

GEST is a consortium of scientists and engineers, led by the University of Maryland, Baltimore County (UMBC), to conduct scientific research in Earth and information sciences and related technologies in collaboration with the NASA Goddard Space Flight Center (GSFC). The consortium members of GEST include UMBC, Hampton University, Howard University, Caelum Research Corporation, and Northrop Grumman Corporation.

GEST News is published quarterly by UMBC. Keep up to date between newsletters by checking our website.

Goddard Earth Sciences and Technology Center
University of Maryland,
Baltimore County
5523 Research Park Dr.
Suite 320
Baltimore, MD 21228
<http://gest.umbc.edu>
Phone: 410-455-6362
Fax: 410-455-8806

NASA Exploring Space Challenges

by Dr. Marci P. Delaney, GEST Information Science and Educational Technology Focus Group

NASA Exploring Space Challenges is a national program providing a compilation of investigations and design challenges for all grade levels in the primary and secondary schools. These academic competitions support many of the national education standards for science, mathematics, technology and the arts. Dr. Marci Delaney developed the Exploring Space Challenges to encourage science inquiry skills and to integrate science, mathematics, art and technology concepts. Students also can use the Challenges to learn to communicate more clearly and effectively. There are currently six Challenges in place for this school year, each of which invites students to embrace imagination and knowledge.

At the request of Space Operations Mission Directorate out of NASA Headquarters, Dr. Delaney designed an activity for SOMD's latest module addition to the International Space Station (ISS), which became "Mission: Name the ISS Node 2." Rather than students just submitting their choice of a name for the Node 2, students had to work collaboratively to design and create their own model, with correct scale proportions, of the Node 2 using their classroom or school hallway. Only after meeting several criteria could students then submit an essay describing their name for this module. The winning name for Node 2 will be announced by March 1, 2007.

Other Challenges for the 2006-07 school year are "Mission: Moon Math," "Mission: Fuel Your Imagination," "Mission: Lights, Camera Action!," "Mission: Design a Lunar Base" and a Teacher Challenge. "Moon Math" pushes students to explore the Moon through measurement. This Challenge involved three interactive video-conference events for students to learn about the scientific method and measurement from a NASA scientist or educator. "Fuel Your Imagination" is a language arts activity, which students write their own fictional story, but with real science, math or engineering facts. "Lights, Camera Action!" is a Challenge specifically for NASA's Explorer Schools. The schools have an opportunity to direct, appear in and produce their own music video highlighting how NASA has had an impact on their school. "Design a Lunar Base" is an activity for lower grade levels. Students work as teams to design, propose and build their own lunar habitat. Finally, the Teacher Challenge is exclusively designed for Teachers to develop their own classroom activity into a Challenge.

Visit <http://esc.nasa.gov> for more information about the NASA Exploring Space Challenges. If you would like to hear more about the Challenges or register for an event, call Dr. Delaney at 301.286.7992 or email her at marci.delaney@gsfc.nasa.gov.



GEST Continues to Grow

2006 has been a great year for GEST, as we continue to welcome many new faces. Listed here are faculty who have recently joined GEST:

Dr. Benita P. Bell is the former Director of the Science Technology, Engineering and Mathematics (STEM) Program and Associate Professor of Chemistry at Bennett College. She holds a B.A. degree in Chemistry from the University of North Carolina at Chapel Hill, a M.S. degree in Chemistry from North Carolina A&T State University and the Ph.D. degree in Nutrition and Chemistry from Howard University. Dr. Bell was awarded a NASA Administrator's Fellowship position where she served as a NASA Fellow in the Office of Biological and Physical Research at NASA Headquarters in Washington, D.C. There she developed a clinical research study on soy isoflavones and their role in immunity and heart disease. Dr. Bell received the Exemplary Teacher of Year Award from the Division of Higher Education and the United Methodist Church Related Institution and the Board of Trustees Faculty Teaching Excellence Award. Dr. Bell currently serves as a Visiting Assistant Research Scientist with GEST.

Dr. Amerlia Colarco received her Ph.D. from the University of Colorado in Atmospheric Physics, and is now doing research at GSFC studying carbon dioxide distributions in the atmosphere. She is specifically interested in developing new methods for measuring carbon dioxide from the ground and from space so that we may better understand how it changes over time and how these changes might impact the Earth's climate.

Dr. Yury Vikhliav received his Master's degree in Applied Math and Physics from the Moscow Institute of Physics and Technology in 1996, with a specialization in geophysical fluid dynamics and oceanography. From 1996 to 1999 he was a research assistant at the Geological Institution of the Russian Academy of Science, where he worked on the reconstruction of the history of sedimentary basins and participated in the creation of a geo-information database of tectonic maps of the Pre-Kaspian Sedimentary Basin. He received his Ph.D. degree in Climate Dynamics from George Mason University in January 2006. His Ph.D. research was focused on understanding the decadal climate variability in the Pacific Basin and an analysis of low frequency dynamical modes in numerical climate models using the breeding technique. Upon graduation, Dr. Vikhliav received a position of research scientist at the Center for Ocean-Land-Atmosphere Studies, Calverton, Virginia. His work was focused on understanding the climate noise and climate predictability using coupled general circulation model simulations. Dr. Vikhliav joined GEST in November 2006 to work with NASA's GMAO program on a new coupled global climate model that will be used for climate studies, data assimilation and climate forecasts.

