GEST NEWS

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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.

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Dust Storms on the Moon?

Most people's idea of the moon is a vast barren landscape where nothing ever happens. This couldn't be farther from the truth, according to GEST researcher Timothy Stubbs, Laboratory for Solar and Space Physics. While Dr. Stubbs was supporting the Solar System Exploration Division at NASA's Goddard Space Flight Center, he was tasked with discovering how certain lunar dust had been energized. Using data gathered from an old Apollo experiment, Dr. Stubbs has theorized that every lunar morning, as the terminator (the dividing line between lunar night and day) traverses the lunar landscape, a long dust storm moves across the landscape in its wake.

"The Apollo 17 astronauts deployed LEAM on the moon in 1972," explains Stubbs. LEAM, short for Lunar Ejecta and Meteorites, was designed to look for dust kicked up by small meteoroids hitting the moon's surface. Scientists feel that the reason for the moon's dusty surface is the result of these meteoroids, which billions of years ago hit the moon almost constantly, pulverizing rocks and coating the moon's surface in dust. LEAM was installed to detect dust created by contemporary meteoroid impacts, as well as examine the properties of the dust created.

Instead, what the scientists have discovered is a repeating pattern of dust particles moving from east or west, rather than from above or below, and at slower speeds than expected for lunar ejecta. Stubbs and his colleagues, after examining this data, have formed a hypothesis that the electrically charged difference between the dayside (positively) and nightside (negatively) of the moon created a constantly moving dust storm. As the line between day and night moves around the moon, Stubbs says, "electrostatically charged dust would be driven across the terminator sideways," by horizontal electric fields. Dr. Stubbs, along with his co-investigators Dr. Richard R. Vondrak and Dr. William M. Farrell, published their findings in an article titled, "A dynamic fountain model for lunar dust," in *Advances in Space Research.* 37 (2006), p. 59-66.

Unfortunately, nobody has been able to verify this, as LEAM operated only for a very short time. Only 620 hours of data were gathered during the icy lunar night and a mere 150 hours of data from the blazing lunar day before its sensors were turned off and the Apollo program ended.

Anecdotal evidence exists, however, that seems to agree with this hypothesis. While in orbit, the astronaut crews of Apollo 8, 10, 15, and 17 sketched "streamers" or a "horizon glow" where sunlight was apparently filtering through dust above the moon's surface. This happened before each lunar sunrise and just after each lunar sunset. NASA's Surveyor spacecraft also photographed twilight "horizon glows," much like what the astronauts saw.

In a few years, the theory may be tested, as NASA plans to return astronauts to the Moon by 2018 and establish a permanent outpost. This would enable them to experience a lunar sunrise, which the Apollo missions were never able to. If the storm exists as Stubbs thinks, these astronauts will be the first there to see it.

(Written from personal communication and NASA Space News.)

Administration Update

After five years as GEST Director, Dr. Robert Curran stepped down on July 1, 2005 and accepted a position with the Climate Change Science Program Office to assist with climate change policy development. Replacing him as Director of GEST is **Dr. Raymond Hoff**, a professor of Physics at UMBC and also currently the Director of our sister center, the Joint Center for Earth Systems Technology (JCET).

At the end of 2004, the decision was made to merge the administration of the two centers, GEST and JCET, to better serve the faculty. The transition is now complete and the improvements enabled by this change are visible in many areas. 2005 also brought in some new faces in the administrative office, including:

- **Glen Engel-Cox,** Communications Manager, responsible for the Annual Report, technical editing, and maintaining the GEST web site and inventory control
- **Charnel Bohn**, Business Specialist, supporting the Data Assimilation; Heliophysics; and Global Modeling, Data Impact and Data Simulation research groups
- **Dennis Small**, Business Specialist, supporting the Information Science and Education Technology; Terrestrial Physics; and Cloud Modeling and Analysis research groups
- **Amy Schneider**, Business Specialist, supporting the Hydrological Sciences and Atmospheric Chemistry and Dynamics research groups
- **Valerie Casasanto**, Program Coordinator, providing logistical support for the visiting scientist and educational outreach programs

