

Nevada Space Grant Consortium  
Nevada System of Higher Education  
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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 Nevada Space Grant Consortium is a Capability Enhancement Consortium funded at a level of \$535,000 for fiscal year 2008.

PROGRAM GOALS

All NVSGC's 2008 objectives were targeted for Outcome #1, and were to accomplish the following:

1. Develop the capacities for Nevada students and faculty to participate in or host regional, national and/or international science or engineering university competitions. **The specific goal will be to foster and support the participation of student teams in at least two competitions** (*NASA Education Framework Outcome objectives 1.2- Student Support – Provide NASA competency-building education and research opportunities to develop qualified undergraduate and graduate students who are prepared for employment in STEM disciplines at NASA, industry, and higher education.*).
2. Formalize industrial partnering relationships with our industrial affiliates to include competitive opportunities for internships, externships and student interactions with industry- **the target being the establishment and implementation of six internships in 2008** (*NASA Education Framework Outcomes 1.2- Student Involvement Higher Education – Provide opportunities for groups of post-secondary students to engage in authentic NASA-related mission-based R&D activities.*).
3. Increase the number of applicants for internships and academy positions at NASA centers- the aim being to maintain or increase the number of interns and academy participants from Nevada- **the specific and measurable target being the implementation of a minimum of four student internships** (*NASA Education Framework Outcome objectives 1.2 and 1.3.*).
4. Establish new courses within the NSHE institution's curricula. Specifically targeting senior design courses and senior research projects in Engineering, Planetary Geology, Remote Sensing, Astrophysics and Astrobiology. The aim is to firmly establish new courses that will show progression from initiation, being offered on an ad hoc basis, to becoming part of the institution's curricula. **The specific target for 2008 was to initiate or advance at least one new course in each area of strategic interest** (*NASA Education Framework Outcome objective 1.4- Course Development – Develop NASA-related course resources for integration into STEM disciplines.*).
5. Increase the number of applicants and awardees from underrepresented groups **such that our scholarship and fellowship, higher education and research infrastructure building programs are representative of the ethnic profile of Nevada (20% underrepresented groups and 40% women).**

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

Since graduating from UNR in the spring of 2008 with a Masters in Mechanical Engineering, Blake Poe, an NVSGC Fellowship recipient, is now working at AeroVironment (AV), an aerospace company that develops and produces unmanned aircraft systems and efficient electric energy technologies. While at UNR, Poe worked on the NevadaSat and Mars Rover projects, developing valuable hands-on skills and creating networking through faculty and industry leaders. These opportunities led to his success in getting a job with AV and the chance to work on the final stages of the Puma

AE (All Environment) project, a small Unmanned Aircraft System (UAS) designed for land-based and maritime operations. "I don't think I would be here now if I didn't have that help," says Poe.

## **PROGRAM ACCOMPLISHMENTS**

**Outcome 1:** *Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals:* (Achievements and progress related to your Fellowship/Scholarship, Higher Education and Research Infrastructure programs). *(Employ and Educate)*

### **Fellowships and Scholarship Programs**

In 2008, NVSGC competed fellowships and scholarships state-wide and allocated \$85,000 for Fellowships for graduate students in Mechanical Engineering and Astronomy graduate programs at both UNR and UNLV, and \$86,000 in Scholarships for students in Math, Mechanical Engineering, Electrical Engineering, Computer Engineering, Chemical Engineering, Geophysics, Physics and Biochemistry degree programs at UNLV, UNR and WNC. The ratio of awardees to applicants was 3:11 for Fellowships and 19:28 in Scholarships in these competitions.

Tommy On, an NVSGC Scholarship recipient since 2006, has spent the past two summers interning at the Desert Research Institute and NASA Glenn Research Center respectively. "My career goal is to work for NASA, and NVSGC has given me the biggest boost to achieve this goal," says On. "Both of these internships exposed me to future careers with an engineering degree and increased my interest for graduate studies."

Significant progress has been achieved in 2008 whereby we met and exceeded **Goal #5** of increasing representation by underrepresented groups in the fellowship and scholarships with 31% of the awards going to students from underrepresented groups.

