Heather Shannon Palmeri received her Ph.D. in Mathematics in December 2012 as part of the RPI School of Science’s Accelerated B.S./Ph.D. program. She performed her graduate research with Professor Margaret Cheney.

Heather’s research was in 3D radar imaging. She developed a novel hybrid 3D radar imaging technique that jointly estimates both target shape and motion from radar data using range, range-rate, and phase. She also developed a mathematical proof justifying the use of this algorithm.

She developed an algorithm to eliminate the need for separating the signals that arise from each of the geometrically distinct scattering center locations on the target, known as scatterer correlation. She also developed a mathematical proof justifying the use of this algorithm.

During her graduate studies, Heather spent one summer at the Air Force Research Laboratory in Rome, NY and three summers at MIT Lincoln Laboratory in Lexington, MA.

Heather has accepted a position with MIT Lincoln Laboratory’s Airborne Radar Systems and Techniques group in Lexington, MA. She will be starting in January 2013.

Tegan Sturtz Webster received her Ph.D. in Mathematics in December 2012 as part of the School of Science Accelerated B.S./Ph.D. Program.

Tegan performed research under Professor Margaret Cheney on multistatic radar imaging of moving targets, developing and simulating scalar and vector radar data models and accompanying imaging operations. Her thesis compares and extends different derivations of the multistatic ambiguity function (MAF), a tool used to assess performance of the waveforms and geometry of a multistatic radar system jointly. She also develops a vector multistatic radar data model incorporating polarization and antenna effects from transmitters used to assess performance of the waveforms and geometry of a multistatic radar system jointly. She also develops a vector multistatic radar data model incorporating polarization and antenna effects from transmitters and receivers, derives two imaging operations that combine the data collected at each receiver, and utilizes the presented data model and imaging operations to simulate multiple antenna geometries and transmission schemes. Her work has appeared in four conference proceedings.
Tegan spent time working at MIT Lincoln Laboratory and the Radar Division of the Naval Research Laboratory during her graduate studies. She will continue to work at the Naval Research Laboratory after her graduation.

**FACULTY NEWS and NOTES**

**Rensselaer Awarded Prestigious Grant From Henry Luce Foundation To Establish a Clare Boothe Luce Assistant Professorship in Computer Science**

http://news.rpi.edu/update.do?artcenterkey=3108

Rensselaer Polytechnic Institute announced a five-year $499,000 grant from the Henry Luce Foundation to establish the Clare Boothe Luce Assistant Professorship in Computer Science. The initiative supports the Institute in advancing women in computer science and other STEM (science, technology, engineering, and mathematics).

**Isom Heron**, Professor of Mathematics, gave the invited 2012 Claude B. Dansby Colloquium Lecture in the Department of Mathematics at Morehouse College in Atlanta on October 25. The title of his talk was "76E: Hydrodynamic Stability Problems Old and New" in which he reported on research results by students, collaborators and myself over the last 15 years. The code 76E is the Mathematical Reviews Subject Classification, in which the research resides. The College is the alma mater of Dr. Martin Luther King, Jr. Prof. Claude Dansby was there during Dr. King's student days, as head of the Mathematics Department from 1924-1963. Prof. Dansby was well regarded as a teacher of the hundreds of students who enrolled in his classes. "He was giver and not a receiver", but in giving, he served as mentor to ten students who went on to attain the PhD degree in the years 1948-1970.