Dr. Elena M. Georgieva received her B.S., M.S. and Ph.D. in Physics from the Department of Physics, University of Sofia. From 1995 to 1999, Dr Georgieva was an Assistant Professor at the Technical University of Sofia. She was a research associate at the Lasers and Optical Characterization Laboratory, Department of Physics, Georgetown University in 2000-01 where she worked on nanoparticles characterization and correlation spectroscopy. She also was a research associate at the NIST Center for neutron research and Johns Hopkins University (2001-02), where she worked on dynamics and conformations of RNA using neutron spectroscopy and investigated the folding mechanisms of biologically active structures. For four years she was a Senior Systems Scientist/Engineer at Science Systems and Applications, Inc. and worked at the Goddard Laser and Electro-optics branch on instrument development for measurement of atmospheric species. Her current research is focused on the development of new type of remote sensing instruments based on the Fabry-Perot interferometric technique. These instruments are able to detect the absorption features of various atmospheric trace species in direct or reflected sunlight; the work includes laboratory, ground-based and airborne testing, modeling and data analysis. Dr. Georgieva contributed to the design and implementation of Fabry-Perot instrument for carbon dioxide and oxygen column measurements.

Focus on Heliophysics Research Focus Group

Created this past April, the Heliophysics research group is the newest of the eight GEST research groups. The group was organized following NASA's own creation of a Heliophysics division to provide a home for GEST space sciences working in this burgeoning research field by bringing them together in a single group. The founding members of this new group are Dr. Phillip A. Webb (who also serves as the research group leader), Dr. Judit Pap, and Dr. Timothy Stubbs. Dr. Webb is simulating meteoric impacts on the atmosphere of Venus to understand the formation of metallic layers in the 120km altitude, as well as researching ice particles in the polar mesospheric. He is refining the automatic fitting technique used in the Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) Radio Plasma Imager (RPI) to determine plasmaspheric Ne. Dr. Pap is addressing the phenomenon of solar variability and its connection to climate changing, including developing an understanding of the relationship between variations in solar irradiance and the magnetic fields of active solar regions and the full-disk magnetic field strength data. Dr. Stubbs is studying lunar dust transport and surface charging (as reported in the last GEST NEWS) that will have important implications for future robotic and human exploration of the Moon.

Joining these researchers in the last year to fill out this new group are Dr. Mehdi Benna (simulation of cometary atmospheres), Dr. Scott Boardsen (radiation belt analyses), Dr. Jan Merka (Earth's bow shock and magnetopause, and interplanetary shocks and discontinuities), Mr. Tom Narock (extending the space science data environment through semantics and knowledge representation), Dr. Yongli Wang (near-Earth magnetic field measurements from spaceborne instruments), Dr. Seiji Zenitani (magnetic field observations), Dr. Antti Pulkkinen (geomagnetic induction), and Dr. Hamed Bekeret (earth magnetic field). Additionally, in the past few months, several visiting scientists have helped to jumpstart this new division, including Dr. Raimund Muscheler (coupled climate model simulation of Holocene cooling events) and Dr. Andrey Samsonov (MHD simulations).

Errico Wins Best Popular Summary

Congratulations to Dr. Ron Errico for winning the first Science-PAO Committee award for best popular summary this past May. The Science-PAO Committee in the Earth-Sun Exploration Division (Code 610) was created by Dr. Franco Einaudi to recognize well-written summaries of papers submitted for refereed publications. Dr. Errico's summary of "Interpretations of an adjoint-derived observational impact measure" was cited for his strong opening sentence as well as his jargon-free explanation of the problem with weather observations. Along with the award, Dr. Errico also received a check for \$1,000.

Employment Opportunities

GEST is seeking qualified scientists for a number of opportunities, including:

- 610-77-000, Gravity Wave Parameterization in GCM
- 613-65-222, Modeling of Interactive Cloud Processes
- 613-77-000, Statistical Cloud Modeling
- 613-77-265, Atmospheric Chemistry/Climate Modeling
- 614-76-263, Space-Based Sensing of Ocean Salinity
- 614-81-278, Carbon Cycle Modeling
- 916-62-216B, Modeling and Analysis Scientific Support
- 971-00-002, Land Data Assimilation

More information about these positions, including requirements and deadlines, can be found on the GEST web site at: http://gest.umbc.edu/employment_opp/employment.html