As of July 1, 2010, **Gwo-Ching Wang** stepped down from her role as Department Head in the Physics, Applied Physics and Astronomy Department to concentrate more fully on her research and **Xi-Cheng Zhang** is assuming the role of Acting Head of the department.

We would like to take this opportunity to publicly thank Gwo-Ching for all her hard work and accomplishments as Head of the department. She consistently did an excellent job. Under her leadership the department grew both in size and stature and is in an excellent position for a bright future. She was also successful in her own research, winning appointment as the Travelstead Institute Chair.

Xi-Cheng brings a long history of experience at Rensselaer to his new role as Acting Head. He joined Rensselaer in 1992 as an Associate Professor, coming from Columbia University. His PhD is from Brown University. Xi-Cheng was promoted to the rank of Full Professor in 1997, was named the Erik Jonsson '22 Distinguished Professor of Science in 2001, and became the Director of the Center for Terahertz Research in 2002. In recent years, he has also chaired various groups within NATO related to THz technology. He won the William H. Wiley 1866 Distinguished Faculty Award in 2009.

Xi-Cheng’s research focuses on THz optical sensing and imaging. His work with time-domain THz spectroscopy systems holds promise for diagnostics of materials such as semiconductors and biomolecules. His interest in THz wave imaging is a result of the availability of phase-sensitive spectroscopic images. These images are ideal for dry dielectric substances including paper, plastics, and ceramics. Xi-Cheng’s research centers on two-dimensional THz wave imaging through free-space electro-optic detection and on THz ray imaging for probing the dielectric properties of three-dimensional structures. He has published over 250 papers in refereed journals and proceedings, holds 20 US patents and 5 international patents, and has consistently received high levels of funding for his research.

**Vincent Meunier Appointed to the Kodosky Career Development Constellation Chair**

**Vincent Meunier** joined the Department of Physics, Applied Physics and Astronomy on August 1, 2010 as Kodosky career development constellation chair. Dr. Meunier received his PhD and BS in Physics from the University of Namur, Belgium, 1999 and 1996, respectively. He also received his MS degree in Chemistry of Interfacial and Mescoscopic Systems at the same university in 1998. He was a Postdoctoral Research Associate with Professor Bernholc, North Carolina State University, from January 2000 to March 2002 and a 2nd Postdoctoral Research Associate appointment with Dr. Robby Sumpter at Oak Ridge National
Laboratory, from April 2002 to January 2004. He was promoted to permanent R&D Associate in January 2004, R&D Staff in 2006 and then R&D Senior Staff since January 2010.

Dr. Meunier’s research areas are in computational physics of nanoscience and surface physics using Density Functional Theory (DFT). The research scope includes electron quantum transport,--simulation of scanning probe techniques, and energy storage materials-- theory of electrochemical supercapacitors. In addition, he also develops large-scale computational codes and algorithms in nanotransport. These are areas of special interest to RPI in which Dr. Meunier has excellent accomplishments.

Dr. Meunier works closely with not only theorists but also with renowned experimentalists. Professors Mildred Dresselhaus, Ward Plummer, Yury Gogotsi and many others worldwide. He has an impressive scholarly record for a scientist of his age group. He published over 100 papers including the most prestigious journals such as Science, Physical Review Letters, Physical Review B, Applied Physics Letters, Nanoletters, etc. He also gave 47 first authored invited talks including Material Research Society, American Chemical Society, and IEEE.

**Interrante Named Fellow of the American Chemical Society**

**Leonard Vincent Interrante**, Professor Emeritus of Chemistry and Chemical Biology, has been elected to the 2010 class of Fellows of the American Chemical Society. The 2010 ACS Fellows will be honored at a special ceremony during the ACS National Meeting in Boston on Monday, August 23, 2010.

**Lester A. Rubenfeld**

**Lester A. Rubenfeld**, Professor of Mathematical Sciences, passed away on July 18, 2010. Professor Rubenfeld graduated from Brooklyn Polytechnic Institute and received his PhD from the Courant Institute of Applied Mathematics. He was author of two textbooks and founder/director of the Center for Initiatives in Pre-College Education, RPI. He had been a member of the faculty of Rensselaer for 43 years. Lester was also past president of the Hebrew Academy of the Capital District.

**Curt Breneman**, Professor and Acting Department Head of Chemistry and Chemical Biology just found out that the recent ONR MURI proposal is to be funded! His group is a subcontractor (to the tune of about $1M) on an ONR MURI grant entitled "Rational Design of Advanced Polymeric Capacitor Films" that leverages the group’s experience in Nanomaterials Informatics with the experimental expertise at the other sites. UCONN is the prime site, with RPI, Penn State, Columbia and U of Akron as sub-sites. The overall grant is to be >$5M.