**Francine Berman** was one of the stars of NSF'S "CS Ed Week" - check her out on the NSF website at:
http://www.nsf.gov/cise/csbytes/newsletter/vol2/CSEdWeek.html and in the video linked below…

In case you missed it, the NSF CS Bits & Bytes team put together a video and related special edition for CS Ed Week. We highlighted everyone on this email based on interviews you’ve done in the past at NSF. We are using the video to help excite and engage more kids in our exciting field. Everything was released yesterday, and we've received some great feedback. Here are the links:

Video:

Special Edition of CS Bits & Bytes:

Press Release for CS Ed Week:

**Francine Berman** is Professor of Computer Science at Rensselaer Polytechnic Institute and previously served as Director of the San Diego Supercomputer Center (SDSC), where she led a staff of 250+
interdisciplinary scientists, engineers, and technologists. Dr. Berman has served on a broad spectrum of national and international leadership groups and committees, including the National Science Foundation's Computer and Information Science and Engineering Advisory Committee. For her accomplishments, leadership, and vision, Dr. Berman was recognized by the Library of Congress as a “Digital Preservation Pioneer” and by *BusinessWeek* and *Newsweek* as one of the top women in technology. For more information about Dr. Berman and her research, see her website (http://www.cs.rpi.edu/~bermaf/) and Digital Preservation Pioneer profile (http://www.digitalpreservation.gov/series/pioneers/berman.html).

K. V. Lakshmi, Assistant Professor at the Baruch ’60 Center for Biochemical Solar Energy Research and the Department of Chemistry and Chemical Biology, Chaired a Session at the Eastern Analytical Society Conference in Somerset, New Jersey.

Shawn-Yu Lin Named Fellow of the AAAS
Nano-photonics expert Shawn Yu-Lin, professor of physics at Rensselaer Polytechnic Institute and a member of the university’s Future Chips Constellation and Smart Lighting Engineering Research Center, has been selected as a fellow of the American Association for the Advancement of Science (AAAS). AAAS cites Lin for “pioneering and developing photonic crystals.” Lin is one of 702 newly selected fellows recognized for their scientifically or socially distinguished efforts to advance science or its applications.

Boleslaw Szymanski, Claire and Roland Schmitt Distinguished Professor of Computer Science, was elected a member of the Network Science Society

RESEARCH NEWS and NOTES

NeST article "Exploiting Friendship Relations for Efficient Routing in Mobile Social Networks", authored by former NeST student Eyuphan Bulut and Boleslaw Szymanski, Claire and Roland Schmitt Distinguished Professor of Computer Science and director of the Social and Cognitive Networks Academic Research Center, was selected as a featured article in the December issue of IEEE TPDS. The article is available for free to all readers at the journal's webpage.

NeST received $1.91mln for its 4th year of RPI activities in Social Cognitive Networks Academic Research Center of which academic lead is the NeST Director, Dr. Boleslaw Szymanski.

The following paper was accepted for publications by Physical Review E. “Phase Transition to Super-rotating Atmospheres in a Simple Planetary Model for a Non-Rotating Massive Planet - Exact Solution “ by Chjan C. Lim, Professor of Mathematical Sciences.

Abstract
A new energy-enstrophy model for the equilibrium statistical mechanics of Barotropic flow on a massive non-rotating sphere is introduced and solved exactly for phase transitions to rotating solid-body atmospheres when the kinetic energy level is high. Unlike the Kraichnan theory, which is a Gaussian model, we substitute a micro-canonical enstrophy constraint for the usual canonical one, a step which is based on sound physical principles. This yields a Spherical model with zero total circulation, microcanonical enstrophy constraint and canonical constraint on energy, leaving angular momentum free as is required for any model whose objective is to predict super-rotation in planetary atmospheres. Closed form solution of this Spherical model, obtained by the Kac-Berlin method of steepest descent, provides critical temperatures and amplitudes of the

3
symmetry-breaking rotating solid-body flows.

Their linear dependence on the relative enstrophy implies that this theory predicts super-rotation when the flow kinetic energy exceeds a critical value linear in the relative enstrophy, with proportionality constant derived from the spectrum of the Laplace-Beltrami operator on the sphere, as expected in an energy-enstrophy theory.

This model and its results differ from previous solvable models for related phenomena in the sense that it is not based on a mean field assumption.