In March 2006, Nancy Flowers moved to a new opportunity with UMBC's Physical Plant. Cathy Manalansan shifted positions to replace her as the Travel Coordinator, while Nina von Gunten assumed different duties at the office front desk. The GEST presence at GSFC has also changed slightly. We've moved our administration office to Building 22, Room 170 (the phone number remains unchanged at 301-286-4403). Grace Roscoe and Valerie Casasanto staff the office full-time, while Associate Director Dr. Tom Low splits his time between GSFC and UMBC. Other members of the administrative staff, including Dr. Hoff, the business specialists, and the communications manager, are available at the GSFC office on a regular basis to provide increased direct support to GEST researchers and sponsors.

Employment Opportunities

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

- **610-67-229, Ocean Modeling Development**
- **610-67-230, Coupled Climate Mod., Pred. & Analysis**
- **610-67-231, Atmospheric Data Assimilation**
- **610-73-253, Aerosol Data Assimilation**
- **612-74-254, Ionspheric Modeling**
- **613-65-221, Global Precipitation Analysis**
- **694-74-255, Geopotential Satellite Studies**
- **920-63-217, Satellite Remote Sensing Avian Studies**
- **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

Research Group Changes

The growth of GEST over the last few years in certain areas called for a modification of the research groups to better conform with current research as well as NASA's plans for future missions. Unchanged are Hydrological Sciences, Terrestrial Physics, Atmospheric Chemistry and Dynamics, and Information Science and Educational Technology. Two groups, formerly known as GMAO-A and -B, have been renamed. GMAO-A has become Data Assimilation, while GMAO-B is now Global Modeling, Data Impact and Data Simulation, led by Dr. Oreste Reale. Cloud Modeling and Cloud Analysis have been merged into one group, Cloud Modeling and Analysis. Finally, a new group, Heliophysics, has been created to encourage collaboration between GEST researchers investigating the Sun, its effects on the plants of the solar system, and general space environmental conditions and their evolution.

Focus on Information Science and Educational Technology

The Information Science and Educational Technology research group at GEST addresses the real need to support NASA research data collection, assimilation, and analysis activities. Led by Dr. Susan Hoban, Senior Research Scientist, the IS&ET group investigates emerging technologies to handle exponentially increasing data streams from remote sensing using large format and hyperspectral imaging as well as the use of high-performance, parallel computer architecture to handle large computational activities. Since the ultimate goal of NASA research is to communicate the nature of our planet and universe to scientists, educators, learners, the general public and makers of public policy, this group also works to provide effective methods for information transfer and understanding through multimedia delivery.

Joining Dr. Hoban in this research is Dr. Sushel Unninayar, a GEST Senior Research Scientist with much experience in climate change research and policy communication. Dr. Anuradha Koratkar, Associate Research Scientist, provides experience in scientific IT applications based on her experience with the Hubble Space Telescope, among other missions. Dr. Daniel Laughlin, Assistant Research Scientist, focuses on the use of computers and the Internet for learning, including the use of games as educational tools. Dr. Yolanda Gayol, Visiting Scientist, works on knowledge dissemination through distance-learning technologies. Dr. Marci Delaney, Research Associate, coordinates the NASA Exploring Space Challenges, academic competitions for middle school students. Laurie Cook, Instructional Design Specialist, is studying for her doctorate and researching the use of advanced technologies for the education of blind and minority students. David Stroud, Assistant Research Scientist, develops multi-media products to enhance science communication. Stefanie Misztal, Media Specialist, is a filmmaker working on producing environmental and solar science media products for GSFC. And Silvia Stoyanova, Media Specialist, prepares multimedia products including web development, graphics and animations for the NASA Web Portal as well as video production.