FACULTY NEWS and NOTES

K. V. Lakshmi, Assistant Professor of Chemistry and Chemical Biology and The Baruch ’60 Center, presented an invited lecture on “The Mechanism of Solar Water Oxidation: Pulsed Multi-Frequency Multi-Dimensional EPR Spectroscopy Studies of Photosystem II” at The Eastern Analytical Symposium (November 15-18, 2010) in Somerset, New Jersey. Dr. Lakshmi described the application of advanced two-dimensional hyperfine sublevel correlation spectroscopy and high-frequency electron nuclear double resonance spectroscopy to obtain direct ‘snapshots’ of the high-energy photochemical intermediates of the solar water oxidation reaction of the photosynthetic protein complex, photosystem II.

Dr. Lakshmi presented an Invited Lecture titled, “Solar Water Oxidation in Nature: A Model for the Design of Bio-Inspired Photovoltaic Devices” at The College of New Jersey (TCNJ) in November, 2010. The seminar was followed by a graduate recruitment meeting with the chemistry majors at TCNJ.

Lee Ligon, Assistant Professor of Biology, and two graduate students in her lab, Maria Apostolopoulou and Vimla Singh, attended the 2010 American Society for Cell Biology meeting in Philadelphia where they presented three posters:

An Atypical Cadherin, Cadherin-23, Localizes to Both Homotypic and Heterotypic Cell-Cell Contacts. M. Apostolopoulou, L. Ligon;

Tubulin Post-Translational Modifications Do Not Completely Correlate with Microtubule Stability. V. Singh, P. Mattingly, R. Persaud, G. Quinones, L. Ligon; and

The Transition from 2D to 3D Polarity in Epithelial Cells Involves Microtubule Reorganization and a Switch in the Post-Translational Modification of Tubulin from Detyrosination to Acetylation. G. Quinones, B. Danowski, A. Devaraj, V. Singh, L. Ligon.

Gwo-Ching Wang, Professor of Physics, Applied Physics and Astronomy gave an invited talk at the fall MRS meeting held in Boston. The title of the talk is, “RHEED Pole Figure Measurements of Biaxial Thin Film Growth Front Evolution”. The authors are: Gwo-Ching Wang, Yu Liu, Churamani Gaire, Wen Yuan, Toh-Ming Lu and Fu Tang (ASU).
RESEARCH NEWS and NOTES

Joanne Luciano Joins Web Science Research Group

Joanne Sylvia Luciano has joined Rensselaer Polytechnic Institute as research associate professor in the Tetherless World Research Constellation. Luciano's research uses computational modeling and the World Wide Web to improve health care and advance medical discovery.

Luciano is an experienced technology consultant to major hospitals and biotechnology and pharmaceutical companies. In addition to her nearly 30 years as a consultant, she held a joint appointment with Harvard Medical School and Massachusetts General Hospital for nine years, where she served as a lecturer and research scientist using computational modeling to study human disease.

She joins an interdisciplinary research team within the Tetherless World Research Constellation at Rensselaer, dedicated to advancing science and society through understanding and utilization of the World Wide Web.

For more details see: http://news.rpi.edu:80/update.do?artcenterkey=2796&setappvar=page(1)

New Application Allows Scientists Easy Access To Important Government Data

Computer Scientists at Rensselaer Polytechnic Institute Work With Elsevier To Enhance Scientific Research via the World Wide Web

Government agencies around the world make billions of bits of raw data available to the public each day, but this data is often in difficult formats or so widely spread around the Web it is virtually unusable to the public and scientists who seek to use this valuable information in their research.

Computer scientists within the Tetherless World Research Constellation at Rensselaer Polytechnic Institute have developed an application to help solve the problem. A collaboration with scientific publisher Elsevier, the application utilizes the U.S. government data warehouse, Data.gov, to provide scientists with easy and direct access to government data sets relevant to their research.

For more information on the Tetherless World Research Constellation work with Data.gov, go to http://data-gov.tw.rpi.edu/wiki.

Demonstrations of Data.gov applications and searches developed by the research group can be found at http://data-gov.tw.rpi.edu/wiki/Demos.

A news release announcing the Data.gov collaboration can be found at http://news.rpi.edu/update.do?artcenterkey=2791&setappvar=page(1).
Multiple oral and poster presentations were presented by RPI researchers at the 12th Annual Upstate New York NMR Symposium held at SUNY Albany on November 29th. The presentations covered recent achievements being made by the Kempf, Wang, and McCallum/Cramer groups and were considered among the highlights of the event by many in attendance. Chunyu Wang, Assistant Professor of Biology was one of the organizers.