### **Higher Education Programs**

*Workforce Development:* The BalloonSat program and the University Rover Challenge teams remain as two of NVSGC's valued workforce development activities. Both of these activities were funded through a state-wide competition for workforce development awards that emphasized the need to facilitate extracurricular activities where multiple students engage in hands-on challenges or activities related to NASA's missions and training. The UNR-URC team placed second this year in the Mars Societies University Rover Challenge competition – yet "Vows to be back in 2009." The BalloonSat program continued with launches in 2008 that have captured new views of the earthscape in both Southern and Northern Nevada. In addition, this program has partnered with LEGO to enable the High Altitude Lego Extravaganza (H.A.L.E.) project that also affected teams from around the nation. Participation has included students in different NSHE institutions and departments in both engineering and sciences. Thus, the NVSGC has partially reached its stated **Goal #1** as its programs have resulted in team competitions. Yet, the UNR ARLISS team did not compete in 2008. Thus, we fell short of having two teams being active in the competition arena. In 2008, the NVSGC Director also conducted additional visitations and consultations on Nevada campuses that have resulted in efforts that are likely to result in a team from a state college (WNC) competing in either the moon buggy competition or an SAE Baja challenge.

*Curricula Development:* NVSGC, in FY 2008, awarded 18 Curricula Development grants to the following institutions: NSC one award; UNR nine awards; DRI one award; UNLV five awards; TMCC one award, and WNC one award, for a total of \$178,710. These projects have ranged from the infusion of content and substantial modifications of existing courses (e.g. increasing undergraduate student projects in robotics courses at UNLV, infusing research projects into an Astronomy course at TMCC) to the creation of new courses (e.g. Artificial Intelligence Programming at UNR, Geophysics) and degree programs (e.g. the creation of a Serious Gaming Minor at UNR), all with substantial NASA mission-related content. **Goal #4** was met in that all strategic areas for curricula development were affected.

### *Industrial Partnering and Internships:*

NVSGC sponsored six industrial affiliate interns at the following companies: Sierra Nevada Corporation of Reno, Nevada; Sierra Particle Technologies of Reno, Nevada; Nevada Alliance for Defense of Energy and Business of Las Vegas, Nevada, and SpecTIR of Reno, Nevada. These internships are providing students with hands-on extracurricular learning in the areas of engineering for satellite operations, engineering and data processing for AUV-enabled remote sensing operations as well as environmental sciences. With the establishment of these internships we have met **Goal #2** and have established more formal partnerships with these industrial affiliates, as well as established new and renewed affiliations with Nevada's businesses that contribute to and help enable the overall NVSGC mission (notably Bigelow Aerospace, Hastings chariots, and Built on Integrity).

*NASA Center Internships:*

NVSGC provided supplementary travel support to three interns at NASA centers (KSC, LRC and GRC). The 2008 goal of engaging and supporting four Space Grant interns at NASA centers (**Goal #3**) was not achieved. However, this is in part to placing ESMD interns, as well as not pursuing the opportunities at JPL in the fashion that we have in past years.

**Research Infrastructure Awards**

NVSGC awarded three Proposal Development grants: A. Gannet Hallar of DRI for *Feasibility Study for NASA Satellite Validation*, Jeff LaCombe of UNR for *Metallic Cellular Structures for Shock Absorber in NASA Space Vehicle Landing Gear System*, and Henry Sun of DRI for *Neutron Tomography and Martial Life Detection* for an award total of \$30,000.

As a result of these awards, Henry Sun of DRI submitted two proposals. One to the NASA Research Announcement NNN08ZDA001N-AISR, Applied Information Systems Research. The lead of that proposal is Keith Schubert of California State University, San Bernardino. The second to the NASA Research Announcement NNN08ZDA001N, Astrobiology: Exobiology and Evolutionary Biology, in collaboration with Chris McKay, Ames Research Center. Additional submissions by Drs. Hallar and LaCombe are anticipated. These submissions are all coordinated with the ongoing and proposed EPSCoR research areas such that the program's efforts are not redundant and remain synergistic.

**Outcome 2:** *Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty: (Discussion of achievements and primarily focused on your Higher Education not discussed in to Outcome 1) and Precollege programs. (Educate and Engage)*

Despite the minimal allocation of resources to precollege programs members of the consortia and partners are still engaged in precollege activities. Among these activities is the maintenance of the Nevada Regional Teacher Resource Center (NRTRC). The NRTRC maintains curricular materials and lesson plans for K-12 teachers primarily in the areas of Space Science and Astronomy and is part of the NASA Teacher Resource Center Network (an education program designed to disseminate educational materials to teachers). Through the use of these multimedia resources, teachers can provide students with the latest in aerospace information, serving as a springboard for classroom discussion across the curriculum. Most of NRTRC's resources are contributed by NASA's Central Operation of Resources for Educators (CORE).

**Outcome 3:** *Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission: (Achievements and progress of General Public and External Relations programs). (Engage and Inspire).*

NVSGC has devoted an increased effort to raise the visibility of NASA education programs to the public in the state and is now helping to underwrite Public Radio's "Science Friday" on KUNR in Reno, NV, and KNPR's daily program "State of Nevada" in Las Vegas, NV, which reaches nearly 94,000 listeners per week with 16% from underrepresented groups. NVSCG will maintain its efforts to aid informal education providers through its affiliation with and support of programs within the planetariums.

