THIRD GRADUATE OF THE ACCELERATED BS/PhD PROGRAM

Jeffrey George Martin was the third person to receive a PhD from the School of Science’s Accelerated BS/PhD Program. During his undergraduate years, Jeff received one of the very prestigious Barry M. Goldwater Scholarships. Jeff performed his graduate research with Robert Linhardt, Ann and John Broadbent, Jr. ’59 Senior Constellation Professor of Biocatalysis and Metabolic Engineering and Professor of Chemistry and Chemical Biology, Biology, and Chemical and Biological Engineering, and Jonathan Dordick, Howard P. Isermann Professor, Director of the Center for Biotechnology & Interdisciplinary Studies, Professor of Chemical and Biological Engineering and Biology.

During his research he constructed a prototype artificial Golgi organelle through the use of digital microfluidics, recombinant enzymes, computer automation, and magnetic nanoparticle technologies. Experiments were performed using the artificial Golgi to demonstrate the ability of the device to enzymatically redesign immobilized glycans. Fluorescence based protein binding studies were performed on these immobilized glycan products to determine their bioactivity. His dissertation was titled “Creation of an Artificial Golgi Organelle: Glycosaminoglycans in Microfluidics.”

Jeff has accepted a postdoctoral position within the Analytical Sciences department at Novartis Institutes for BioMedical Research in Cambridge, MA and will be starting the position in January 2011.

FACULTY NEWS and NOTES

Francine Berman, Vice President for Research and Professor of Computer Science has been named a fellow of the Institute of electrical and Electronics Engineers (IEEE).

Henry L. Ehrlich, Professor Emeritus of Biology, received a certificate “In recognition of Distinguished Service as an Editorial Board Member of Applied and Environmental Microbiology” from the American Society of Microbiology.
Joanne 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.

Her arrival at RPI was picked up by the ACM and ISCB:
ISCB highlighted on front page: http://www.iscb.org/ right side - with link to:
And Genome Web: http://www.genomeweb.com/informatics/people-news-78

James Moore, Professor of Chemistry, gave an invited lecture entitled "Soluble Polyaramide Analogs" at the Symposium on Advanced Materials, University of California, Santa Barbara, January 7-8, 2011.

Bolek Szymanski, Claire and Roland Schmitt Distinguished Professor of Computer Science, and his team have learned that their $500,000 per year ITA grant funded by the US and UK has been extended for another five years to 2016.

On November 22 and 23 Bolek Szymanski briefed the Undersecretary of the Army and the Vice Chief of Staff of the Army on the research of the SCNARC center.

Christian Wetzel has been granted promotion to Professor in the Department of Physics, Applied Physics and Astronomy. He joined Rensselaer in March of 2004 as Future Chips Constellation Professor and Associate Professor of Physics. The Constellation comprises three chaired faculty who develop new concepts for light emitting devices and optoelectronics. Wetzel's research centers on the electronic band and defect structure of wide band gap semiconductor materials and devices by means of optical spectroscopy under external perturbation. Since 1993, he has focused on group-III nitrides with major contributions in the identification of the residual donor in GaN as oxygen and its DX-type behavior. In the group of Prof. Akasaki, he studied the processes of light emission in GaInN quantum wells. He demonstrated the dominance of piezoelectric polarization in the band structure and the light emission processes. At RPI he implements the concepts of piezoelectric bandstructure control to realize new concepts of high efficiency light emitting devices and solar cells. Current emphasis lies on high brightness light emitting diodes emitting in the 520 – 560 nm green spectral region. Dr. Wetzel’s work has been published in some 110 papers that received over 1500 citations.

RESEARCH NEWS and NOTES

Functionally Strain-Graded Nanoscoops for High Power Li-Ion Battery Anodes

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See the full paper at:
http://pubs.acs.org/doi/abs/10.1021/nl102981d
Abstract

Lithium-ion batteries show poor performance for high power applications involving ultrafast charging/discharging rates. Here we report a functionally strain-graded carbon–aluminum–silicon anode architecture that overcomes this drawback. It consists of an array of nanostructures each comprising an amorphous carbon nanorod with an intermediate layer of aluminum that is finally capped by a silicon nanoscoop on the very top. The gradation in strain arises from graded levels of volumetric expansion in these three materials on alloying with lithium. The introduction of aluminum as an intermediate layer enables the gradual transition of strain from carbon to silicon, thereby minimizing the mismatch at interfaces between differentially strained materials and enabling stable operation of the electrode under high-rate charge/discharge conditions. At an accelerated current density of ~51.2 A/g (i.e., charge/discharge rate of ~40C), the strain-graded carbon–aluminum–silicon nanoscoop anode provides average capacities of ~412 mAh/g with a power output of ~100 kW/kg electrode continuously over 100 charge/discharge cycles.


Green Car Congress: http://www.greencarcongress.com/


Times Union: http://www.timesunion.com/business/article/The-nanoscoop-on-battery-life-937390.php
Adam Metzler, is the first RPI student to win two Student Best Paper Award for his presentations. He also won an award at the previous meeting in Baltimore. There were 17 student papers in the Underwater Acoustics Technical Committee sections at Cancun. Adam is a student of William Siegmann, Associate Dean of Science for Graduate Education and Research and Professor of Mathematics.

Abstract:
Parabolic equation solutions have recently been improved to increase accuracy for rangedependent problems involving sloping fluidsolid interfaces. One improvement is a formulation using a new set of variables that includes a term proportional to the normal stress at a horizontal interface [J. Acoust. Soc. Am. 127, 1962 (2010)]. These variables lead to horizontal interface conditions with only first order derivatives, which is valuable for implementing techniques such as energy conservation or single scattering that handle range dependence. This improvement is extended to problems that involve layered poroelastic media that occur in shallow water environments. An analogous formulation is derived for the field variables in a poroelastic layer. The horizontal interface conditions have similar characteristics as in the elastic case. Solutions are obtained for layered environments and are benchmarked to confirm accuracy. [Work supported by the ONR.]

STAFF NEWS and NOTES

A project led by Tetherless World staffer John Erickson is being featured on the front page of the US Data.gov Web site.

Pamela Murarka has recently joined the School of Science as Business Administrator. She moved from the School of Humanities, Arts, and Social Sciences to the School of Science and will be working in the Dean’s office. Pamela has been working at Rensselaer since 2001 as Financial Manager for Science & Technology Studies and the Economics departments. Pamela is also a graduate of the EMBA program at Rensselaer.

In the December 2010 Science Newsletter it should also have noted that Carol Trifaro also had worked in the Department of Biology.