

Texas Space Grant Consortium (TSGC)

University of Texas at Austin – Lead Institution
<http://www.tsgc.utexas.edu>

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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 Texas Space Grant Consortium [TSGC] is a Designated Consortium funded at a level of \$590,000 for fiscal year 2007. The Texas Space Grant Consortium has effectively administered and operated programs for the National Space Grant & Fellowship [NSG&FP] program since 1989. The TSGC membership currently includes 41 academic, government, industrial and non-profit affiliates -- the largest among the 52 consortia nationally.

PROGRAM RELEVANCE TO NASA

Space Grant consortia build human capital and research expertise to support NASA programs and missions, expand NASA's expertise and educational networks, and bring knowledge and awareness of space to a broad range of constituents in every state. Texas Space Grant goals and programs are highly integrated and align with NASA's Strategic Goals, the Vision for Space Exploration, consortium goals, state priorities and the outcomes of the NASA Education Portfolio Strategic Framework. Our goals and programs serve multiple constituencies with emphases on customer focus, NASA-related content, the STEM (Science, Technology, Engineering and Math) pipeline, increased diversity, effective evaluation of programs, the development of partnerships, and program sustainability. Our programs are a mix of NASA mandated programs (fellowships and scholarships), ongoing flagship programs (Design Challenge and LiftOff), and programs that result from competitive responses to consortium Announcements of Opportunity (AOs). We also support student flight projects and student satellite design/build programs.

Academic Affiliates

- Austin Community College
- Angelo State University
- Baylor University
- Houston Community College Northwest
- Lamar University
- Prairie View A&M University
- Rice University
- San Jacinto College
- Southern Methodist University
- Sul Ross State University
- Tarleton State University
- Texas A&M University
- Texas A&M University - Commerce
- Texas A&M University - Corpus Christi
- Texas A&M University - Kingsville
- Texas Christian University
- Texas Southern University
- Texas State University - San Marcos
- Texas Tech University
- Trinity University
- University of Houston
- University of Houston, Clear Lake
- University of Houston, Downtown
- University of Texas at Arlington
- University of Texas at Austin
- University of Texas at Dallas
- University of Texas at El Paso
- University of Texas at San Antonio
- University of Texas at Tyler
- University of Texas HSC, Houston
- University of Texas HSC, San Antonio
- University of Texas Medical Branch, Galveston
- University of Texas - Pan American
- University of Texas SW Medical Center

Government Members

- Office of the Governor
- Texas Higher Education Coordinating Board

Industrial Members

- Lockheed Martin
- United Space Alliance

Non-Profit Members

- Don Harrington Discovery Center
- Southwest Research Institute
- Universities Space Research Association (USRA)

PROGRAM BENEFITS TO SOCIETY

Texas Space Grant programs are designed to strengthen our nation's future workforce; attract and retain students in STEM disciplines and engage Texans in NASA's mission. We operate programs over wide areas of Texas and enhance minority and underserved society involvement by utilizing a Minority Serving Activities Council (MSIAC) to organize Space Grant activities in underserved areas. We impact K-12 students and teachers, pre-college, graduate and undergraduate students and communities of the general public with all of our outreach, Fellowships and Scholarships, Higher education and K-12 programs. We generate a strong public awareness through press releases, student success stories, and public lectures.

PROGRAM GOALS AND ACCOMPLISHMENTS

Texas Space Grant goals are summarized below.

Minority and Underserved Participation Enhancement: TSGC has a primary focus on increasing the number of females and minorities in its programs. Twelve of our 34 academic institutions are minority serving institutions (MSIs). Our goal is to increase the quantity and quality of female and underrepresented minorities in our programs to levels commensurate with the number of female and minority enrollees in Texas colleges and universities. To help achieve these goals, TSGC formed the Minority Serving Institutions Activities Council (MSIAC) in 2006. This council, made up of institutional representatives from MSIs and minority faculty members from non-MSI institutions, is funded to develop programs and activities to increase minority participation in consortium activities. A major challenge in this area of activity is the low enrollments of female and minority students in STEM disciplines at our institutions.

Fellowships and Scholarships / Longitudinal Tracking: TSGC annually awards 20 to 25 fellowships at the \$ 5000 level as supplements to local funding. We award no more than two fellowships to students at any one TSGC institutions in a given year. A three person committee (two members from MSIs) ranks the applicants and selects the recipients each year. In 2007-2008, we awarded 23 fellowships. TSGC awarded 24 undergraduate scholarships at the \$ 1000 level during 2007-2008. 38% of the recipients were female and 25% were minorities. We also provided small design scholarship stipends to outstanding students in our design challenge program and supported students attending the summer academies at the various NASA centers. In total, we awarded \$ 165,000 in fellowships and scholarships in 2007-2008. A challenge in this area is that scholarship rules at many institutions make it unappealing for minority students to apply for our scholarships. If we provide \$ 1000, they lose \$ 1000 elsewhere in their support package.

Workforce Development: Our flagship workforce development, the TSGC Design Challenge, involves student teams working for academic credit on problems of interest to NASA. NASA and its industry contractors provide problems and mentors for the student teams. At the end of each term, students present their work to interested members of the NASA JSC community at a Design Showcase. During the 2007-2008 year, 26 teams (95 students) from 10 institutions participated. This program was used as a model by NASA's Exploration Systems Mission Directorate (ESMD) when it established a nationwide student design program in 2006.