**Session I: Protein Folding and Dynamics**

*Zhenming Du*, Research Associate, Center for Biotechnology and Interdisciplinary Studies
*Coupled pK\textsubscript{a} Shift between Conserved Cysteine and Aspartate Plays Key Role in Protein Splicing*

*Jim Kempf*, Assistant Professor, Chemistry and Chemical Biology
*Steady State and POWER-NMR-Based Quadrupolar Stark Spectroscopy: New Tools for Electrostatics Characterization*

**Session II: Protein Structure and Function**

*Wen Chen*, Graduate Student of Biology
*Structural Basis of Alzheimer's Causing Mutation within Transmembrane Domain of Amyloid Precursor Protein*

*Scott McCallum*, Director, NMR Core, Center for Biotechnology and Interdisciplinary Studies
*Revealing the structural basis for selectivity in multi-modal chromatographic separations of proteins*

http://web.me.com/chunyuwang/upstateNMR/Welcome.html

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**Novel correlation of Schottky constants with lattice energies for II-VI and I-VII compounds**

Heribert Wiedemeier, Professor Emeritus of Chemistry and Chemical Biology

**ABSTRACT**

Correlations of computed Schottky constants ($K_s = [V^\text{zn}][V^\text{z}]$) with structural and thermodynamic properties showed linear dependences of log $K_s$ on the lattice energies for the Zn-, Cd-, Hg-, Mg-, and Sr-chalcogenides and for the Na- and K-halides. These findings suggest a basic relation between the Schottky constants and the lattice energies for these families of compounds from different parts of the Periodic Table, namely, $\Delta H^\circ_{T,L} = -(2.303 \cdot n \cdot R \cdot T \cdot \log K_s) + 2.303 \cdot n \cdot R \cdot m_b + 2.303 \cdot n \cdot R \cdot T \cdot i_b$.

$\Delta H^\circ_{T,L}$ is the experimental (Born-Haber) lattice energy (enthalpy), $n$ is a constant approximately equal to the formal valence (charge) of the material, $m_b$ and $i_b$ are the slope and, intercept, respectively, of the intercept b (of the Log $K_s$ versus $\Delta H^\circ_L$ linear relation) versus the reciprocal temperature. The results of this work also provide an empirical correlation between the Gibbs free energy of vacancy formation and the lattice energy.

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STUDENT NEWS and NOTES

ExxonMobil Bernard Harris Summer Camp in Astrobiology

The Astrobiology Summer Science Camp, led by Douglas CB Whittet, Professor of Physics, Applied Physics and Astronomy, and Director of the New York Center for Astrobiology, was a front-page news story on the NASA NAI site: http://astrobiology.nasa.gov/nai

November 15, 2010 / Posted by: Daniella Scalice

This summer, NAI’s team at Rensselaer Polytechnic Institute (RPI) hosted the ExxonMobil Bernard Harris Summer Science Camp in Astrobiology. The camp is a free, academic program of The Harris Foundation, named for Bernard A. Harris, MD, an accomplished NASA astronaut, physician, and entrepreneur, and the first African American to walk in space.

The theme of this year’s camp, held from June 12-25th, was The Quest for Life, and 50 middle school students participated. During the two exciting weeks, students went on several field trips to Albany Pine Bush, Howe Caverns, Rocky Hill Dinosaur Park, and the American Museum of Natural History in New York City. Students also took many classes such as the Mars Student Imaging Project, and completed a Field Trip to the Moon. The main activity for the students was to propose a mission to search for life on either Mars, Europa, or Titan.

Madelyn May Wins Honorable Mention in Olympus Bioscapes

Madelyn May, a Biology undergraduate working with Chris Bjornsson, Director, Microscopy Core, Director, Cell & Molecular Core, Research Assistant Professor, Department of Biology, received an honorable mention in the Olympus Bioscapes competition for one of her confocal images. She will be attending a dinner honoring the winners that happens at the ASCB Meeting in December.

Melissa Clark Wins An American Chemical Society Student Leadership Award

The award letter states, “On behalf of the American Chemical Society's Committee on Education Task Force on Undergraduate Programming, I am delighted to inform you that you have been selected for the 2011 Student Leadership Award. This program recognizes emerging leaders in our ACS student chapter
network and helps them prepare for the leadership opportunities at volunteer organizations, such as ACS, and in their professional career. The committee recognizes your contributions and skills and believes that you have tremendous potential to be a successful leader.

The 2011 ACS Leadership Institute will be held at the Omni Hotel in Fort Worth, Texas on January 21 - 23, 2011. At the conference, you will be paired with a participant from your Local Section and attend the Local Section Track, participate in sessions with the Younger Chemist Committee members, and brainstorm with you fellow ACS student leaders. You will also have an opportunity to participate in a Leadership development course entitled "Engaging and Motivating Volunteers" from the ACS Leadership Development System.

Nancy Bakowski
Manager, Undergraduate Programs
American Chemical Society

Cuiping Zhao Was Awarded a Fellowship by the American Heart Association

Graduate student, Cuiping Zhao, was awarded a two-year pre-doctoral fellowship by the American Heart Association. She is a student of Doug Swank, Assistant Professor of Biology.