**Gyorgy Korniss**, Professor of Physics, Applied Physics and Astronomy and NeST was awarded a two-year, $192,000 grant by NSF DMR/DMS for the project "Stochastic Synchronization and Coordination Problems in Complex Networks with Time Delays", and a four-year, $423,984 grant by the DARPA "GRAPHS" program for the project "Ensemble-Based Modeling of Large Graphs and Its Applications to Social Networks". The latter award is a multi-university collaborative project led by Notre Dame. The grants will support graduate students and postdocs on theoretical and data-driven modeling of complex networks.

**Michael Shur**

USC, RPI (Michael Shur), SET, Inc. team reported on new RF power limiters based on III-Nitride materials that have unprecedented high operating voltages, excellent temperature stability and radiation hardness. Fully planar and simple to fabricate, these limiters could be used in nearly any type of microwave integrated circuit.

**G.-C. Wang**, Professor of Physics, Applied Physics and Astronomy

Patent: "Nanocatalyst Pd-coated Ultrathin Mg Nanoblades for Hydrogen Storage", Fu Tang, Tom Parker, Toh-Ming Lu and G.-C. Wang,

US patent number 8,282,993 issued on 10/09/2012.

**Airborne Scientists Search Distant Stars for Complex Organic Molecules**

**Rensselaer-led Astrobiology Group Among First Granted Access to New Flying Observatory**

http://news.rpi.edu/update.do?artcenterkey=3115

A team of astrobiology researchers — including two from Rensselaer Polytechnic Institute — will use a series of nighttime flights on an airborne observatory to search newly born stars for the presence of precursors to life.

The scientists, led by **Douglas Whittet**, director of the New York Center for Astrobiology at Rensselaer, will use the observatory’s infrared absorption spectroscopy capabilities to search for a suite of molecules in clouds of dust surrounding five young stars. Their work is part of the first season, or cycle, of research to be performed aboard the Stratospheric Observatory for Infrared Astronomy (SOFIA), the largest airborne observatory in the world.

The work is a collaboration between Whittet and **Charles Poteet**, a post-doctoral research associate at Rensselaer, and researchers at SETI, the California Institute of Technology, Ithaca College, the NASA Ames Research Center, and Johns Hopkins University.
Bonding-induced thermal conductance enhancement at inorganic heterointerfaces using nanomolecular monolayers

Peter J. O'Brien, Sergei Shenogin, Jianxiun Liu, Philippe K. Chow, Danielle Laurencin, P. Hubert Mutin, Masashi Yamaguchi, Pawel Keblinski & Ganpati Ramanath
http://news.rpi.edu/update.do?artcenterkey=3110

AMERICAN GEOPHYSICAL UNION FALL 2012 MEETING
TO VIEW THE PRESENTATIONS, GO TO THE SITE BELOW, BROWSE PROGRAM, AND SEARCH FOR Rensselaer.


MONDAY, DECEMBER 03, 2012

IN11F-01. Science Data Platforms: Informatics Architectures at the Forefront. (Invited)
Peter A. Fox

V11C-2767. Th and U in hydrous rhyolite melts
Lingbo Xing; E B. Watson; Daniel M. Ruscitto

TUESDAY, DECEMBER 04, 2012

T21C-2576. Global variations in H2O/Ce: Slab surface temperatures beneath volcanic arcs
Lauren B. Cooper; Daniel M. Ruscitto; Terry Plank; Paul J. Wallace; Ellen M. Syracuse; Craig E. Manning

IN22A-07. Persistent Identification of Agents and Objects of Global Change
Curt Tilmes; Peter A. Fox; Anne Waple; Stephan Zednik

MR22A-07. Diffusion of highly charged cations in olivine (Invited)
Daniele J. Cherniak; E B. Watson; Yan Liang

IN23C-1531. Making MetPetDB a tool for reconnaissance studies of metamorphism and metamorphic rocks
Benjamin W. Hallett; Frank S. Spear; L. K. Horkley; Sibel Adali; Peter A. Fox

