DEPARTMENT OF BIOMEDICAL ENGINEERING UNIVERSITY OF ROCHESTER

GRADUATE PROGRAM NEWSLETTER SPRING 2009

RECENT STUDENT PUBLICATIONS

Lancianese, SL, Kwok, E, Beck, CA, Lerner, AL. 2008. *Predicting regional variations in trabecular bone mechanical properties within the human proximal tibia using MR imaging.* Bone 43: 1039-1046

Zhu, T., Liu, X., Gaugh, M., Connelly, P., Ni, H., Ekholm, S., Schifitto, G., Zhong, J., 2009. *Evaluation of measurement uncertainties in human DTI-derived parameters and optimization of clinical DTI protocols with a wild bootstrap analysis*. J. Magn. Reson. Imaging, 29:422-435.

Reynolds DG, Shaikh S, **Papuga MO,** Lerner AL, O'Keefe RJ, Schwarz EM, Awad HA. 2008. *Micro-CT-Based Measurement of Cortical Bone Graft-to-Host Union.* J Bone Miner Res. *Epub ahead of print*

Ehrenberg, M.S., Friedman, A.E., Finkelstein, J.N., Oberdorster, G., and McGrath, J.L. 2009, *The influence of protein adsorption on nanoparticle association with cultured endothelial cells*. Biomaterials 30, 603-610.

Gaborski, T.R., Clark, A., Jr., Waugh, R.E., and McGrath, J.L. (2008). *Membrane mobility of beta2 integrins and rolling associated adhesion molecules in resting neutrophils*. Biophys J 95, 4934-4947.

Mortensen, L.J., Oberdorster, G. Pentland, A.P, DeLouise, L.A. 2008 *In Vivo Skin Penetration of Quantum Dot Nanoparticles in the Murine Model: The Effect of UVR* Nano Letters 8: 2779-2787

Student Headlines

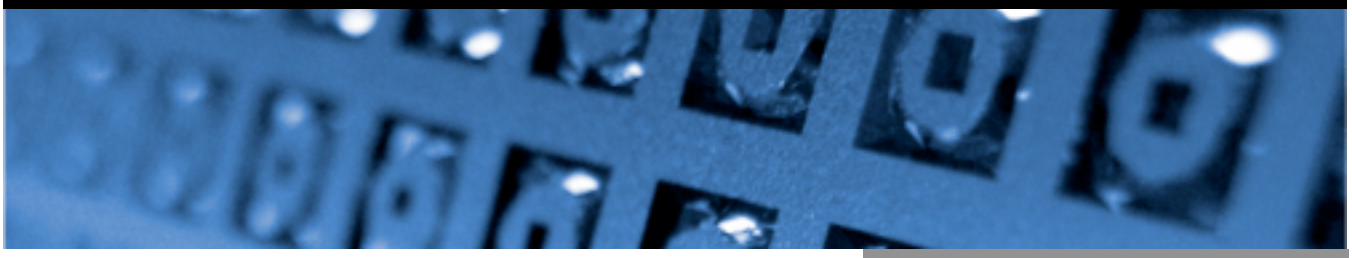
Tom Gaborski takes "lab-to-market" as VP of Life Sciences at SiMPore Inc.

Recent PhD graduate Tom Gaborski is realizing his dream of entrepreneurship as VP of Life Sciences at UR spinoff, SiMPore, Inc. Tom helped found SiMPore Inc. in 2007 while he was a graduate student in the PhD program. The company actually grew out of a chance experiment conducted by Tom and Chris Striemer, who was then a PhD candidate in Electrical and Computer Engineering. Chris had inadvertently made the world's thinnest nanoporous membrane while developing new materials for silicon-based lasers. Tom and Chris designed and conducted experiments to test if the nanoscale pores could be used to separate proteins of different sizes and charges and discovered that they did so very efficiently. The commercial potential of this discovery was immediately obvious to Tom. Along with their advisors, Chris and Tom founded SiMPore to commercialize the discovery. The company now employs 9 people and

started selling membranes in January of 2009. Sales have been steadily increasing as advertising efforts payoff and global interest in the material grows. Tom wears many hats in the small start-up but his primary job is to lead the company in its development of products for the biological sciences. Under Tom's leadership, devices for protein and DNA purification are already in the SiMPore product pipeline.