Joseph Paki, Undergraduate Student In The Department Of Physics, Applied Physics And Astronomy, Was Awarded The Richard Madey ‘43 Prize.

Joseph Paki, undergraduate student in the Department of Physics, Applied Physics and Astronomy, was awarded the Richard Madey ‘43 Prize. The prize awarded annually, recognizes outstanding scholarship and academic excellence in the study of Physics. Joe Paki was also recognized for maintaining a 4.0 grade point average.
The Madey Prize was presented at the Physics colloquium held on Wednesday, November 10, 2010. The speaker was Paul Chaikin, Professor, Center for Soft Matter Research and Physics, New York University, the title of his talk, “Self-Replication Without Life”. Paul Chaikin is Silver Professor of Physics at New York University and a member of the National Academy of Sciences. His research interests are very diverse from superconductors to packing M&M chocolates. Professor Chaikin was hosted by the SPS (Society of Physics Students) and Professor Sang-Kee Eah.

Ruchira Chatterjee Receives the Slezak Memorial Award and the Baruch ’60 Award of Excellence

Ruchira Chatterjee is a doctoral student in the Department of Chemistry and Chemical Biology at Rensselaer. She is developing structural methods to directly probe the light-driven water oxidation reaction in the photosynthetic protein complex, photosystem II. Her research on understanding the fundamental principles of solar water oxidation in nature could enable the design of a new generation of cost-effective and highly efficient devices for solar energy conversion. Her graduate research has earned Ruchira Chatterjee the prestigious Slezak Memorial Award in the Department of Chemistry and Chemical Biology in the School of Science. The Slezak award, established in memory of Stephen and Cecilia Slezak, is awarded for graduate research in Chemistry that serves the betterment of mankind through the application of science to the common purposes of life. Ruchira Chatterjee’s research embodies the spirit if the Slezak Memorial Award.

Ruchira Chatterjee has also received the highly competitive Baruch ’60 Award of Excellence at the 27th Eastern Regional Photosynthesis Conference at the Marine Biological Laboratory in Woods Hole, MA. She received the Baruch ’60 Award for her outstanding lecture at the conference titled, “A Tale of Two Quinones” which explores the enormous functional diversity of quinone cofactors in photosynthetic and respiratory proteins.

Ruchira joined Rensselaer as a doctoral student in 2007, after earning her Bachelor’s degree in Chemistry at St. Xavier's College (Calcutta, India) and a Master’s degree in Physical Chemistry at the University of Delhi (Delhi, India). In early 2008 she joined the research group of Professor K. V. Lakshmi in the Department of Chemistry and Chemical Biology. Ruchira Chatterjee’s graduate research is focused on developing advanced multi-dimensional multi-frequency pulsed EPR spectroscopy and solids NMR spectroscopy methods to disentangle the individual steps that lead to solar energy conversion by photosystem II. The solar water-splitting protein complex, photosystem II (PSII), catalyzes one of the
most energetically demanding reactions in Nature by using light energy to drive a catalyst capable of oxidizing water. Elucidating the water oxidation chemistry of photosystem II is of major importance in developing catalytic systems for solar fuels production. In addition to addressing important chemical problems related to energy conversion, Ruchira Chatterjee’s research also addresses the methodological void that exists in this field. Ruchira is exploiting the diverse potentials of NMR and EPR spectroscopy to interrogate the structure and dynamics of photochemical reaction intermediates. This approach brings new and otherwise unobtainable structural and functional insights to the problem. “Ruchira is a very bright and creative student in my laboratory. The discoveries that Ruchira is making in her graduate study will greatly impact the field of natural and artificial photosynthesis,” said Professor Lakshmi, who is Ruchira Chatterjee’s academic adviser. “It is indeed a privilege to collaborate with such a talented scientist.”

Programming Competition Results

CORRECTION: In the November 2010 issue, the person supplying the questions was mistakenly identified as Professor Heidi Newberg. It should have been Lee Newberg, Research Associate Professor in the Department of Computer Science.

STAFF NEWS and NOTES

We welcome Carol Trifaro to the School of Science as the Sr. Business Administrator for the Tetherless World Constellation, Earth & Environmental Sciences, and Computer Science. Carol has been with Rensselaer since 2003 and has worked in Earth & Environmental Sciences, Research Administration & Finance, and most recently in the Nanotechnology Center.

ALUMNI NEWS AND NOTES

Steve Sasson ’72, inventor of the digital camera, received National Medal of Technology and Innovation from President Barack Obama this week. There was a preceding Q&A with the public over the Internet with Steve, Marye Anne Fox, and Warren Washington (climate researcher). Steve mentions RPI & Professor Resnick in answer to the question "Who was your favorite science teacher?"


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