T23A-2634. CRUSTAL AND UPPER-MOST MANTLE STRUCTURE BENEATH WESTERN TIBET FROM SEISMIC TOMOGRAPHY USING REGIONAL EARTHQUAKES
Ayda Shokoohi Razi; Vadim L. Levin; Steven W. Roecker; Guo-chin Huang

V23D-2861. Investigating Records of Prograde Metamorphism in Quartz with TitaniQ Thermobarometry: Initial Results from the Northfield Mountains, Vermont
Patrick Dyess; Laura E. Webb; Frank S. Spear; Jay B. Thomas

WEDNESDAY, DECEMBER 05, 2012

IN34A-03. Next Generation Data Environments (Invited)
Deborah L. McGuinness

IN34A-004. Interoperability and different ways of knowing: How semantics can aid in cross-cultural understanding
Peter L. Pulsifer; Mark A. Parsons; Ruth E. Duerr; Peter A. Fox; Siri-Jodha S. Khalsa; James P. McCusker; Deborah L. McGuinness

THURSDAY, DECEMBER 06, 2012

ED41A-0666. NEON non-specialist use case; science data reuse in a classroom
Peter A. Fox; Brian Wee; Patrick West; James Wilson; Han Wang; Stephan Zednik

S41A-2383. The Crust and Upper Mantle Structure of Northeastern Iran from Joint Waveform Tomography Imaging of Body and Surface Waves
Ben Baker; Steven W. Roecker; Keith F. Priestley; Mohammad Tatar

OS43C-1848. Impact Ejecta above an Unconformity in Hudson River Sediments
Dallas H. Abbott; Nick Gogan; Dee Breger

ED44A-02. Facilitating Collaboration Through Linked Open Data
Thomas W. Narock; Eric A. Rozell; Erin M. Robinson

FRIDAY, DECEMBER 07, 2012

IN51A-1685. Semantically Enabling Knowledge Representation of Metamorphic Petrology Data
Patrick West; Peter A. Fox; Frank S. Spear; Sibel Adali; Cam Le Nguyen; Benjamin W. Hallett; L. K. Horkley

IN51A-1689. Enabling the Integrated Assessment of Large Marine Ecosystems: Informatics to the Forefront of Science-Based Decision Support
Massimo Di Stefano; Peter A. Fox; Stace E. Beaulieu; Andrew R. Maffei; Patrick West; Jonathan A. Hare

IN51C-1695. Community Science – The Next Frontier (Invited)
Deborah L. McGuinness

IN51C-1696. Creating a Linked Data Hub in the Geosciences
Thomas W. Narock; Eric A. Rozell; Erin M. Robinson

IN51C-1702. Exploring Sea Ice Composition Using Semantic Data Dictionaries and qb.js
James P. McCusker; Ruth E. Duerr; Siri-Jodha S. Khalsa; Peter L. Pulsifer; Mark A. Parsons; Peter A. Fox; Deborah L. McGuinness

IN51C-1703. Climate Change, Disaster and Sentiment Analysis over Social Media Mining
Jeongmin Lee; James P. McCusker; Deborah L. McGuinness

IN51C-1704. Modeling and Representing National Climate Assessment Information using Linked Data
Jin Guang Zheng; Curt Tilmes; Aaron Smith; Stephan Zednik; Peter A. Fox

IN51D-1712. Semantic Web Compatible Names and Descriptions for Organisms
Han Wang; Nathan Wilson; Deborah L. McGuinness
IN51D-1713. Applying Semantics in Dataset Summarization for Solar Data Ingest Pipelines  
James Michaelis; Deborah L. McGuinness; Stephan Zednik; Patrick West; Peter A. Fox

T51F-2674. Joint Inversion of Receiver Functions and Surface Wave Group Velocities from the MANAS data set to Determine Crustal Thickness Variations in the Tien Shan  
Amy Gilligan; Keith F. Priestley; Steven W. Roecker