In addition, our UNLV associate director (Dr. George Rhee) initiated a lecture series for the International Year of Astronomy whereby local, national and international Astronomers and Astrophysicists provide public lectures across the state. Dr. Robert Collier, our WNC associate director and founder of the Jack C. Davis Observatory at WNC, also lead off the Nevada State Museum's Frances Humphrey lecture series in January 2009 with a special presentation, *Galileo's Cosmos and Beyond*.

**PROGRAM CONTRIBUTIONS TO PART MEASURES**

Longitudinal Tracking: Total awards = **87**; Fellowship/Scholarship = **22**, Higher Education/Research Infrastructure = **65**; **24** of the total awards represent underrepresented groups. **5** students have accepted STEM positions in an aerospace industry, while **14** have graduated and are pursuing advanced STEM degrees.

Course Development: NVSGC made a substantial effort in 2008 to infuse NASA-STEM content into the campus and departmental curricula across the state. NVSGC initiated 18 different projects across six institutions (including community colleges) that are effecting departments in Science, Engineering, Math, Physics, Geosciences, Computer Science, Journalism and Art. These projects have ranged from the infusion of content and substantial modifications of existing courses (e.g. increasing undergraduate student projects in robotics courses at UNLV, infusing research projects into an Astronomy course at TMCC) to the creation of new courses (e.g. Artificial Intelligence Programming at UNR,

Geophysics) and degree programs (e.g. the creation of a Serious Gaming Minor at UNR), all with substantial NASA-mission related content.

Matching Funds: NVSGC has maintained its ability to provide matching funds mostly through state funding (with 70% of the FY08 matching funds being provided by the state and the remaining 30% being provided from the NSHE institutions). Additional matching from Industrial Affiliates and partners may become more standardized and documented in the future.

Minority-Serving Institutions: NVSGC has made a significant commitment to partnering with TSU that was initially facilitated by a Memorandum of Understanding between DRI and TSU (initially brokered by Marcus Shute of TSU and Chris Maples of DRI). The partnering led to the submission of joint research and EPO programs to the NASA's NAI competition in the Spring of 2008. These proposals were not awarded yet it is anticipated that the collaborations that were initiated as a result of this substantial proposal effort will ultimately result in new joint programs.

### IMPROVEMENTS MADE IN THE PAST YEAR

#### Management:

A new Program Coordinator (Leone Thierman) was added in the summer of 2008. The new program coordinator is significantly contributing to the revision and development of the management operating procedures and ensuring our programs are funded, operational and responsive.

A new faculty (Dr. Sandip Thanki) has become engaged in the consortium operations and has been added as a Campus Associate Director for the Nevada State College. Sandip is a past Space Grant Fellow and is now the NSC's Chair for the Department of Science. His engagement has already led to new curricular and extracurricular activities on that campus regarding astrophysics and planetary geology.

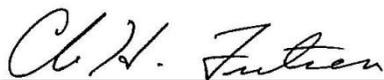
In addition to these personnel improvements, NVSGC has adopted a more formalized agreement and list of duties for Campus Associate Directors. These include explicit instructions for A) organizing campus-wide meetings and workshops; B) recruiting, supporting and mentoring students; C) promoting and administering the awarding of fellowships and scholarships; D) ensuring timely submission of student and faculty progress reports on projects; E) providing a supporting role in the system-wide preparation of proposals and reports, and F) fostering and promoting economic development within the state of Nevada.

### PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

NVSGC has eight member higher education learning institutions across the state, including: the University of Nevada, Las Vegas (UNLV); the University of Nevada, Reno (UNR); the Desert Research Institute (DRI); the College of Southern Nevada (CSN); the Great Basin College (GBC); Truckee Meadows Community College (TMCC); Western Nevada College (WNC), and Nevada State College (NSC).

The consortium utilizes Campus Associate Directors in a management and advisory capacity, as well as in a communication and reporting capacity. The Associate Directors, in conjunction with the program coordinator and two NSHE research administrators comprise an internal advisory committee that aids in setting yearly operational goals and aims. The Director of the Nevada NASA Space Grant/EPSCoR Program reports to the Vice Chancellor and the Nevada System of Higher Education's (NSHE) Research Affairs Council that consists of the Research Vice Presidents from UNR, UNLV and DRI. In addition, the Director also meets with the NSHE EPSCoR Advisory Council (formed in 2007). Thus, the consortium operations are effectively run as a system-wide program with those with higher education interests represented.

Respectfully submitted,



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Christian H. Fritsen