

# Science News

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THE MONTHLY NEWSLETTER OF RENSSELAER POLYTECHNIC INSTITUTE'S SCHOOL OF SCIENCE

## Center for Social and Cognitive Networks

**Boleslaw Szymanski**, Claire and Roland Schmitt Distinguished Professor of Computer Science announced on September 29, 2009 that a ten-year, \$35.5 million contract had been awarded by the Army Research Laboratory. Rensselaer's share in this is \$18.35 million. Participating in the project from Rensselaer are, in addition to Bolek as Principal Investigator, Co-Principal Investigators: **James Hendler, Selmer Bringsjord, William Wallace, Malik Ismail-Magdon, Gyorgy Korniss, Sibel Adali, Chjan Lim, Ron Sun, Mark Goldberg, Mohammed Zaki, Konstantine Arkoudas** and **Elliot Anshelevich**.

The Northeast Center for Social and Cognitive Networks, led by Rensselaer Polytechnic Institute, assembles a team that includes members from Northeastern University, City University of New York, and IBM; as well as collaborators from Harvard University, New York University, University of Maryland, University of Indiana at Bloomington, and Notre Dame University. The participating researchers include team leaders Professor Laszlo Barabasi, co-founder of the Network Science discipline, and James Hendler, co-inventor of Semantic Web. This team is made up of scientists from a broad range of disciplines. It includes neuroscientists, cognitive scientists, social scientists, management scientists, physicists, mathematicians, engineers, and computer scientists. The Center will study the fundamentals of social and cognitive networks and their roles in today's society and organizations, including in the U.S. Army. The goal is to gain a deeper understanding of social/cognitive networks by, first, developing new theoretical insights into, and formalisms for modeling and analyzing, such networks; and, second, by developing novel measurement tools and systems as well, including intelligent systems. The research will provide the conceptual, formal framework for better grasping the complex nature of human social interactions in intersecting cultural, ethnic, and geographic environments, and in both formal and informal human organizations.

The proposed work directly addresses the newly arising challenges to the U.S. Army and U.S. national interests. Social/cognitive networks impact the Army in all aspects of its operations. Ranging from cohesiveness and quality of the Army's personnel, to the Army's performance in peace and war and its ability to perform its missions, social/cognitive networks will also be increasingly important in the future. With its direct focus on interactions between humans, social/cognitive networks are central to network science and its role in today's society. In some sense, computer and information networks are just the means to achieve the goal of social networks. They allow interactions between humans in a meaningful way by providing immediate information and operations, and in the longer term by enhancing human knowledge and understanding of the world. Hence, the research on social/cognitive networks is central to the proposed Collaborative Technology Alliance. On one hand it will inform, and on the other it will be informed by, the research on computer networks and information networks. The proposed center will undertake leading and innovative research to develop both a fundamental understanding of the underlying theory, as well as tools for simulation, measurement, analysis, prediction, and control of social/cognitive networks and their impact on the U.S. Army.

## **Breneman Named Acting Head of the Chemistry and Chemical Biology Department**

Linda McGown has decided to step down from her Department Head position in the Chemistry and Chemical Biology Department to concentrate more fully on her research program. Linda has done a great job in consistently representing the department's interests and serving as an advocate and mentor for the faculty, staff and students in the department. She has accomplished many things as head, including hiring bright young faculty, creating an exciting new research center in the department, and improving the department's curricula and course offerings. During this time she was also successful in her own research program, winning appointment as the William Weightman Walker Professor of Chemistry.

Curt Breneman has agreed to serve as Acting Head of the department once Linda steps down. Curt's appointment as Acting Head will begin January 1, 2010. It will continue until a new head for the department is hired. The search for a new head is underway.

Curt brings a long history of experience at Rensselaer to the position. He joined Rensselaer in 1989 as an Assistant Professor following postdoctoral work at Yale University. His Ph.D. is in Physical Organic Chemistry from the University of California, Santa Barbara. Curt was promoted to Associate Professor in 1995 and to Full Professor in 2002.

Curt's research focuses on the development of predictive cheminformatics methodology for understanding, quantifying and modeling causative relationships between molecular structure and function for a wide range of applications including drug design, metabolic outcome prediction and nanomaterials informatics. He has leveraged these interests by organizing and directing Rensselaer's NIH-funded "RECCR" Cheminformatics Center as well as the "Rensselaer Cheminformatics Consortium".

Curt has published 85 academic papers and book chapters, has given over 100 invited lectures, and presented numerous other talks in a variety of venues. During his tenure at RPI, Curt has raised over \$11.7 million in research support, including significant collaborative efforts and acquisitions of research equipment. He is an active contributor to the American Chemical Society, and was recently elected Chair of the ACS Division of Computers in Chemistry.

