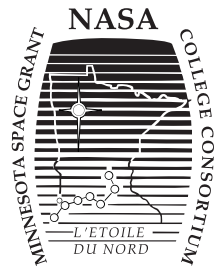


The North Star



Publication of the Minnesota Space Grant Consortium

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NEAR Mission Scientist Speaks at Augsburg

Dr. Maria Zuber, Professor of Geophysics and Planetary Sciences at MIT gave the Sverdrup Lecture titled, "Expedition to an Astroid: the Near Earth Asteroid Rendezvous (NEAR) Mission" on April 8 in the Foss Center on the campus of Augsburg College.

Dr. Zuber's remarks focused on the scientific and engineering highlights of the NEAR Mission: from the launch at Kennedy Space Center through the encounter with the exciting secondary target asteroid Mathilde; a flyby of Earth; an unexpected spacecraft malfunction that led to a year's delay in the rendezvous; the successful orbit insertion and mapping mission of Eros; and finally the dramatic landing. Results from NEAR have significantly revised scientists' view of the evolution of "low-gravity" planetary bodies. Dr. Zuber discussed the results from the spacecraft sensors that revealed the composition, mass, and magnetic signature of the asteroid, as well as how this information is providing valuable clues to the accretion of the solar system.

Dr. Zuber is the E.A. Griswold Professor of Geophysics and Planetary Sciences at MIT where she studies the evolution of the Earth and terrestrial planets. More NEAR information is available at <http://www.discovery.jpl.nasa.gov/near.html>. (Call for tickets for Sverdrup 2003: 612-330-1324).

Neutrinos and Robotic Sleds at UMD

Dr. Alec Habig, Professor of Physics at UMD, is studying neutrino oscillations using the MINOS (Main Injector Neutrino Oscillation Search) and Super-K (Super-Kamiokande) detectors. Past results from Super-K have used neutrinos produced in cosmic ray interactions with the upper atmosphere to strongly suggest that muon neutrinos of energies from a few hundred MeV to a few hundred GeV oscillate to tau neutrinos as they travel the tens to thousands of kilometers through the earth to the detector. This implies that neutrinos have mass, a finding of fundamental importance to the fields of both particle physics and astrophysics.

The MINOS experiment is being constructed both to unambiguously confirm this result and to precisely measure the oscillation parameters using an intense, well-calibrated man-made beam of neutrinos generated at Fermilab. This neutrino beam will turn on in 2005 and will be aimed toward the Soudan Underground Physics Laboratory in northeastern Minnesota. The neutrinos will be observed by similar detectors at their origin in Fermilab and after traveling the 735 km to Soudan. The differences in the signals at the two detectors should provide the best measurement yet of muon neutrino to tau neutrino flavor oscillations.

Dr. Habig is part of the Super-K analysis team that continues to refine the atmospheric neutrino results. He works on the high energy end of the atmospheric neutrino spectrum, visible to Super-K as upward-going muons originating from muon

(Neutrinos at UMD, cont.)

interactions in the rock below the detector.

MINOS detector construction at the Soudan Underground Lab began in the summer of 2001 and passed the halfway mark in July of 2002. The proximity of the UMD campus to the Soudan site (80 miles north of Duluth) makes it time and cost effective for this research group to be strongly involved in the construction and installation of the MINOS far detector. Developing the DCS will be the focus of the UMD group's effort. The DCS is the system which monitors the status of the experimental equipment and environment, allowing for corrections resulting from any spurious effects introduced by local conditions and ensuring that the apparatus operates at peak efficiency. The monitoring of the conditions in the electronics racks and the integration of this monitoring data into the main data stream are the specific programs to be developed in the near future at UMD.

Dr. Habig is also supervising the UMD Industrial Engineering Club with a design for a robotic sled to move parts and equipment to the astronauts working outside the International Space Station (ISS). The sled will contain and move tools to the sites where they are needed and will provide a telepresence external to the ISS. More information is available at: <http://www.numi.fnal.gov>.

Higher Education Highlights

Dr. Martin Johnston of the University of St. Thomas has received an NSF grant for research titled *Collaborative Investigation of Chaos, Exotic Atoms, and Electron Optics in the Advance Physics Laboratory*. The award will allow Dr. Johnston to expand his "experiment in chaos."

Dr. Brian Beecken, professor of Physics at Bethel College, received a grant by the *George I. Alden Trust of Worcester, MA* to help support the initial development of a proposed major in applied physics that will allow the purchase of specialized laser and fiber optics equipment for particular interest in modern optics and laser communication applications. Dr. Beecken also received a *NASA Langley Grant* for his collaborative work in building an instrument that will change how climate and radiation sensing is done.