V51B-2792. A Refined Model of Zircon Saturation in Crustal Magmas  
Patrick Boehnke; E B. Watson; Dustin Trail; Timothy M. Harrison; Axel K. Schmitt

Marc Downie; Eric Ameres; Peter A. Fox; Johannes Goebel; Alvaro Graves; James Hendler

IN53D. IN53D. Semantics and Cyberinfrastructures for Next Generation Science II  
Convener(s): Deborah McGuinness (RPI and McGuinness Associates), Deana Pennington (University of Texas at El Paso), Kit Macleod (James Hutton Institute) and Hassan Babaie (Georgia State Univ)

IN53D-06. Semantic Modeling of the Sea Ice Component of a Global Climate Model  
Siri Jodha S. Khalsa; Peter A. Fox; Mark A. Parsons

IN53D-07. Exploratory visualization of earth science data in a Semantic Web context  
Xiaogang Ma; Peter A. Fox

S53C-2525. Analysis of microseismic activity detected by the WIZARD array, Alpine Fault, New Zealand  
Jessica P. Feenstra; Steven W. Roecker; Clifford H. Thurber; Neal Lord; Grant O’Brien; Jeremy D. Pesicek; John Townend; Stephen C. Bannister

IN54A-02. Knowledge Networks and Science Data Ecosystems. (Invited)  
Peter A. Fox

T54B-05. Velocity structure of the NE Tibetan Plateau: P and S body wave tomographic model of the northeastern Tibetan Plateau and its margins with additional constraints from surface wave tomography  
Ceri Nunn; Steven W. Roecker; Frederik J. Tilmann; Keith F. Priestley; Ross Heyburn; James Mechie; Eric A. Sandvol; James F. Ni; Yongshun J. Chen; Wenjin Zhao

STUDENT NEWS and NOTES

Jessica Ziegler, a Senior in Professor K. V. Lakshmi’s laboratory at the Baruch ’60 Center for Biochemical Solar Energy Research and the Department of Chemistry and Chemical Biology receives the 2012 Eastern Analytical Society (EAS) Undergraduate Student Award at the EAS Awards Luncheon in Somerset, NJ. The award was presented by Professor Cecil Dybowski, President of the EAS. Jessica has previously received the New York Society for Applied spectroscopy Award and the Founder’s Award of Excellence, Schultz and Marsh Awards at Rensselaer.
Ruchira Chatterjee, a graduate student in Professor K. V. Lakshmi’s laboratory at the Baruch ’60 Center for Biochemical Solar Energy Research and the Department of Chemistry and Chemical Biology presented an Invited Lecture at the Eastern Analytical Society Conference in Somerset, NJ. Her presentation in the Frontiers of EPR Spectroscopy Session was titled, “Two-Dimensional $^1$H HYSCORE Spectroscopy of Biosynthetically Exchanged Sr$^{2+}$ Photosystem II.”

ALUMNI NEWS and NOTES

David Ferrucci is a Research Staff Member and leader of the Semantic Analysis and Integration Department at IBM’s T.J. Watson’s Research Center. He led the DeepQA project that developed the computer system capable of competing with champion players at the game of Jeopardy! His team of 25 researchers also focuses on developing technologies for discovering knowledge in natural language and leveraging those technologies in a variety of intelligent search, data analytics, and knowledge management solutions. Dr. Ferrucci and his team plan to apply DeepQA technologies to areas like medicine, government, and law to drive advances in computer supported intelligence and decision-making. He enjoys spending time with his wife and two daughters.

To learn more about Dr. Ferrucci and his research, see his group's website at: http://www-03.ibm.com/innovation/us/watson/research-team/index.html.
For more of Dr. Ferrucci’s interview at NSF, see: http://www.livescience.com/21394-jeopardy-winner-watsons-creator-on-life-as-a-scientist.html.

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 Emeritus of Science, at waitsc@rpi.edu