

Wyoming NASA 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 Wyoming Space Grant Consortium is a Capability Enhancement Consortium funded at a level of \$535,000 for fiscal year 2008.

PROGRAM GOALS

Fellowship Program

Goal: Improve opportunities for research experience and internships for graduate and undergraduate students. **Objectives:** Get students involved in actual research projects; build partnerships and improve communication among academic affiliates; maintain effective communication among students, researchers, advisors and SG staff; improve interactions between NASA centers, industry and students.

Goal: Encourage and retain college students in STEM majors. **Objectives:** Expose students to available SG opportunities; encourage students studying STEM fields at multiple stages in their education.

Goal: Maintain diversity in fellowship/scholarship programs to reflect the diversity demographics of enrolled higher education students in the state of Wyoming (7.2% total minority student enrollment).

Objectives: Increase awareness of SG opportunities to minority students; provide fellowships and scholarships greater than or equal to state higher education demographics (7.2% in Wyoming).

Higher Education

Goal: Increase the number of quality applications for competitive higher education programs.

Objectives: Publicize and promote available opportunities; improve the quality of proposals submitted.

Goal: Increase the quality of STEM education. **Objective:** Increase the quality of curriculum offerings at the University of Wyoming and community colleges.

Goal: Achieve a level of diversity in SG programs that reflects the diversity demographics of Wyoming.

Objectives: Offer research infrastructure and higher education faculty grants at a level greater than or equal to institutional percentage; Increase awareness of SG opportunities to minority students (this overlaps with the objectives under Fellowship/Scholarships).

Research Infrastructure

Goal: Increase the impact of research infrastructure programs. **Objectives:** Expose researchers to available SG opportunities; expose researchers to external NASA opportunities; offer assistance in writing grant proposals; co-fund proposals with NASA EPSCoR.

Goal: Build partnerships between industry and academia. **Objective:** Identify partnership opportunities.

Goal: Achieve a level of diversity in SG programs that reflects the diversity demographics of Wyoming.
Objective: Offer research infrastructure and higher education faculty grants at a level greater than or equal to institutional percentage.

Precollege

Goal: Stimulate interest in STEM careers. **Objectives:** Offer workshops to K-12 teachers; promote NASA programs to students and teachers; provide opportunities for educational programming focusing on STEM disciplines.

General Public

Goal: To improve public support of science education and research (this goal crosscuts and combines programs from both our General Public and External Relations categories). **Objectives:** Improve use of media in promoting WSGC events and programs; increase visibility at public events; expand interactive space science exhibits at public locations – most notably libraries and museums.

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

OUTCOME 1

Graduate Research Fellowships- For the 2008 budget year, five graduate fellowships were awarded.

Undergraduate Research Fellowships- We funded a total of 14 undergraduate research fellowships this year. Of these undergraduates, we would particularly like to highlight Trent Mankowski. During one of our meetings with Trent, he stated that receiving the Space Grant Fellowship, and working on this research project, has reignited his interest in studying physics at a time when he was strongly considering dropping out of college or changing his major to a non-science degree. Now he plans to continue and complete his physics degree, and has even expressed interest in pursuing graduate study in the same field. Additionally, Joseph Griffith and Sage McCann are non-traditional students, who have returned to college later in life to get their degrees.

NASA Internships- There were 4 students at NASA Centers for summer internships in 2008.

Community College STEM Scholarships- At the time of this progress report, two community colleges (Casper College and Eastern Wyoming College) were still in the process of running their FY2008 competition for these awards, so we do not have the final results from their competitions (however, the results for all competitions will appear in 2008 CMIS). The current number of awardees: 40 total, 29 were women (72.5%), 6 were underrepresented minority students (15%).

Transfer Scholarships- 6 scholarships were awarded to STEM students transferring to the University of Wyoming (the only 4-year university in the state) from Wyoming community colleges.

Faculty Research Initiation Grants- 5 grants were awarded to faculty at the university or community college level to conduct new research.