Higher Education Programs: TSGC supports two to three small higher education improvement projects each year and also provides supplemental funding for student teams flying experiments on NASA's microgravity aircraft. In 2007-2008, there were 3 small higher education projects supported at \$ 15K each and 3 student microgravity teams were supported. The projects supported were: Texas A&M: "AggieSat Lab" Houston Community College Northwest: "Undergraduate Science Research Program – USRP" and Texas Tech: "Flame Physics. The reduced gravity student projects supported were; Austin Community College: "Centrifugal Microgravity Mass Assessment System", University of Texas at Austin: "Performance Test of A Closed Loop Fluidic Momentum Controller in One Axis" and Texas A&M University: "Fluid Dynamics & Hydrostatic Pressure".

Research / New Investigator Program: TSGC provides research start up funding of \$ 10K, matched by the recipient's home institution, to three to five new faculty each year. These funds are awarded competitively to young investigators starting space-related research programs. In 2007-2008, we awarded 4 grants. The research topics were: UT Arlington: "*Ultra-Compact Multi-Spectral Infrared Photonic Sensors for Infrared Sensing and Imaging.*", UT San Antonio: "*Martian Surface Compositions and H2O/CO2 Circulation investigations using OMEGA and THEMIS data.*", Lamar University: "*Feasibility Study of Synergistic Effect of Crop Based Life Support and Spacecraft Vibration Suppression*" and Texas Tech: "*Launching a Space Elevator: Design Study*".

K-12 Education Program: TSGC's K-12 program focuses on teacher education. Our goal is to use the leverage of excited teachers to help fill the STEM pipeline. Since 1990, TSGC has conducted a week-long teacher workshop, LiftOff, at NASA JSC. These workshops emphasize science, mathematics, and technology learning experiences by incorporating a space science theme supported by NASA missions. Teacher participants are provided with information, materials, and experiences through hands-on activities and field trips that promote space science and enrichment activities for themselves and others. In the summer of 2007, 43 teachers attended the workshop. On average, each teacher attending uses the educational curriculum received at LiftOff with 125 students and trains additional teachers in their district. The first 6 months after the Liftoff workshop, records indicate that on average, each Texas liftoff teacher participant conducted two training workshops involving 15-20 teachers per workshop. Approximately 1000 educators have been reached by LiftOff outreach and five thousand students have benefited from activities teachers received at LiftOff.

Public Awareness: Our goal in this area is to make the public aware of program opportunities, awards, and successes, TSGC provides press releases to local newspapers across Texas noting participation in our programs by students, teachers, and other individuals. In January 2008, we began collecting information for a "Success Stories" booklet that highlights the ongoing activities and accomplishments of students and teachers that have participated in our programs. TSGC also maintains an extensive website. (www.tsgc.utexas.edu).

Management and Infrastructure: TSGC's goal in this area is to manage program activities efficiently and at low cost. We review our strategic plan annually, seek external support, require matching from recipient institutions on many of our programs, and augment activities initiated by other groups whenever possible. We use our institutional representatives to review proposals and select scholarship and fellowship recipients. We recruit NASA and contractor mentors for our design challenge teams. We have followed NASA's move to full-cost accounting. We are working to identify all cost elements of our program and to present them as matching wherever possible. We have two primary management challenges. First, the representatives from some of our 41 institutional members are not active. Since institutions appoint their own representatives, encouraging activity is difficult. Our second challenge is the Space Grant funding cycle. Our contract year begins March 1 of each year, but due to continuing resolutions in congress, funding delays are common. We need to secure bridge funding from March 1 until the NASA funding arrives.

STUDENT ACCOMPLISHMENTS

Successes are found in the statistical data - 90% of the students significantly supported by Space Grant, during the 2006 & 2007 fiscal years, whom have completed the degree in which they received their Space Grant support, went on to either pursue advanced STEM degrees or to be employed in STEM disciplines. 51% went on to pursue an advanced STEM degree, 24% secured employment in STEM positions at non-NASA contractors, 5% were employed in STEM positions in academia and 10% went to work for NASA contractors.

Some direct quotes of student impacts are:

“Participation in the Space Grant program enabled me to take a class titled 'Rocket Science'. This program was an honors geology class and I can proudly say that despite being a chemistry major, I had the highest grade. I was also able to participate in research at Sul Ross and I know that being accepted into the PhD program at the University of Texas at San Antonio was a direct result of this research.”

Gabriel Guy, 2006 TSGC Scholarship
Sul Ross

Since graduating with my Masters in aerospace engineering in Dec. 2007, I have remained employed in the automatic flight control design group within the Bell Helicopter engineering department. In this position, I have continued on assignments related to the US Military UH-1Y and AH-1Z helicopter autopilots, as well as the automatic flight control system of Bell's newest commercial model, the 429. I have also transitioned into the PhD program in the Aerospace Engineering department at the University of Texas at Arlington, where I currently have an unmanned aerial refueling paper in the revision process for the Journal of Guidance, Control, and Dynamics. I additionally have an unmanned autonomous airship project in its research stages for an upcoming AIAA conference.

Jayne Tucker, 2006 & 2007 TSGC Graduate Fellowship
UT Arlington

It impacted my life and education in the essence in that has provided me with a goal to achieve an engineering degree, and was also a financial blessing to pay for college.

Aldolfo Cortez
2007 TSGC Columbia Crew Memorial Scholarship
San Jacinto College

“As a graduate student I was the recipient of several academic accolades including the Texas Space Grant Fellowship. Accordingly, I am a strong advocate of the research, education, and outreach programs that the Space Grant Consortium supports. In particular, the Texas based supplemental fellowship helped provide me with crucial financial support and further enticed me to remain in my home state of Texas for my graduate education. I am certainly grateful for the Space Grant Fellowship program and now, as an educator, I hope to remain affiliated in the ongoing effort to motivate new generations of space enthusiasts.”

Ryan Russell
2002-2003 Texas Space Grant Fellowship, UT Austin
1998-1999 Texas Space Grant Scholarship, Texas A&M
Current Job: Assistant Professor Aerospace Engineering
Georgia Institute of Technology