### **Professor Emeritus Gerald Friedman's Contributions Acclaimed Kennard B Bork, *Earth Sciences History* 28, 158 – 160 (2009)**

"In the early 1980s Gerry Friedman and Ellis Yochelson promoted the idea of creating a journal focusing on the history of geology. It was to be the first of its kind, and is still the only one published in English. Michele Aldrich, Douglas Bassett, William Jordan, Walter Kupsch, and others supported the initiative. Friedman worked long and hard to launch the History of the Earth Sciences Society and-with the substantial involvement of his wife, Sue Tyler Friedman to produce and distribute the new journal *Earth Sciences History*. It should be noted that the Sue Tyler Friedman Medal, presented by the Geological Society of London for contributions to the study of the history of geology, acknowledges Sue's efforts on behalf of our discipline. I was enlisted to edit the first volume of *ESH*, in 1982, with the understanding that Gerry would shepherd the journal on its long-term journey. With continued re-election by the membership, Gerry served HESS and *ESH* as editor for a dozen years, building the journal into a recognized flagship for analyses relating to the evolution of the earth sciences."

"Above and beyond founding a society and editing a journal, the Friedman productivity in the history of geoscience is evident in Gerry's interest in the key role played by geologists of the Rensselaer School in

forming a major part of the original base of American geology. His celebration of the work of Stephen Van Rensselaer (1765-1839), Amos Eaton (1776-1842), James Hall (1811-1898), and Ebenezer Emmons (1799-1863) has added significantly to our understanding of American science in the nineteenth century.”

“A concise 'Appreciation' cannot list all of the awards and tributes gathered by Professor Friedman, but a few world-class recognitions should be mentioned. In addition to the HESS and GSA History of Geology Division plaudits noted above, Gerry has received the Hedberg Award in Energy from the Institute for the Study of Earth and Man (ISEM), the Sidney Powers Award of the American Association of Petroleum Geologists (AAPG), the Twenbofel Award of the Society for Sedimentary Geology (SEPM), and the Legendary Geoscientist Award from the American Geological Institute (AGI). The title of the latter award says it all.”

### **2009 Founders Award of Excellence**

The following students from the School of Science received the Founders Award of Excellence at the Honors Convocation held on Saturday, October 24, 2009.

Del Bene, Kevin	Mathematics
Devaraj, Anjan	Biology (BIAM)
Elton, Daniel C.	Applied Physics
Escriva, Robert	Computer Science
Fedan, Natasha	Biology
Goldfarb, Dennis	Computer Science
Lemanis, Robert	Geology
Li, Daniel	Biology
Liu, Jingle	Physics
Lu, Xiaofei	Physics
Norman, Zachariah	Chemistry
Ou, Ya	Physics
Paki, Joe	Physics
Patton, Evan	Computer Science
Pyzocha, Neena	Biology and Psychology
Sanchez, Oswaldo	Mathematics
Zonenberg, Andrew	Computer Science

### **Miriam Katz studies Global Climate Change**



**Mimi Katz**, Assistant Professor of Earth and Environmental Science, joins an international team of researchers this month in Bremen Germany for 4 to 5 weeks, working under the auspices of the Integrated Ocean Drilling Program (IODP). This expedition completes the sea level transect from land to sea that was initiated 15 years ago. Prof. Katz has been involved with both of the previous drilling expeditions of this transect, along with the onshore coastal plain drilling phases.

The science team’s goal is to study and interpret marine sediment cores drilled this past summer by IODP Expedition 313 - the New Jersey Shallow Shelf Expedition. These cores will reveal important information about sea-level history, Earth cycles that relate to sea-level change, the mechanisms that force it, and the impact on the geography of coastal regions over time.

“Researchers have drilled on the coastal plain and the continental slope to learn about sea level change from its highest to lowest levels over the last 35 million years,” says co-chief scientist Gregory Mountain of Rutgers University, Department of Earth and Planetary Sciences. “Access to the records in our current drill target will provide us with missing information that bridges those two sets of records. The new samples will enable us to determine time, rate, and magnitude of changes that have occurred over the last 35 million years and lead us to improve our understanding of coastal response to sea level rise, one aspect of climate change.”

You can view Prof. Mountain’s video detailing the expedition objectives at:

<http://uk.youtube.com/watch?v=7H52h1WJvwc&feature=channel>

The Integrated Ocean Drilling Program (IODP) is an international marine research program dedicated to advancing scientific understanding of Earth through drilling, coring, and monitoring the seafloor. <http://www.iodp-usio.org/>

## **RPI Students Win Security Competition and place Second in Capture the Flag**

RPISEC, an undergraduate Security Club at RPI (mainly CS, ECSYS students) participated in the annual NYU-Poly (worldwide security contest). Many are also members of RCOS (Rensselaer Open Source Software Center).