Faculty Education Enhancement Grants- 3 grants were provided to support faculty members at the University of Wyoming and Wyoming community colleges who wish to develop new college courses in STEM fields. Particular interest was given to interdisciplinary courses.

UW Undergraduate Research Day- We co-sponsored this campus-wide event held in April 2008 to showcase undergraduate research done at the University of Wyoming and Wyoming community colleges. Most of our Undergraduate Research Fellows presented their research at the event.

Speaker Series- So far in 2008 we helped sponsor the University of Wyoming Department of Physics & Astronomy's Rebka Symposium – a two-day symposium in honor of Professor Emeritus Glen Rebka. There were research presentations by alumni, faculty, and current students; and a keynote speech given by Kip Thorn (Feynman Professor of Theoretical Physics at Caltech) on the impact of the Pound-Rebka experiment.

OUTCOME 2

Astro Camps- We support the Wyoming Astro Camp which is a residential camp held at the University of Wyoming for students completing 6th-8th grades. This camp grew out of a NASA ROSES E/PO grant to UW astronomy faculty Daniel Dale and Henry Kobulnicky. The goals of the program for the students are to 1. introduce them to science and science careers (through astronomy and aerospace); 2. familiarize them with the college environment while encouraging them to study STEM fields in high school and college.

There is a second Astro Camp held in Casper as a collaboration between Casper College and the Casper Planetarium. Both camps have teacher development opportunities for pre-service and in-service middle and high school STEM teachers.

Women in Science Conferences- In May 2008, Wyoming NASA Space Grant hosted the ninth annual Women in Science Conference at the UW campus. The conference is designed to increase interest in science and technology careers and promote a positive image of science careers for our youth. It also provides role models for young women and gives them information about going to college.

NASA Explorer School Collaboration- Current school is Arapahoe School in Arapahoe, WY.

State Science Fair- WSGC supports science fair and provides awards to aerospace related projects.

Space Trunks- Self-contained educational resources for teachers that are shipped around the state.

OUTCOME 3

StarDate Radio Show- Sponsorship of the public radio program “StarDate,” produced by the University of Texas Observatory, continues to be our most successful method of increasing visibility and reaching the public across the whole state. All of our Fellowship, Grant, Scholarship, and other programs are advertised statewide as part of this underwriting.

Newsletter- Summary of programs and awards distributed electronically.

University of Wyoming Community Enrichment Program- Offered a public program to coincide with the arrival of the Phoenix Lander on Mars.

PROGRAM ACCOMPLISHMENTS

OUTCOME 1

Goal: Improve opportunities for research experience and internships for graduate/undergraduate students.

- 14 undergraduate students were funded to work on research projects through our Undergraduate Research Fellowship Program. 5 graduate students were given graduate assistant appointments to work on research projects under our Graduate Research Fellowship Program.
- Eastern Wyoming College was added as an affiliate. We continue to encourage Northwest College to become an affiliate member. Have maintained regular monthly contact with affiliates, including two consortium strategic planning meetings, conference calls, and numerous e-mails.
- Regular summer and academic year meetings held with 2008 undergraduate fellows. Meetings held with transfer scholarship recipients (six students). Individual meetings held with graduate fellows (five SG funded, plus one NASA EPSCoR funded).
- Four programs widely advertised (NASA Academy, USRP, JPL, and ESMD internships). On request, WSGC staff will read over internship applications for students – several students usually take advantage of this every year. We had two Space Grant student internships at JPL during summer 2008, and one in the SAWDRIP Program. Two student internships were funded through the ESMD grant at local industry (one of whom was subsequently hired as a full-time employee).

Goal: Encourage and retain college students in STEM majors.

- Information was distributed to encourage new students to apply in the student newspaper, e-mails, website, public radio announcements, posters, and career fairs.
- One FY2008 undergraduate research fellow previously received an undergraduate fellowship in our FY2007 competition; another previously participated in our Community College Transfer Scholarship program. Two graduate students previously received Graduate Research Fellowships. 2 FY2008 CC Transfer Scholarship recipients previously received CC STEM Scholarships.

