

Volume 1, Number 6

Featured Story

Newberg Shares Gruber Prize for Discovering Rapid Expansion of Universe



Photo Credit: Rensselaer/
Gary Gold

In 1998, two research teams a world apart uncovered a key truth about our universe — it was expanding. Fast. One of the experiments, the Supernova Cosmology Project, was originally a thesis project for Heidi Jo Newberg, now an associate professor of physics, applied physics, and astronomy at Rensselaer. Members of the two research teams are now being honored for their discovery with one of the top scientific awards in the field — the 2007 Gruber Cosmology Prize.

The Gruber Prize honors a leading cosmologist, astronomer, astrophysicist, or scientific philosopher for theoretical, analytical, or conceptual discoveries leading to a fundamental advancement in the field. The \$500,000 prize will be shared by the research teams. Newberg and her colleagues join previous Gruber Prize winners that include the originators of the Big Bang theory and the creators of the Hubble Space Telescope.

As a graduate student at the University of California, Berkeley, Newberg and her mentors worked to design an experiment to discover the rate at which the expansion of the universe was slowing down, due to gravitational attraction of matter. “It is a formative experience in my career,” says Newberg. “To have been part of an experiment whose results defied the expectations of the larger scientific community.” [Read more.](#)

Honors and Awards

- **Deborah McGuinness** (Professor, Computer Science; Constellation Professor, Tetherless World) won a deployed paper award for her jointly authored paper titled “The Virtual Solar-Terrestrial Observatory: A Deployed Semantic Web Application Case Study for Scientific Research.” The paper was published in the *Nineteenth Conference on Innovative Applications of Artificial Intelligence (IAAI-07)*.
- **Heidi Newberg** (Associate Professor, Physics) is one of the winners of the 2007 Cosmology Prize of the Gruber Foundation for her contributions to the discovery that the expansion of the universe is accelerating.
- **E. Fred Schubert** (Professor, ECSE, Physics; Wellfleet Senior Constellation Professor, Future Chips) received an innovative product award from MICRO/NANO Newsletter for work on non-reflective coatings. The editors of R&D Magazine and MICRO/NANO Newsletter selected this work as some of the most innovative for 2007 in their inaugural MICRO/NANO 25 Competition. Collaborators on the work include **J.-Q. Xi** (Graduate Student, Physics), **Martin F. Schubert** (Graduate Student, ECSE), **Jong Kyu Kim** (Research Assistant Professor, ECSE), Minfeng Chen (National Taiwan University), **Shawn-Yu Lin** (Professor, Physics; Constellation Professor, Future Chips), W. Liu (Crystal IS, Inc.) and J. A. Smart (Crystal IS, Inc.).

Research Accomplishments

- **Deborah McGuinness** (Professor, Computer Science, Constellation Professor, Tetherless World) gave a keynote address at the *Semantic eScience Workshop* co-located with the *Twenty-Second Conference on Artificial Intelligence*. The title of the talk was “Explaining Complex Systems.”
- **Saroj Nayak** (Associate Professor, Physics), **Philip Shemella** (Graduate Student, Physics), and **Yiming Zhang** (Graduate Student, Physics) made a key discovery that could help advance the role of graphene

as a possible heir to copper and silicon in nanoelectronics. Graphene, a one-atom-thick sheet of carbon, eluded scientists for years but was finally made in the laboratory in 2004 with the help of everyday, store-bought clear adhesive tape. Graphite, the common material used in most pencils, is made up of countless layers of graphene. The researchers simply used the gentle stickiness of tape to break apart these layers. The team outlined their findings in the report “Energy Gaps in Zero-Dimensional Graphene Nanoribbons” published by *Applied Physics Letters*. **Pulickel Ajayan**, (Henry Burlage Professor, Materials Science and Engineering) is also listed as a co-author.