**Curt Breneman** is serving as 2010 Chair of the ACS Division of Computers in Chemistry (as well as Acting Head of the Department of Chemistry and Chemical Biology) and will be presenting a talk in the Skolnick Award Symposium at the August 2010 ACS Meeting in Boston. He is PI on two new grants (ONR – Nanocomposite Materials Informatics, and Lilly Pharmaceuticals – Prediction of drug metabolism outcomes) totaling over $1M.

**Jim Crivello**: Named “2010 ACS Fellow” at the Spring 2010 ACS Meeting in San Francisco. Also, his paper in the Journal of Polymer Science, Part A: Polymer Chemistry, January 2010 “Photoinitiated Cationic Polymerization with Triarylsulfonium Salts, J.V. Crivello and J.H.W. Lee. (first published in Vol 17, 1977, 977-999)" was recognized as one of the 20 Top Articles of All Time in that journal. Jim was also recognized by
the ACS Division of Polymer Chemistry with an Outstanding Achievement Award presented to Polymer Fellows at the San Francisco ACS Meeting, Mar. 24, 2010.

**Peter Dinolfo** won “Best Poster” award at the 2010 Gordon Research Conference in Inorganic Chemistry, and was an invited speaker at the 2009 Gordon Research Conference in Photosynthesis.

**K.V. Lakshmi:** A major paper of Dr. Lakshmi’s was recently accepted to the prestigious journal “Biochemistry” on the “Assembly of a Multisubunit Photosynthetic Membrane Protein Complex”. Dr. Lakshmi also recently won renewal of her major DOE grant.

**Lee Ligon**, Assistant Professor of Biology, has been notified that she has won a research scholar grant, entitled "The Role of Heterotypic Cell-Cell Adhesion in the Metastatic Cascade" from the American Cancer Society.


**Mark Wentland** has compounds from his labs in four separate Phase 2 clinical trials for 1) alcohol addiction, 2) binge eating, 3) cocaine addiction and 4) treatment of opioid-induced constipation.

**Ingrid Wilke**, Associate Professor of Physics, Applied Physics and Astronomy, received notification from NSF that she received an award to research the development of a "High power GaInAs photoconductive terahertz radiation" (together with Partha Dutta as co-PI). The project will run for three years (starting this July) and is funded with $360,000.

**Ingrid Wilke**, Associate Professor, Department of Physics, Applied Physics & Astronomy, presented an invited paper on “THz Emitter Development for THz Wave Applications in Biophotonics” at the XII International Conference on Laser Applications in Life Sciences 2010 (LALS-2010). The conference was held in Oulu (Finland) in June 2010. She presented another invited paper on “Review of THz Emission from Narrow Band Gap Semiconductors” at the Electronics Materials Conference in South Bend, Indiana in June 2010.

**Mohammed J. Zaki**, Professor of Computer Science, was awarded an 2010 HP Labs Innovation Research Award. (see [http://www.hpl.hp.com/open_innovation/irp/2010_results.html](http://www.hpl.hp.com/open_innovation/irp/2010_results.html))

The Defense Treat Reduction Agency will increase it’s funding of terahertz research on air photonics under the direction of Xi-Cheng Zhang, Professor and Acting Head of Physics, Applied Physics and Astronomy, from $450K to $750K.

Nature has a research highlight about the work being conducted by Xi-Cheng Zhang's group in the Center for Terahertz Research, "detection from a distance", [http://www.nature.com/nature/journal/v466/n7305/pdf/466416c.pdf](http://www.nature.com/nature/journal/v466/n7305/pdf/466416c.pdf).

Nature Photonics selected a paper by Xi-Cheng Zhang's group in the Center for Terahertz Research on THz air photonics as the hottest topic in the September issue. In addition, the reporters and crew members from Reuters TV in New York City interviewed the group and filmed a video for Reuters TV in our THz lab. There are 70 to 80 media stories covered the work, including Nature, Science, Washington Post, BBC, ABC, Reuter, US News, etc.
Rensselaer Polytechnic Institute Researchers Develop Ultra-Simple Method for Creating Nanoscale Gold Coatings

*Study Details New Process for Creating Monolayers of Gold Nanoparticles; Holds Promise for New Nanoelectronics Applications*

**Sang-Kee Eah**, assistant professor in the Department of Physics, Applied Physics, and Astronomy at Rensselaer, and graduate student Matthew N. Martin infused liquid toluene — a common industrial solvent — with gold nanoparticles. The nanoparticles form a flat, closely packed layer of gold on the surface of the liquid where it meets air. By putting a droplet of this gold-infused liquid on a surface, and waiting for the toluene to evaporate, the researchers were able to successfully coat many different surfaces – including a 3-inch silicon wafer — with a monolayer of gold nanoparticles.