Dr. Jeannine Gregoire of Augsburg College was awarded an NSF grant to bring science and mathematics undergraduates into inner city classroom as mentors and teachers. The *Teaching Scholar Partnership Program* is in its second year. Results were presented at a poster session sponsored by NSF in Washington, D.C. in June, 2002.

More information available on the MnSGC website at <http://www.aem.umn.edu/msgc>

National Space Grant College and Fellowship Program Strategic Plan 2002-2006: Executive Summary

The National Space Grant College and Fellowship Program Implementation Plan will guide the Space Grant program through the year 2006. This Executive Summary includes our National Vision, six National Mission Statements, and twelve National Goals. The strategic planning process involved in all 52 Space Grant programs directly. Participation in the creation of the strategic plan included Space Grant Directors; Associate Directors; state, industry, and academic affiliates and NASA. In order to assure all state participate in the completion of this Plan, a participative process was used. One state, one vote. This methodology provided the opportunity for all participants and stakeholders to shape and focus the future of the National Space Grant College and Fellowship Program. This Implementation Plan is our roadmap. At its core is our support for NASA's Strategic Framework and our science and engineering education, research, and outreach programs.

Mission Goals 2002-2006:

1. Using our network of scientists, engineers, and educators, enable the development of a diverse workforce of future scientists, engineers, technology professionals, and educators.

Goal 1: Create a National Space Grant Fellowship Program and work to significantly increase the program size each year.

Goal 2: Involve Space Grant students in research and discovery.

Goal 3: Model diversity in Space Grant leadership, programs, and activities.

2. Stimulate and nurture innovative programs to assure the development and transfer of practical applications in aerospace research and education.

Goal 4: Identify innovative concepts and resources within and outside of the Space Grant network, share information across the network, and identify sources of financial and other support.

3. Cultivate a nationwide network of partners from universities, industry, museums, science centers, state and local agencies, to pursue state and national aerospace research, education, and economic development goals.

Goal 5: Establish Space Grant as a viable state/national resource and catalyst for aerospace research, education, and economic development.

Goal 6: Each consortium has on its Advisory Board members of science centers, industry, museums, and state and local agencies to create an environment where collaboration is encouraged and supported in areas of common interest.

Representatives from the state Advisory Boards will comprise a national working group on networking which will meet at regional and national meetings and report.

4. Provide access to the excitement, knowledge, and technology from America's Earth, Air and Space programs.

Goal 7: Develop, enable, and highlight local participation in Earth, Air, and Space programs on a national level.

5. Educate students at all levels by encouraging and supporting interdisciplinary and multi-disciplinary research experiences and education programs.

Goal 8: Develop and promote national Space Grant opportunities for student research activities/space missions (e.g. Cube Sat, Cit. Explorers)

Goal 9: The ISS: A Science Classroom for America. Engage the nation to be an active learner in this new science classroom by developing and flying student experiments on the ISS.

Goal 10: Develop networks of students, faculty, and industrial scientists to address workforce issues.

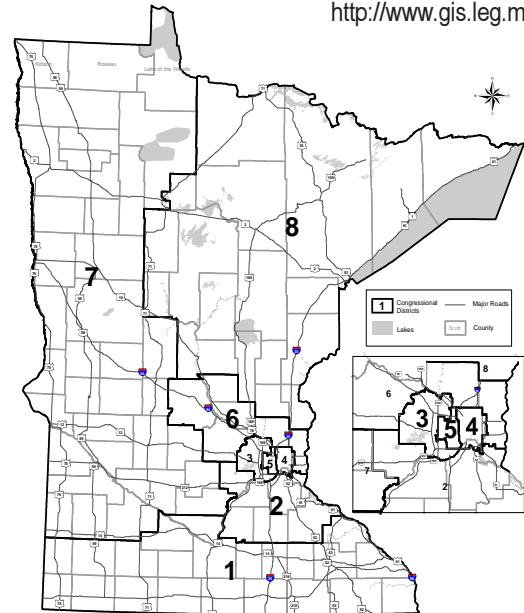
6. Serve the general public by contributing to scientific literacy.

Goal 11: Develop Earth, Air, and Space programs to enhance public scientific literacy and to complement community needs.

Goal 12: Engage in all facets of the community in the excitement of scientific discovery using Science, Math, Engineering and Technology (Edutainment, Process of Discovery).