Goal: Maintain diversity in fellowship/scholarship programs to reflect the diversity demographics of enrolled higher education students in the state of Wyoming (7.2% total minority student enrollment).

- The Office of Multicultural Affairs has routinely publicized our opportunities in their newsletter. E-mails have been sent to minority students. We have attempted to contact general minority student organizations to encourage them to consider STEM speakers, activities, and to publicize our opportunities, however we have received no interest from them so far.
- So far, out of 66 recipients, 7 underrepresented students have received awards (including two disabled students) or 10.8% of the total awards (7.6% of all awards considering ethnic minority students only, 3.0% considering only disabled students). Casper and EWC are still in the process of running their CC STEM Scholarship competitions; their awardees will be reported in CMIS.

- Of the 22 faculty Education and Research grant proposals we received, seven were from female faculty members (32%), seven were Asian (32%), and one was disabled (4.5%). Of the nine recipients of our faculty Education and Research grants there were four female faculty members (44%), three Asian faculty members (33%), and one community college faculty member (11%).

Goal: Increase the impact of research infrastructure programs.

- Research grant opportunities were publicized through a variety of means, including: e-mail, webpage, posters, and public radio announcements. Sixteen proposals were received in our FY2008 competition, six awards were made.
- NASA Research Opportunities publicized. Numbers unavailable at the time this proposal was written, we should have them available for CMIS.
- Proposal writing workshop currently under development. Office staff offers assistance with proposal writing for national grants.
- NASA EPSCoR co-funds faculty research proposals with us annually.

Goal: Build partnerships between industry and academia.

- We are arranging ESMD internships with a small Laramie-based aerospace company, Firehole Technologies, Inc. We hope to be able to involve them in future Space Grant programs, and possibly join as an industry affiliate.

Goal: Increase the number of quality applications for competitive higher education programs.

- WSGC and NASA funding opportunities publicized through affiliate representatives. We continue to explore matching and funding sources. Eastern Wyoming College became a full affiliate member in FY2008. We will continue to try to recruit Northwest College (the only remaining community college in Wyoming) to join our consortium.
- Information sessions were held to give proposal-writing tips. Some pre-review of proposals was offered, specifically in relation to budgetary requirements (where the most difficulties seem to be encountered by proposers) – only a few proposers took advantage of this.

Goal: Increase the quality of STEM education.

- Three education development grants were awarded, including one to a faculty member at a community college, and one to an Asian faculty member.

OUTCOME 2

Goal: Stimulate interest in STEM careers.

- We presented workshops at the 2009 Wyoming Science Teachers Conference on the “Space Trunks” program (total of 10 teachers attended workshops, many more stopped by our display to talk about our programs). “Space Trunks” have also been publicized through our Newsletter, by teacher e-mail list serves, at the State’s Science Fair (with a mini-workshop for teachers), and at Women in Science Conferences.
- Materials and handouts distributed, numbers not recorded. Information on the NASA Educator Resource Center was distributed.
- Attendance at the Laramie Women in Science event was 350 students and teachers (15% underrepresented minority, including disabled; 94% women). Riverton held a “Men in Science” event with approximately 150 students and teachers (estimated 25% ethnically underrepresented).

OUTCOME 3

Goal: To improve public support of science education and research (this goal crosscuts and combines programs from both our General Public and External Relations categories).

- Number of contacts through media is stable.
- WSGC has a presence at many public events, including: the State Science Fair, career fairs, teacher conferences/workshops, Women in Science Conferences, and a program through the Univ. of Wyoming Community Enrichment Programs Office.