- **Boleslaw Szymanski** (Professor, Computer Science; Director, Center for Pervasive Computing and Networking) and **Gang Chen** (Postdoc, Center for Pervasive Computing and Networking) received US Patent #7,246,054 on a discrete event simulation system and method they co-invented. This is the first patent granted to the Center for Pervasive Computing and Networking.
- **Jeff Trinkle** (Professor and Head, Computer Science) was selected to be the Program Chair for the *Robotics: Science and Systems* conference to be held at ETH in Zurich, in June 2008.
- **Bulent Yener** (Associate Professor, Computer Science) recently gave four invited talks in Europe. At the Technical University of Berlin, he gave a talk titled “Metrics for Anonymous Communications.” At the University of Innsbruck, Austria, he gave a talk titled “Measuring Anonymity.” And at the University of Trento, Italy, he gave talks titled “Combinatorial Designs, Constructions and Applications” and “Metrics for Anonymous Communications.”
- **Xi-Cheng Zhang** (Professor, Physics; Director, Terahertz Research Center) was awarded U.S. Patent #7,242,010: GaSe crystals for broadband terahertz wave detection. This is his third patent this year.

Other News

- Several new faculty members are joining the School of Science. They include:
 - Sanmay Das, Assistant Professor of Computer Science
 - Peter Dinolfo, Assistant Professor of Chemistry and Chemical Biology
 - Joel Giedt, Assistant Professor of Physics, Applied Physics and Astronomy
 - Susan Gilbert, Professor and Head of Biology
 - George Makhatazde, Professor of Biology, Biocomputation & Bioinformatics Constellation Professor
 - Deborah McGuinness, Professor of Computer Science, Tetherless World Constellation Professor
 - Mark Platt, Assistant Professor of Chemistry and Chemical Biology

Welcome to all!

- Federal agencies in the United States need to provide sustainable funding streams to maintain the nation’s competitiveness and nourish the next generation of scientists, according to Robert Palazzo, Rensselaer provost and professor of biology and incoming president of the Federation of American Societies for Experimental Biology (FASEB). Palazzo laid out his vision for the biomedical sciences at a July 10 event at the National Press Club in Washington, D.C. “The time has come to focus on a long-term vision for science,” Palazzo said. “We need to set the course for the future of science: to articulate a vision of where we want biomedical research to be in the next 20 years.”
- Two Rensselaer undergraduates are currently at the center of an experiment that could reveal the origins of the universe. The Large Hadron Collider (LHC) at the European Organization for Nuclear Research (CERN) in the foothills of the Swiss Alps is perhaps the largest scientific experiment of our time. Samuel Punshon-Smith and Mathew Pevarnik, both undergraduate physics majors, arrived in Switzerland in early July to begin what they both expect to be a whirlwind dip into the amazing arena of particle physics. These two accomplished students are working with elite research teams from dozens of nations around the world.
- Rensselaer’s chapter of the Society of Physics Students (SPS) was selected *Chapter of the Year* for the second year in a row.

Upcoming Events

- Undergraduate Student Orientation, August 20-21
- Transfer Student Orientation, August 24
- Navigating Rensselaer and Beyond, August 21-26
- Groundbreaking Ceremony for the the East Campus Athletic Village, August 26, 10:00 AM
- Fall Classes Begin, August 27
- NSF Symposium: Cyber-Enabled Discoveries and Innovation, September 5-6, 8:30 AM - 6:00 PM, Center for Biotechnology and Interdisciplinary Studies Auditorium, See www.rpi.edu/nsfcdi for details (Faculty are encouraged to attend)
- Colloquy: The Future of Computationally Enabled Discovery and Innovation, September 7, 10:30 AM, Center for Biotechnology and Interdisciplinary Studies Auditorium (Faculty are encouraged to attend)
- CCNI Ribbon-Cutting Ceremony, September 7, Noon, Center for Biotechnology and Interdisciplinary Studies Auditorium (Faculty are encouraged to attend)
- Medalist Day Open House, September 8 (All department should plan to participate)

This newsletter is prepared monthly and distributed to faculty, staff and students in the School of Science to keep everyone informed of accomplishments and events within the school. Corrections and items for the next newsletter should be sent to spoon@rpi.edu.