NASA Presence by Congressional District in Minnesota

<http://www.gis.leg.mn/>



There are eight (8) Congressional Districts in Minnesota. Each of the districts is outlined above. Some of the NASA projects and contracts are listed below by district along with the name of their Congressional Representatives and District Office locations:

District 1: (Gil Gutknecht, Rochester). Business contracts for Human Space Flight ('99) include: Crenlo Inc, Cytec Fiberite, Inc. and Sheldahl, Inc. Mayo High School's planetarium program has also received MnSGC funds in the past. **Mankato State** has the **NASA Educational Resource Center** (507-389-5711/ronald.browne@mnsu.edu)

District 2: (Mark Kennedy, Northfield). **MnSGC Affiliate Carleton College. St. Mary's University is a NOVA site.**

District 3: (Jim Ramstad, Bloomington). Business contracts for Human Space Flight ('99) include: Color Span, Ergosource, MTS Systems Corp., Rosemount Inc. and SRMI. This district has hosted the annual FIRST Lego Robotics competition annually. SBIR: Superior Vacuum Tech. Assoc.

District 4: (Betty McCollum, St. Paul). Business contract for Human Space Flight ('99) includes 3M. **MnSGC Affiliates include: Bethel College, College of St. Catherine, Macalester College, and University of St. Thomas.** SBIR: Ballistic Recovery; Aerometrics/TSI; Top-VU Tech.

District 5: (Martin Sabo, Minneapolis). Business contracts for Human Space Flight ('99) include: Goods/Services; Norstan Communications; Videolabs, Inc. **MnSGC Affiliates include: University of Minnesota-TC, Augsburg College. UM-TC is also a NOVA site.**

District 6: (Bill Luther, St. Cloud). Business contracts for Human Space Flight ('99) include: Remmele Engineering; Rosemount Inc.; Technical Sales, Inc. **St. Cloud State** has the **NASA Educational Resource Center** (320-255-4766/hjensen@stcloudstate.edu)

District 7: (Collin Peterson, Detroit Lakes) **MnSGC Affiliates Concordia College and Bemidji State University** are in this district.

District 8: (James Oberstar, Duluth) Business contracts for Human Space Flight ('99) includes Tescom Corp. **MnSGC Affiliates University of Minnesota Duluth and Fond du Lac Tribal College. Sea Grant at UMD and Cirrus Design Corp.** are also part of this district. For more information see www.nasa.gov under 'NASA Procurement' for MN listings.

Space Science Across the Curriculum Conference March 15, 2003 at Science Museum of Minnesota To Feature The Centennial of Flight

The fifth annual Space Science Across the Curriculum Conference will feature an aviation theme this year in celebration of 100 years of flight. The keynote speaker is Betty Wall, a W.A.S.P or Women Airforce Service Pilot. Her remarks will feature her experience as a pilot in WWII. Also speaking is Dr. Sanjay Limae, Director of the Office of Space Science Education at the University of Wisconsin, Madison. His topic, "Weather on Planets," will be followed by a brief overview of the curriculum and resources their program has to offer to support the teaching of space science in the classroom. For registration information call 651-221-4747 or dcameron@smm.org.

FIRST: For Inspiration and Recognition of Science and Technology

FIRST is a national non-profit organization which inspires youth to pursue further study, experience and careers in engineering and technical fields. By doing so, FIRST helps ignite the curiosity and demand for learning, with the schools and universities then supplying that desired education. The premise of FIRST is to partner youth with practicing engineers so that the students can "play with professionals" to solve challenging engineering problems. To achieve this goal, FIRST has established the FIRST Robotics Competition for high school youth and a Junior Robotics program for 9 - 14 year old students with a network of tournaments called the FIRST Lego League. FIRST Robotics Competitions provide teams with a limited amount of materials and a challenging game to solve. For more information on FIRST in Minnesota refer to the FIRST website at www.usfirst.org.

Science CentrUM

The University of Minnesota supports the renewed efforts of Science CentrUM to connect research scientists at the University with K-12 educators in the Twin Cities and surrounding area. Science CentrUM maintains a website informing teachers of workshops, programs, internships, opportunities and special events at the University of Minnesota, with links to departments and programs sponsored by Science CentrUM Consortium Partners and district affiliates. Current programs include GLOBE; ESSEA; PKAL; Science Works!; COSTS; GENIE; REX, and additional related programs. Partners include the MnSGC, Earth Systems Science Education Alliance, the JASON Project, NASA/NOVA, GLOBE, and Minneapolis Public Schools' Math/Science Matters. See www.science.umn.edu for more information and to get involved.

