

Wisconsin Space Grant Consortium
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PROGRAM DESCRIPTION

The National Space Grant College and Fellowship Program consists of 52 state-based, university-led Space Grant Consortia in each of the 50 states plus the District of Columbia and the Commonwealth of Puerto Rico. Annually, each consortium receives funds to develop and implement student fellowships and scholarships programs; interdisciplinary space-related research infrastructure, education, and public service programs; and cooperative initiatives with industry, research laboratories, and state, local, and other governments. Space Grant operates at the intersection of NASA's interest as implemented by alignment with the Mission Directorates and the state's interests. Although it is primarily a higher education program, Space Grant programs encompass the entire length of the education pipeline, including elementary/secondary and informal education. The Wisconsin Space Grant Consortium is a Designated Consortium funded at a level of \$785,000 for fiscal year 2009.

PROGRAM GOALS

Outcome 1: Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals (Educate and Engage)

Goal 1. Enhance Wisconsin growth in aerospace while supporting the NASA workforce pipeline by supporting workforce development initiatives and testing methods of improving recruitment of students early in their career and retaining of top students through their schooling.

Objectives

- 1.1 Use our primary Workforce Development initiative, the Student Satellite Program, to support a science-focused and science-driven instrument program to fly on a high-altitude balloon (Instrument Development Program).
- 1.2 Maintain our ability to recruit students from a wide range of Affiliate Member institutions by supporting and refining our Balloon and Rocket Programs.
- 1.3 Continue to budget specific money in the Other Student Awards Program to help support at least two students (more if selected) to NASA Academy, at least two students (more if applicable) to a NASA Internship and at least one team to NASA's Reduced Gravity Program.
- 1.4 Increase retention of our best and brightest aerospace students by increasing Fellowship awards for our most highly-ranked graduate students (the top 10%) from \$5000 to \$8,000 and investigating raising the ceiling on our Undergraduate awards.
- 1.5 Provide opportunities for our funded students, faculty and other experts to present their research at our nineteenth annual Wisconsin Space Conference.
- 1.6 Support and strengthen the national Space Grant program through the Director's elected leadership roles in the national organization.
- 1.7 Continue to press our Affiliate Members to build relationships with the Minority Advancement offices at their campuses, and nurture the relationships that are already growing.

1.8 Support the explosive growth of aerospace programs at our minority-serving institution, the College of Menominee Nation (CMN), by investing in and being a founding partner of the pilot Tribal College Rocket Consortium.

1.9 Continue to recruit Affiliate Members to diversify our reach.

Metrics: Fly the first engineering model of our Instrument Development Program in August, 2009. Maintain the number of Affiliate Members represented in our Higher Education and Student Satellite programs. Attend all national meetings and have the Director participate in all Executive Board and Nominating Committee activities. Have 100% compliance with all academic affiliates in submitting diversity plans. Fund at least four NASA Academy or NASA Intern students and one Microgravity team. Bring in at least one new Affiliate member.

Outcome 2: Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty (Educate and Engage)

Goal 2. Utilize the limited resources of the Consortium and the success of the current Special Initiatives Program to create a new suite of cohesive, progressive programs that recruit and better retain minority and female students from middle school through high school to our current higher education offerings.

Objectives

2.1. Partner with the College of Menominee Nation (CMN) in supporting aerospace-centered research and student activities under a special funding initiative that targets Native American students served by CMN.

2.2 Create a High School Rockets program as a partnership with SLI and Rockets 4 Schools, one that injects standards-based STEM curriculum into the already-successful Rockets 4 Schools spring rocket launch and closes the pipeline gap between students served by Rockets for Schools and those served by our Rocket Competition.

2.3. Continue to nurture our strong relationships with our two minority-serving Affiliate Members, the College of Menominee Nation and Alverno College (a women's college with a large African-American student population).

Metrics: Support CMN-based student rocketry and research, with a target of fielding at least one CMN team in our annual rocket launch and at least two research projects with an aerospace focus. Have a High School Rockets pilot program ready to roll out in 2010.

Outcome 3: Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission (Engage and Inspire)

Goal 3. Seek out more effective ways to encourage Wisconsin precollege educators to learn and utilize space-related content, and find new, innovative methods of funding those efforts.

Objectives

3.1 Continue the current Aerospace Outreach Program, with increased emphasis on reaching out to educators directly.

3.2 Discontinue the Education Liaison position. In its place, expand the membership in the High School Partners program by two schools. This objective also crosses over to Outcome 2.

Metrics: Support only those Outreach programs with an educator training focus. Recruit two high schools into the High School Partners program.

PROGRAM/PROJECT BENEFIT TO OUTCOME (1,2, OR 3)

Outcome 1: Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals (Educate and Engage)

- Student Satellite Program: Our student satellite program is a multi-pronged effort to increase the number of aerospace-experienced scientists and engineers in Wisconsin. It includes our annual Rocket Competition, the Elijah High-Altitude Balloon program, and a science-driven instrument development program, in which students conceptualize, design, build, fly and analyze data from a multispectral imager flown on our Elijah High-Altitude Balloon.
- Tribal College Rocket Consortium: This program is designed to engage Native American undergraduates in culturally relevant, highly challenging, NASA-inspired engineering and science educational activities. The long-term goal is the creation of a vibrant, active, self-sustaining consortium of tribal colleges, bound by a mutual interest in undergraduate rocketry, and dedicated to the goals of providing Native American students with confidence and experience in challenging aerospace activities.