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Researchers at Rensselaer have developed a new, ultra-simple method for making layers of gold that measure only billionths of a meter thick. As seen in the research image, drops of gold-infused toluene applied to a surface evaporate within a few minutes and leave behind a uniform layer of nanoscale gold. The process requires no sophisticated equipment, works on nearly any surface, takes only 10 minutes, and could have important implications for nanoelectronics and semiconductor manufacturing.
“There has been tremendous progress in recent years in the chemical syntheses of colloidal nanoparticles. However, fabricating a monolayer film of nanoparticles that is spatially uniform at all length scales — from nanometers to millimeters — still proves to be quite a challenge,” Eah said. “We hope our new ultra-simple method for creating monolayers will inspire the imagination of other scientists and engineers for ever-widening applications of gold nanoparticles.”

Watch a video demonstration of this new fabrication process at: http://www.youtube.com/watch?v=nqkwM9o1s-w

Results of the study, titled “Charged gold nanoparticles in non-polar solvents: 10-min synthesis and 2-D self-assembly,” were published recently in the journal *Langmuir*. Read the journal paper at: http://dx.doi.org/10.1021/la100591h

Whereas other synthesis methods take several hours, this new method chemically synthesizes gold nanoparticles in only 10 minutes without the need for any post-synthesis cleaning, Eah said. In addition, gold nanoparticles created this way have the special property of being charged on non-polar solvents for 2-D self-assembly.

Previously, the 2-D self-assembly of gold nanoparticles in a toluene droplet was reported with excess ligands, which slows down and complicates the self-assembly process. This required the non-volatile excess ligands to be removed in a vacuum. In contrast, Eah’s new method ensures that gold nanoparticles float to the surface of the toluene droplet in less than one second, without the need for a vacuum. It then takes only a few minutes for the toluene droplet to evaporate and leave behind the gold monolayer.

“The extension of this droplet 2-D self-assembly method to other kinds of nanoparticles, such as magnetic and semiconducting particles, is challenging but holds much potential,” Eah said. “Monolayer films of magnetic nanoparticles, for instance, are important for magnetic data storage applications. Our new method may be able to help inform new and exciting applications.”

Co-authors on the paper are former Rensselaer undergraduate researchers James I. Basham ’07, who is now a graduate student at Pennsylvania State University, and Paul Chando ’09, who will begin graduate study in the fall at the City College of New York.

The research project was supported by Rensselaer, the Rensselaer Summer Undergraduate Research Program, the National Science Foundation (NSF) Research Experiences for Undergraduates, and the NSF’s East Asia and Pacific Summer Institutes and Japan Society for the Promotion of Science.

For more information, visit Eah’s website at: http://www.rpi.edu/~eahs.

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http://news.rpi.edu/update.do?artcenterkey=2739
Darrin Fresh Water Institute Outreach Program

Below is a photo of an outreach group who came to learn about what is done at the DFWI and to get a tour of the facilities. The group was from Faith Temple in Newburgh New York. David Diehl DFWI site manager is in photo with group.

![Photo of Outreach Group](image)

STUDENT NEWS and NOTES

**Adam Metzler**, was the recipient of the Best Student Paper Award in Underwater Acoustics-First Prize for the 159th Meeting of the Acoustical Society of America, held in Baltimore, Maryland. The paper, entitled “Improving the Parabolic Equation solution for Problems Involving Poro-elastic Media” was co-authored by Adam M. Metzler, William L. Siegmann (Rensselaer Polytechnic Institute), Ralph N. Baer (Naval Research Laboratory, Washington D. C.) and Jon M. Collis (Colorado School of Mines, Golden CO). Metzler is a graduate student with **William Siegmann**, Professor of Mathematical Sciences and Associate Dean for Graduate Education and Research in the School of Science.

**Mohammed Al Hasan**, a student of Mohammed J. Zaki, Professor of Computer Science, has been named the winner of the 2010 ACM SIGKDD Doctoral Dissertation Award. (see [http://www.kdd.org/kdd2010/awards.shtml](http://www.kdd.org/kdd2010/awards.shtml))
Graduate student Matthew N. Martin of the Department of Physics, Applied Physics, and Astronomy was recently awarded a postdoctoral fellowship at the National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland. The post-doctoral work will extend Matthew’s graduate research on chemical synthesis and 2D self-assembly of gold nanoparticles performed in Assistant Professor Sang-Kee Eah’s laboratory at RPI. He was also a NSF/JSPS EAPSI fellow and worked in Professor Toshiharu Teranishi’s laboratory in Tsukuba, Japan, for 10 weeks in the summer of 2009.

The post-doctoral fellowship is a joint project between NIST and the Institute for Research in Electronics and Applied Physics at the University of Maryland, College Park with funding from the American Recovery and Reinvestment Act. For more information, visit http://www.nistfellows.umd.edu/.

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