Candace Gildner wins Ruth Kirchstein award for MD/PhD Studies

Candace Gildner, a MD/PhD student in BME, has recently been awarded a Ruth L. Kirschstein National Research Service Award for Individual MD/PHD Fellows from the NIH. This prestigious, four-year award covers her PhD research as well as her remaining two years in medical school. Candace is investigating how chronic exposure to cigarette smoke affects extracellular matrix remodeling in the lung. Candace hopes to discover which factors regulate the deposition, conformation and physiologic properties of extracellular matrix fibronectin and determine if these factors are localized to lung tissue in response to cigarette smoke. Candace is currently in her fourth year as a PhD student in the Department of Biomedical Engineering, working under the direction of Dr. Denise C. Hocking.



Faculty and Program News

Stem Cell Funding

BME Graduate Faculty Drs. Hani Awad, Edward Puzas, and Edward Schwarz, and Xinping Zhang all members of the Center for Musculoskeletal Research at the University of Rochester Medical Center, have recently obtained funding from the New York state initiative for stem cell research. Projects will focus on understanding the molecular genetic characteristic of mesenchymal stem cells (MSCs), expanding MSCs in vitro and in vivo, developing methods to impregnate matrices with MSCs to tissue engineer bone and cartilage, labeling MSCs in vivo. Future efforts will also be focused on nanotechnologies, 3D printing of scaffolds, and cGMP production of MSCs for human use.

Benjamin Miller wins Award for Innovation

BME Graduate Faculty Dr. Benjamin Miller was honored as one of the recipients of the Rochester Business Journal's 2009 Health Care Achievement Awards. Dr. Miller has founded two local companies based on diagnostic biosensing technologies developed in his laboratory.

STUDENT AWARDS

TOM GABORSKI

Tom received special recognition from the BME department for his work as the primary instructor in BME201L in the fall of 2005 and 2006.

LISA BONNANO

Lisa Bonnano was awarded BME Graduate TA Award for outstanding contributions to BME230.

CANDACE GILDNER

Candace won an NIH Ruth Kirchstein Award in support of her MD/PhD studies (see front page).

ALUMNI NEWS

TONG ZHU

Tong is now a Research Assistant Professor in Imaging Sciences at the University of Rochester.

MILESTONES

PROPOSAL DEFENSES

Nathan Clark "Computational Microscopy Applied to Determine Spatial Distribution of Membrane-Associated Proteins in Cells"

Kelley Garvin "Promoting Angiogenesis within Three-Dimensional Engineered Tissue Using Ultrasound"

Vivek Khandwala "Developing Techniques for Quantifying the Therapeutic Efficacy of Deep Brain Stimulation"

Luke Mortensen "Analysis of Quantum Dot Skin Penetration in a Barrier Compromised In Vivo Model"

THESIS DEFENSES

Nichola Charles (PhD) "A Novel Method for Enriching CD34+ Hematopoietic Stem and Progenitor Cells from Adult Bone Marrow Using Immobilized Selectins"

Morton Ehrenberg (PhD) "The Physicochemical Basis of Nanoparticle Interactions with Cells: Application and Analysis"

Tom Gaborski (PhD) "Quantitative Methods for Understanding Physical Mechanisms of Neutrophil Adhesion"

Nathaniel Greene (MS) "Response Properties of Single Units in the Lateral Superior Olive of the Decerebrate Cat"

Matthew Heckman (PhD) "The Circadian Clock and Nr2f2 (COUP-TF) Regulation of Adipogenesis"

David Reynolds (PhD) "Structural and Mechanical Analysis of a Mouse Model of Massive Bone Allografts, and the Effect of Systemic Anabolic Parathyroid Hormone Therapy for Graft Healing"

Jaimee Reynolds (PhD) "The Effect of Inertia on Horizontal Reflexive Head Movements"

Zhao Wang (PhD) "Multiwavelength Reflectance Confocal Microscopy for Immune Cell Identification"

Tong Zhu (PhD) "Towards Optimal Human Diffusion Tensor Imaging (DTI) Protocols with Wild Bootstrap Analysis"