Outcome 2: Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty (Educate and Engage)

- We again funded the Wisconsin Rockets for Schools program, this time for elementary students. Elementary students put together kit rockets and launch them, a high school rocket competition follows. The WSGC collegiate rocket competition builds on these two programs.

Outcome 3: Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission (Engage and Inspire)

- Our 19th annual Wisconsin Space Conference was held at the Milwaukee School of Engineering Campus. This two-day conference highlights the culmination of research and education scholarships, fellowships and grants that we have funded.

PROGRAM ACCOMPLISHMENTS

Outcome 1 associated goals and objectives

Goal 1

Objective 1.1 accomplishments. As noted above, we have broadened workforce opportunities for science majors in an innovative way by running the Instrument Development Program. We have a core group of 3 science Co-Investigators from two different affiliate members, and 5 engineering students as our engineering team. The engineering team has tested its first prototype and will launch a test of the second iteration of the instrument this summer.

Objective 1.2 accomplishments. For FY09 we funded 9 students from 3 affiliate members in our Elijah High-Altitude Balloon teams, and 57 students in 15 teams from 9 affiliates as part of the Rocket Competition. Based on the recommendations of a Task Force drawn from our Advisory Council, we have instituted a new Elijah High-Altitude Balloon Faculty Workshop. The goal through this workshop is to give faculty at interested affiliates the skills and tools needed to begin a balloon payload program at their home institutions.

Objective 1.3 accomplishments. In FY08 we funded 3 NASA Academy students, 7 NASA interns, 1 NASA Reduced Gravity team with 9 students (8 females), and 3 senior design teams with 26 students.

Objective 1.4 accomplishments. We funded six students under this objective.

Objective 1.5 accomplishments. The 19th annual Wisconsin Space Conference was hosted by the Milwaukee School of Engineering.

Objective 1.6 accomplishments. Director R. Aileen Yingst is currently serving as an active member of the Space Grant Directors' Executive Committee and the Nominating Committee.

Objective 1.7 accomplishments. In FY 08 it was made a requirement for each Institutional Representative of an academic institution to provide the WSGC with a summary of the demographics of their institution and a diversity plan to enhance the recruitment and retention of underrepresented students into our programs. So far, compliance is at 60%.

Objective 1.8 accomplishments. The Tribal College Rocket Consortium was inaugurated this year, with the first launch held in May, 2010. Three tribal colleges participated in this culminating activity.

Objective 1.9 accomplishments. Our current membership now stands at 38 institutions, meaning that since the WSGC moved to our current lead institution, we have gained 17 new members. Diversity of membership is one of the great strengths of the WSGC.

Other Progress and Accomplishments under Outcome 1

WSGC Scholarships, Undergraduate Research Awards, and Fellowship Program: In FY 2009 we made awards to 47 students within these three programs with NASA funding. Of those awards, 15 went to Undergraduate Scholars, 7 to Undergraduate Research Awards and 14 to Graduate Fellows, including the winner of the Dr. Laurel Salton Clark Award. Member institutions are supporting 11 additional undergraduate students with internal funding. Students will present their findings at this summer's Wisconsin Space Conference to be held at UW-Sheboygan August 19 and 20.

Research Infrastructure Program: 2 Research Seed grants were awarded to provide relatively new faculty or staff the opportunity to establish a space-related research project, or more experienced faculty or staff the opportunity to begin new space-related research programs. Also included in this program is our support of the WIYN Astronomy Consortium, which provides 1-3 observing nights per year to members and 1 faculty member a travel grant to a NASA Center.

Higher Education Incentive Grants: Three new or continuing awards were made to college or university faculty or academic staff interested in developing a new course, minor, major, or curricular area related to any NASA-related discipline.

Industry Awards: We have partnered with our Industry members to fund 3 student interns. In addition, 5 industry staff members were funded to receive additional training important to stay abreast important changes in the high-technology field of aerospace engineering.

Outcome 2 associated goals and objectives

Goal 2

Objective 2.1 accomplishments. These have been addressed in the section "Improvements Made in the Past Year" below.

Objective 2.2 accomplishments. We were able to clarify objectives and goals for this program and solidify a partnership with the NASA Student Launch Initiative Program, but because we were unable to hire a project coordinator for this program until it was too late in the academic year, we put this program on hold for 2009.

Objective 2.3 accomplishments. The various programs we currently support or are pursuing with these colleges, as noted in other sections herein, bears testament to our continuing active partnership with our minority-serving institutions.

