mission Directorate or the Space Technology Mission Directorate scientific pursuits and NASA’s mission/strategies. This program will support student recruitment and retention efforts in the STEM fields at the respective campus.

- ***Strategy:*** Conduct a statewide competition calling for proposals for “Academic Project Awards” for researchers at any of the ISGC (non-core) academic affiliates. To be considered for selection, a program must be conducting innovative research directly aligned with the SMD’s scientific pursuits: Earth Science, Planetary Science, Heliophysics, or Astrophysics; or the STMD. The award will be competed every year. A current award recipient will need to re-compete, but is eligible for renewal up to three years with satisfactory progress of the project. Engaging undergraduate students (with emphasis on women, underrepresented minorities, and persons with disabilities) with the project is encouraged. Priority will be given to proposals which collaborate with other affiliates.
- ***Outcome and Evaluation:*** Depending on NASA funding availability, award up to four grants annually to ISGC academic affiliates. The director and the respective campus coordinator review the performance of these programs annually. The programs will be evaluated based on the number of: papers, presentations, patents, student and non-student participants, and collaborations with and outside of NASA. Progress and annual reports are required. Sustainability of the research beyond ISGC funding is an important evaluation factor. Projects will be selected through a competitive process that will use the selection criteria put forth in the RFP.

- **Alignment:** This objective (2.2) aligns with NASA Strategic Objective 1.1, 1.2, 2.2, 3.1, 3.2, and 3.3 and all Mission Directorates.

Objective 2.3: Encourage and assist all affiliates with submissions of new and innovative research proposals in fields aligned with NASA's strategy and Mission Directorates.

- **Strategy:** Distribute research opportunity announcements to ISGC affiliates through personal communication, presentations, e-mail, and the Consortium website. ISGC will cooperate and collaborate with Iowa NASA EPSCoR to cross-promote all NASA opportunities.
- **Outcome and Evaluation:** Increase external funding opportunities for ISGC affiliates in Iowa. The director is responsible for this activity. Research opportunity announcements will be released via the ISGC homepage, and the program coordinator will facilitate the dissemination of information.
- **Alignment:** This objective (2.3) aligns with NASA Strategic Objective 1.1, 1.2, 2.1, 2.2, 3.1, 3.2, and 3.3 and all Mission Directorates.

Goal 2B: To support precollege educators through professional development, pre-service and in-service training to improve education in Iowa that will encourage and inspire students to enter and remain in STEM disciplines; to enhance public awareness, scientific literacy, understanding of reasons for exploration, daily benefits to humanity, and appreciation for sciences and technology based on NASA's on-going strategic plan objectives.

Objective 2.4: Conduct and support precollege professional development activities for STEM educators in hands-on curriculum which will help inspire, educate, and employ the next generation of explorers; to promote a strong STEM educational base in Iowa and make curricular connections with NASA educational materials, opportunities, and expertise; by increasing public awareness of tangible daily benefits to humanity from NASA advancements.

- **Strategy:** The associate director will deliver professional development training that includes NASA content, and ensures alignment with ISGC and state educational objectives, and which specifically focus on the NASA HEO goals of educating and engaging the public as outlined in this Objective 3.1. ISGC will work with former NASA Explorer Schools, former ISGC Partner Schools, and other STEM education partners to develop specific activities that the ISGC will support or provide. The associate director will recruit various tribal and underserved schools in Iowa for participation in the creation of hands-on NASA-related activities for teachers to link the NASA mission to STEM education. Teachers of students with vision and/or hearing impairments will be included. Where appropriate, industrial affiliate involvement will be sought. In addition, collaborations will be sought with other local and state organizations to increase training and resource sharing, including but not limited to: Iowa State University Extension's Extension 4-H Science, Technology, Engineering, and Mathematics program (4-H STEM), Iowa Academy of Science (IAS), the Iowa Junior Academy of Science (IJAS), Iowa Governor's STEM Initiative, and ISGC academic affiliates faculty working with STEM education. Educators will be recruited to partner with ISGC in making strong connections to

NASA for Iowa students. These partners will assist the associate director in promoting STEM learning linked to NASA content and interests and work to increase STEM career interest and awareness.

- **Outcome and Evaluation:** The associate director will oversee the management of these activities as appropriate. Activities will be reported to the director, and they will be evaluated based on the number of teachers and students involved/impacted in Iowa.
- **Alignment:** This objective (2.4) aligns with NASA Strategic Objective 3.3 and Mission Directorates ARMD, HEOMD, and SMD.

Objective 2.5: Conduct and support various engaging and educational activities to promote students' learning in STEM related areas.

- **Strategy:** ISGC will partner with other organizations to support conferences as well as hosting an exhibit booth at appropriate events and conducting educator workshops. Some of the examples include the Iowa Science Teacher Section of the Iowa Academy of Science to support the annual fall science teachers' conference and linking NASA learning opportunities to Iowa educators.
- **Outcome and Evaluation:** The associate director will administer these activities as appropriate. Activities will be reported to the director, and they will be evaluated based on the number of teachers and students involved/impacted in Iowa.
- **Alignment:** This objective (2.5) aligns with NASA Strategic Objective 3.3 and Mission Directorates ARMD, HEOMD, and SMD.