PROGRAM CONTRIBUTIONS TO PART MEASURES

- **Student Data and Longitudinal Tracking:** Total awards = 57 (FY2006-2008); Fellowship/Scholarship = 57, Higher Education/Research Infrastructure = 0; 4 of the total awards represent underrepresented minority F/S funding. No students have accepted STEM positions in an aerospace industry, 9 students have accepted STEM positions in non-aerospace fields (including academic fields), while 6 have graduated and are pursuing advanced STEM degrees.

- **Course Development:** During 2008, we funded three Education Enhancement Grants to faculty developing new STEM courses.
- **Matching Funds:** Currently, WSGC is right on track for collecting the required \$400,000 in matching funds. The departmental match contribution is currently at \$81,522.13, which is more than the required amount and is generally our hardest category to collect. As for the remainder of the categories, we are right on track with collecting the required amounts. The graduate tuition, affiliate and nonprofit matches aren't tallied until closer to the end of our grant cycle. Both of the indirect costs are also calculated on the last day of our grant cycle. Based on the current amount of match already collected there is no reason that WSGC cannot collect the required balance of matching funds.
- **Minority-Serving Institutions:** There are no minority serving institutions within the state.

IMPROVEMENTS MADE IN THE PAST YEAR

We have continued to develop our ground-up management strategy and expanded our network by adding another affiliate community college to the consortium. Half-way through the year, we rearranged our main-office staff to ensure future continuity within our office. Our current Associate Director, Michele Stark, has decreased from full-time to half-time, and we have hired a second Associate Director, Shawna McBride, at a half-time level. Our Office Associate, Kristy Isaak, continues in the same position at ¾-time.

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

- **University of Wyoming:** 4-year university. Location of the WSGC offices. Involved in Undergraduate and Graduate Fellowships, Faculty Research and Education Grants, NASA internships, and community college transfer scholarships;
- **Casper College:** 2-year community college. Involved in Undergraduate Fellowships, Faculty Research and Education Grants, community college transfer scholarships, and offer locally-run community college STEM scholarships.
- **Central Wyoming College:** 2-year community college. Involved in Undergraduate Fellowships, Faculty Research and Education Grants, community college transfer scholarships, and offer locally-run community college STEM scholarships.
- **Eastern Wyoming College:** 2-year community college. Involved in Undergraduate Fellowships, Faculty Research and Education Grants, community college transfer scholarships, and offer locally-run community college STEM scholarships.
- **Laramie County Community College – Laramie County Campus:** 2-year community college. Involved in Undergraduate Fellowships, Faculty Research and Education Grants, community college transfer scholarships, and offer locally-run community college STEM scholarships.
- **Laramie County Community College – Albany County Campus:** 2-year community college. Involved in Undergraduate Fellowships, Faculty Research and Education Grants, community college transfer scholarships, and offer locally-run community college STEM scholarships.
- **Northern Wyoming Community College District – Sheridan College:** 2-year community college. Involved in Undergraduate Fellowships, Faculty Research and Education Grants, community college transfer scholarships, and offer locally-run community college STEM scholarships.
- **Northern Wyoming Community College District – Gillette College:** 2-year community college. Involved in Undergraduate Fellowships, Faculty Research and Education Grants, community college transfer scholarships, and offer locally-run community college STEM scholarships.
- **Western Wyoming Community College:** 2-year community college. Involved in Undergraduate Fellowships, Faculty Research and Education Grants, community college transfer scholarships, and offer locally-run community college STEM scholarships.
- **Embry-Riddle Aeronautical University:** military college, offers some undergraduate classes and some master's level classes. Involved in Faculty Research and Education Grants.
- **90th Space Wing, F.E. Warren Air Force Base:** air force command located in Wyoming, includes the Inter-Continental Ballistic Missile Museum and interest in rocketry informal education programs.
- **Wickman Spacecraft and Propulsion, Co.:** industry affiliate, they design and produce small solid rocket motors used in some defense missiles and other satellite programs.
- **Casper Planetarium:** informal education affiliate, associated with the K-12 school district in Casper, WY, hold astronomy events for the general public, workshops for teachers and students.