NASA Education Workshops (NEW)

NASA's Education Program is undergoing significant changes in response to the increased role that education will be playing under the new administrator, Sean O'Keefe. An overarching new initiative, Explorer Academies, has been designed to bring professional development, student opportunities, new technology tools and an emphasis on reaching underserved and underrepresented populations. The NEW summer workshops will support the Explorer Academies. During July 2003, ten pilot workshops will be held, each consisting of five (5-member) educator teams targeting grades 5-8, expanding to other grade levels in the future. Competitive application and selection of pilot teams will be based on criteria with a requirement that at least one member of the team having previous experience in a NASA teacher enhancement program. Call 703-312-9391 or new@nsta.org for more information or see <http://education.nasa.gov/new>.

Websites of Interest

- Free NASA "Science Files" for teachers: <http://scifiles.larc.nasa.gov>
- RESAC: Regional Earth Science Application Center. <http://resac.gis.umn.edu>
- ForNET: GIS for natural resources: <http://www.gis.umn.edu/fornet>
- NOVA: <http://education.nasa.gov/nova>
- Deep Space Probe: www.teamencounter.com/spacegrant or order 1-800-522-3217.

Minnesota Science Teacher Education Initiative

The first Minnesota Science Teacher Education Initiative was held last summer on the campus of the University of Minnesota-TC sponsored by Space Education Initiatives of Green Bay, WI and the MnSGC. A dozen K-12 educators from the Twin Cities area and neighboring Wisconsin were involved in an intensive, hands-on, science content curriculum workshop focusing on earth and space science areas. Jason Marcks, from Space Education Initiatives, brought his team of experts for a week-long content enrichment experience featuring a full 8-section curriculum, CD Rom, and sample constructivist projects. The pilot was a success at all grade levels. Jason will be presenting again at the March 15 Space Science Conference (see opposite article) at the Science Museum of Minnesota. See: www.spaceed.org for more information.

Third Annual STEPS at University of St. Thomas

Sixth grade girls who will be going into 7th grade in the fall of 2003 are encouraged to apply for the STEPS (Science, Technology, Engineering Preview Summer) Camp this summer at the University of St. Thomas where they will ultimately build a glider airplane. The camp is FREE and open to girls who are interested in exploring careers in the sciences and engineering. Camp participants live in dorms and take part in classes in plastics, electricity, machining, computer-aided design, assembly, Web design, chemistry, physics, engineering, robotics and career exploration. Four (4) camps will be scheduled this summer during the weeks of June 15, June 22, July 6, and July 13th. Anyone interested in applying should contact Jackie Kubal at 651-962-5750. More information is available at <http://www.stthomas.edu/technology>.

Penn State Workshops for Science Educators 2003

Penn State University and the Pennsylvania Space Grant Consortium are offering a series of workshops for science educators that will help you bring standards-based teaching and thought-provoking learning into your classroom. Workshops listed are:

- Astrobiology: The Origin and Early Evolution of Life, June 23-27, 2003.
- Mechanics of Materials Series, June 23-27, 2003
- Biotechnology: From Laboratory to Classroom, July 7-11, 2003.
- Stars and Planets, July 14-18, 2003
- Weather Camp for Science Educators, July 21-25, 2003
- Galaxies and Cosmology, July 21-25, 2003 & Space-Based Astronomy, July 28-Aug. 1 See www.outreachpsu.edu/C&I/Science4Educators to register.

NASA Connect

NASA Connect is an annual series of FREE integrated mathematics, science, and technology instructional distance learning programs for students in grades 6-8. Each program has three components: 1) a 30-minute television broadcast, which can be viewed live or taped for later use; 2) an educator guide including a hands-on activity; and 3) an interactive web activity which provides educators an opportunity to integrate technology in the classroom setting. These three components are designed as an integrated instructional package.

REGISTER: Register on-line at connect.larc.nasa.gov

ACCESS: NASA Connect airs on television, can be down loaded from satellite, or obtained as a video.

INTEGRATE: Integrate the broadcast, hands-on activity, and web activity into your classroom to enhance and extend your curriculum.

Announcements

- Space Science Across the Curriculum Conference for K-12 teachers at the Science Museum of Minnesota, Saturday, March 15, 2003. Register: www.smm.org or call Dawn Cameron at 651-221-4747.
- Grants available for Space Education Programs from Space Explorers. See <http://www.space-explorers.com/grantinfo/>
- Undergraduate Student Research Program: <http://education.nasa.gov/usrp/>

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