Objective 2.6: Build strategic partnerships and linkages between STEM formal and informal education providers and, through hands-on, interactive educational and inspirational activities, engage students, educators, families, the general public and all agency stakeholders to increase Americans' science and technology literacy, reasons for exploration, and engagement in aeronautics, space, and science.

- **Strategy:** The ISGC will support informal education partners and their activities that are available to the general public. This aligns with the specifically focused goals of the NASA HEO Directorate of educating and engaging the public as outlined in this Objective 2.6. The director and associate director will work with outreach affiliates to develop project plans for the next year of the ISGC in this category and promote collaboration among said affiliates.
- **Outcome and Evaluation:** The associate director will oversee this objective. Activities supported must demonstrate how the NASA support will provide a lasting impact on the STEM education and public awareness in Iowa of the NASA strategic plan.
- **Alignment:** This objective (2.6) aligns with NASA Strategic Objective 3.3 and Mission Directorates ARMD, HEOMD, and SMD.

Strategic Area 3: Competitively Awarded Projects

Goal 3: To help accomplish the NASA mission by empowering faculty toward the development of new, and improvement of current, STEM related curricula; as well as emboldening student led projects which directly aligned with the NASA Mission Directorate research priorities, while strengthening STEM education.

Objective 3.1: (Curriculum Development) To support the development of STEM related curricula aligned with NASA Mission Directorates, with a focus on improving student STEM skills.

- **Strategy:** Support development of STEM related curricula focused on preparing the future STEM workforce by including (but not limited to) increasingly augmenting hands-on instruction, using online and virtual NASA content experiences, using publicly available NASA data, accelerating the use of digital learning tools, etc. Funding will be focused on curricula developed around the Science and Space Technology Mission Directorates. Priority will be given to proposals which are developing curricula supporting transdisciplinary learning and are attempting to develop STEM ecosystems fostering partnerships between educators and industry. The award will be competed every year. A current award recipient will need to re-compete but is eligible for renewal up to three years with satisfactory progress of the project. Priority will be given to proposals which collaborate with other affiliates.
- **Outcome and Evaluation:** Depending on NASA funding availability, up to four Curriculum Development awards will be provided. Two are intended to be awarded toward activities aligning within the SMD, and the other two within the STMD. Progress and annual reports are required. Projects will be selected through a competitive process that will use the selection criteria put forth in the RFP.
- **Alignment:** This objective (3.1) aligns with NASA Strategic Objective 1.1, 1.2, 2.2, 3.1, 3.2, and 3.3 and all Mission Directorates.

Objective 3.2: (Student Hands-On) To support academic projects which align with the research priorities of the NASA Mission Directorates and engage students in hands-on experiences to promote skills important for STEM careers.

- **Strategy:** Support funding for student-led projects allowing for direct hands-on work with technology, hardware, machinery, etc. This will be a Competitive Award, as outlined in the budget. To be considered for selection, the student projects must align with one or more of the NASA Mission Directorate research priorities and will be selected using the criteria as put forth in the RFP.
- **Outcome and Evaluation:** Based on funding availability, up to 15 student hands-on awards will be granted. The ISGC director and associate director will review the projects. They will be evaluated based on the number of students involved/impacted, and collaborations with and outside of NASA. Progress and annual reports are required.
- **Alignment:** This objective (3.2) aligns with NASA Strategic Objective 1.1, 1.2, 2.2, 3.1, 3.2, and 3.3 and all Mission Directorates.

Strategic Area 4: Consortium Management

Goal 4: Encourage participation of consortium personnel and affiliates in all programs in-state and nationally.

Objective 4.1: Actively participate in the activities of the National Council of Space Grant Directors (NCSGD), the National Space Grant Foundation, and/or other related state or national programs.

- **Strategy:** The ISGC director and necessary staff will attend/support the regional and national meetings. The director and/or appropriate staff will serve on at least one committee or board of the state and national organizations.
- **Outcome and Evaluation:** Network participation will be reported annually in the NASA Office of Education Performance Measurement (OEPM) system.
- **Alignment:** This objective (4.1) aligns with NASA Strategic Objective 1.1, 1.2, 2.2, 3.1, 3.2, and 3.3 and all Mission Directorates.

Objective 4.2: To continue involvement in the Great Midwestern Regional Space Grant to promote collaboration.

- **Strategy:** The ISGC staff will actively participate in regional quarterly webinars, share consortia successes, and coordinate for regional activities.
- **Outcome and Evaluation:** The ISGC director will work with the regional states to develop and conduct regional quarterly meetings and programs, including programs with industry. The director will evaluate the effectiveness of ISGC participation in regional events and coordinate with the other Great Midwestern Regional Space Grant Directors to continually improve the regional communication and collaborations.

Alignment: This objective (4.2) aligns with NASA Strategic Objective 1.1, 1.2, 2.2, 3.1, 3.2, and 3.3 and all Mission Directorates.