Other Progress and Accomplishments under Outcome 2

Special Initiatives program: Eight awards were made to faculty, educators or other individuals or groups to develop and conduct innovative programs that directly target groups traditionally underserved in aerospace. Though any member or group may propose to this program, it tends to draw projects that serve predominantly precollege groups. This program does not usually fund higher education students directly, though we often fund programs proposed by higher education students. These programs map to Goal 2.

Outcome 3 associated goals and objectives

Goal 3

Objective 3.1 accomplishments. Our main thrust for Outcome 3 continues to be our successful Aerospace Outreach program. This program is designed to fund innovative planning grants and supplemental grants for projects that increase interest, recruitment, experience and training of pre-college students in the pursuit of space- or aerospace-related science, design, or technology; or encourage K-12 students in space-related pursuits. We place our emphasis on projects that focus on educators, both before and during their service.

Objective 3.2 accomplishments. Our High School Partners program currently has one school. This is not because of lack of interest on the part of state schools, but because the Director cannot commit the time to travel to more than one school. Two other possible avenues for this program have met with some success: (1) distance learning through non-traditional means, such as Skype; and (2) bringing in new personnel to run the program and presentations (see below).

PROGRAM CONTRIBUTIONS TO PART MEASURES

- Longitudinal Tracking: Total awards = 96 awards, 10 to students receiving awards in more than one project; Fellowship/Scholarship = 86; Higher Education/Research Infrastructure = 0; 7 of the total awards represents underrepresented minority F/S funding; 20 students have accepted positions in a STEM field, while 17 have graduated and are pursuing advanced STEM degrees.
- Course Development: Two new courses targeted at the STEM skills needed by NASA developed with NASA support.
- Matching Funds: \$722,541.
- Minority-Serving Institutions: Wisconsin has two tribal colleges and one primarily female college. Of these three institutions, two are members of the WSGC: Alverno College and the College of Menominee Nation (CMN). Interactions with Alverno College include funding 2 Higher Education grants in 2007 and 2008 that have continued into 2009 and participation in our Rocket Competition. Interactions with CMN include continued participation in our Collegiate Rocket Competition and the new Tribal College Rocket Consortium mentioned above.

IMPROVEMENTS MADE IN THE PAST YEAR

- We have partnered with the College of Menominee Nation to start the Tribal College Rocket Consortium, as noted above. In this, its first year, this program has resulted in dozens of Native American students participating in high-technology, NASA-relevant, hands-on educational activities.
- In November we hired former High School science teacher and Space Explorers, Inc. employee Jim Schmidt as our Special Programs Coordinator. Jim is responsible for the day-to-day management of a suite of new or emerging programs at the WSGC. The nature of his position

and his background allows us to respond quickly to new opportunities and follow the evolving goals of the state and NASA Education.

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

Wisconsin Space Grant Consortium Members

Alverno College	Academic	4yr bac
Carroll University	Academic	4yr bac
Lawrence University	Academic	4yr bac
Ripon College	Academic	4yr bac
St Norbert College	Academic	4yr bac
University of Wisconsin-Oshkosh	Academic	4yr bac
University of Wisconsin-River Falls	Academic	4yr bac
Wisconsin Lutheran College	Academic	4yr bac
Carthage College	Academic	4yr bac/Grad
University of Wisconsin-Green Bay	Academic	4yr bac/Grad
University of Wisconsin-La Crosse	Academic	4yr bac/Grad
University of Wisconsin-Parkside	Academic	4yr bac/Grad
University of Wisconsin-Stout	Academic	4yr bac/Grad
University of Wisconsin-Superior	Academic	4yr bac/Grad
University of Wisconsin-Whitewater	Academic	4yr bac/Grad
Milwaukee School of Engineering	Academic	Bac/Master
College of the Menominee Nation	Academic	Tribal
University of Wisconsin-Fox Valley	Academic	Com/Jr
University of Wisconsin-Sheboygan	Academic	Com/Jr
Western Technical College	Academic	Com/Jr
Marquette University	Academic	PhD
University of Wisconsin-Madison	Academic	PhD
University of Wisconsin-Milwaukee	Academic	PhD
Aerogel Technologies, LLC	Industry	Aerospace
Astronautics Corporation of America	Industry	Aerospace
Orbital Technologies Corporation	Industry	Aerospace
Space Explorers, Inc.	Industry	Education
Space Education Initiatives	Industry	Education
Spaceflight Fundamentals, LLC	Industry	Education
Experimental Aircraft Association (EAA)	Not-for-Profit	Aviation
Medical College of Wisconsin	Academic	Medical
AIAA – Wisconsin Section	Not-for-Profit	Engineering
BioPharmaceutical Technology Center Institute	Not-for-Profit	Parent is Promega
Great Lakes Spaceport Education Fnd, Inc.	Not-for-Profit	Rockets for Schools
Wisconsin Association of CESA Administrators	Not-for-Profit	Education
Wisconsin Department of Public Instruction	Government	State/Local Gov
Wisconsin Department of Transportation	Government	State/Local Gov
Wisconsin Aerospace Authority	Government	State/Local Gov

All WSGC members have equal status and equal representation on our Advisory Board regardless of their size.