

Illinois Space Grant Consortium (ISGC)
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Affiliate members: Illinois Institute of Technology, Northwestern University, The University of Chicago, DePaul University, University of Illinois at Chicago, Bradley University, Adler Planetarium and Museum, Discovery Center and Museum

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 Illinois Space Grant Consortium is a Designated Consortium funded at a level of \$590,000 for fiscal year 2007.

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. ISGC's strategic plan and objectives continue to support NASA's Education Framework. For example, one of the requirements for funding undergraduate research programs and research seed grants is the project must support research in an area of interest to NASA. ISGC encourages students to apply and take part in the vast array of NASA center summer internship program. Funding is allocated in ISGC's budget to fund four students each year.

Program Benefits to the State: Funding from Space Grant has enabled the ISGC universities to expand the number of opportunities for student involvement in research, particularly at the undergraduate level. ISGC has also contributed to the STEM pipeline in Illinois, reaching young pre-college students in afterschool programs and high school students in academic summer programs. Space Grant support has helped to expand the number of participants in workshops and graduate courses in astronomy and physics for teachers in the Chicago Public System and in the Rockford area (higher than average percentage of underrepresented students).

Program Goals:

- Education: to enhance teaching and research participation to attract undergraduates to modern science and engineering
- Research: to provide strong academic training through research experiences focused on aerospace science and engineering

- Outreach: to enhance precollege students' and the general public's science, engineering, mathematics and technology (STEM) skills and knowledge

Program Accomplishments:

- The Illinois Space Grant recognizes the importance of a well educated STEM workforce. Our academic affiliates provide a high quality of education at the undergraduate and graduate levels. Of the \$590,000 allocated to ISGC in 2007, over half of the money (\$385,000) funded scholarships and fellowships (\$150,000), NASA internships (\$25,000), undergraduate research programs (\$150,000), hands-on design courses and extracurricular projects (\$20,000), and research seed grants (\$40,000).
- The undergraduate research opportunities (numbering more than 30) explored many areas of aerospace engineering, astronomy, astrophysics, and earth science. Nine of these projects were:
 - Modeling and experiments on dispersion in the atmospheric boundary layer
 - The Transition Radiation Array for Cosmic Energetic Radiation (TRACER)
 - Life support systems analysis techniques for early Martian life support systems
 - Designing an autopilot system for a uninhabited autonomous vehicle (UAV)
 - Advanced hybrid rockets
 - Assessment of fracture properties of heterogeneous adhesives using multiscale cohesive scheme
 - Active flow control for reducing losses in turbomachine corner flows
 - Shedding infrared light on the earliest stages of massive star formation
 - Shape effect of carbon-based nanofillers in paramethoxymethamphetamine (PMMA)
- The consortium was at or near its target percentage of 25% for underrepresented minority students; 25% of fellowship/scholarship students and 23% of higher education/research students were underrepresented. The percentage of female fellowship/scholarship students was 39%; very close to ISGC's 40% target.
- ISGC-supported research resulted in 21 papers, conference presentations, and posters.
- With the addition of Adler Planetarium, DePaul, and the Discovery Center Museum, ISGC was able to greatly expand its educational opportunities for teachers. Many of the participating teachers serve in school districts with large minority and low income populations. Of the 55 teachers that attended the 2007 programs, 36% were underrepresented minorities and 87% were female.
- The 16th Illinois Aerospace Institute was held on the UIUC campus. Thirty-four high school students participated in this one-week summer program. Female participation was at its highest level (26%). A survey of the 51 IAI participants who have graduated or will

graduate this year from high school since the 2005 program received 24 responses. All 24 have or will continue on to college; of the 24, 20 have entered STEM fields.

Student Accomplishments:

- Among the many talented students funded in 2007 include two who have distinguished themselves. One of the University of Chicago undergraduates (currently a junior) was accepted as HESS Collaboration summer intern at the Max-Planck-Institut für Kernphysik in Heidelberg, Germany to study cosmic gamma rays. When he arrived, his research advisor laid out a plan for the work he was to do over the 2 ½ months he would be with them. Two weeks later, the student returned to the researcher having completed the assignments. This student has applied for a Goldwater Scholarship and is likely to receive this award. A Northwestern student who completed his BS degree last May was accepted into a special DAAD (German Academic Exchange) program. He is currently pursuing advanced studies in Germany and will enter graduate school at Stanford in the fall of 2008.
- More than 90% of ISGC student awardees from 2006 and 2007 are still enrolled in their current degree programs.