In the quiz part of the tournament, they came in first and second: <http://www.poly.edu/csaw-quiz>

The winners are:

**1<sup>st</sup> Place: Robert Escriva and Jay Smith, Rensselaer Polytechnic Institute**

**2<sup>nd</sup> Place: Adam Camella and Andrew Zonenberg, Rensselaer Polytechnic Institute**

**3<sup>rd</sup> Place: Sriram Lakshmanan, Georgia Tech and Eugene Vasserman, University of Minnesota**

In Capture the Flag part of the competition, they came in second: <http://www.poly.edu/csaw-CTF>

The winners are:

**1<sup>st</sup> Place: Team ppop** Brian Pak, Andrew Wesie, David Kohlbrenner, Tyler Nighswander  
Carnegie Mellon University

**2<sup>nd</sup> Place: Team RPISEC** Alexandru Radocea, Ryan Govostes, Adam Comella, Andrew Zonenberg  
**Rensselaer Polytechnic Institute**

**3<sup>rd</sup> Place: SecDaemons** Jonathan Tomek, Chris Long, Chris Lytle, Matthew Thomas  
DePaul University

## **14<sup>th</sup> ROBERT RESNICK LECTURE**

October 2, 2009

### **THE ULTIMATE LAWS OF NATURE DARK MATTER, SUPERSYMMETRY, THE LHC AND STRING THEORY**

**Gordon Kane, PhD**

Victor Weisskopf Collegiate Professor of Physics  
Director, Michigan Center for Theoretical Physics  
University of Michigan, Ann Arbor

The following day, Professor Resnick met with faculty and students from the Department of Physics.



## **THE HARTECK LECTURE SERIES IN PHYSICAL CHEMISTRY**

November 3, 2009

### **SPECTROSCOPIC METHODS IN BIOINORGANIC CHEMISTRY: BLUE TO GREEN TO RED COPPER SITES**

Edward I. Solomon '68, PhD, NAS  
Monroe E. Spaght Professor of Chemistry and SSRL Professor  
Stanford University

## **2010 Bonner Prize Recipient is an RPI BS Graduate**

Bob Wiringa '72, Senior Physicist in the Physics Division at Argonne National Laboratory, with his long time colleague Steve Pieper, Bob is awarded the 2010 T.W. Bonner Prize in Nuclear Physics. This is awarded by the American Physical Society, and is considered the highest honor in the field of Nuclear Physics. Bob and Steve developed a detailed model of complex nuclei based on microscopic interactions between nucleons, implemented through novel computing techniques they developed over many years. The actual citation reads "For development of quantitative, ab initio calculations of the properties of nuclei from  $A=6-12$ , including deep physical insight into the nature of nuclear forces and the application of state-of-the-art computational physics."

After graduating from RPI, Bob went to the University of Illinois for his PhD. He has been on the staff at Argonne since 1981. Here is his web page:

[http://www.phy.anl.gov/theory/staff/Wiringa\\_RB\\_1.html](http://www.phy.anl.gov/theory/staff/Wiringa_RB_1.html)

### **Faculty News and Notes**

Bolek Szymanski, Malik Magdon-Ismail and Lee Newberg won an NSF Eager Stimulus Grant for \$241,000 for biocomputing on volunteer platforms.

The CISCO Academy held a 3 day Network Security class for 42 instructors from 10 states in the Northeast in conjunction with the Center for System Security and Information Assurance (CSSIA) <http://www.cssia.org/>

The White House has confirmed the appointment of Jim Hendler as a member of the US Air Force Scientific Advisory Board - one of the highest advisory boards to the DoD.

The Association for Computing Machinery (ACM) and the IEEE Computer Society (IEEE-CS) has awarded the inaugural Ken Kennedy Award to Francine Berman, for her efforts to build a national cyberinfrastructure.

Bulent Yener has been awarded an NIH R01 grant with a team from U. Albany for \$453K for modeling saliva glands.

Jim Hendler and Sir Tim Berners Lee of MIT have been awarded a one year DARPA Jumpstart grant for \$310K.

## **HAPPY THANKSGIVING!**

*This newsletter is prepared monthly during the academic year and distributed to School of Science faculty, staff, students and alumni to highlight accomplishments and events within the school. Please submit news items for the next newsletter to Samuel Wait, Associate Dean of Science, at [waijsc@rpi.edu](mailto:waijsc@rpi.edu).*