

INSIDE:

- PARTNERS' NEWS
- BRAZILIAN CONNECTION
- NEW RECORD FOR GRANT SUBMISSIONS
- BIOMET HAPPENINGS



Center for Biomedical Engineering and Technology - University of Maryland School of Medicine
in conjunction with the Fischell Department of Bioengineering, School of Engineering, University of Maryland, College Park

Fischell Festival

As a partner with the Fischell Department of Bioengineering, BioMET is committed to supporting department initiatives and participating in as many activities as appropriate. One of the biggest events for the Fischell Department is its annual Fischell Festival that features talks, posters and a career fair/exhibitors expo. Since BioMET is a new partner and as of yet not very well known, it was decided that the exhibitors expo would be a great way to introduce ourselves to the Fischell Department community and especially the students.

Since BioMET has not had a table at any venue before, much work was required to present the BioMET story and highlight the work that goes on at the Center. When BioMET was part of UMBI, marketing materials were produced by the central administration. Since the move to the University of Maryland, new materials have not been developed. The first order of business then was to create a brochure that would describe the center, its mission, its capabilities, the expertise and resources available, and its contact information. Pamela Wright, *BioMET Now's* editor and designer, pulled together images and text to create a new look for the Center, using the new UMB color palette and font choices.

In addition, the imaging capabilities and range of research

CONTINUED PAGE 3



Assistant Director Brian Hockenberry at the BioMET Table.

BIOMET SCIENTIFIC PROGRAMS

LABORATORY OF
MOLECULAR CARDIOLOGY

LABORATORY OF
NANOBIOLOGY

LABORATORY FOR
NEURODEGENERATIVE DISEASES

LABORATORY FOR
PRION DISEASES

PROGRAM IN
CANCER BIOLOGY

PROGRAM IN
CELL STRUCTURE AND
DEVELOPMENT

PROGRAM IN
MITOCHONDRIAL DYNAMICS

Sticking to Business

September 9th's issue of *Science Magazine* was a real treat for BioMET Acting Director Dr. W. Jonathan Lederer, his postdoctoral fellow, Dr. Benjamin Prosser, and School of Nursing Associate Professor Chris Ward. Their long awaited publication on the effect of cellular stretch on heart function finally went to press. The article was also highlighted in the research section of the magazine. Their work links calcium signaling with cellular contraction, investigating how a chemical signal can initiate and control a mechanical function. Through the development of a new technique to control cellular stretch, their work showed that a heretofore unknown pathway involving reactive oxygen species was triggered and linked the calcium signal to the contractile mechanism. The work also looked at the disconnect in this pathway involved in muscular dystrophy. The work also included the development of a bioglue, trade marked as MyoTak (see *BioMET Now*,

CONTINUED PAGE 4



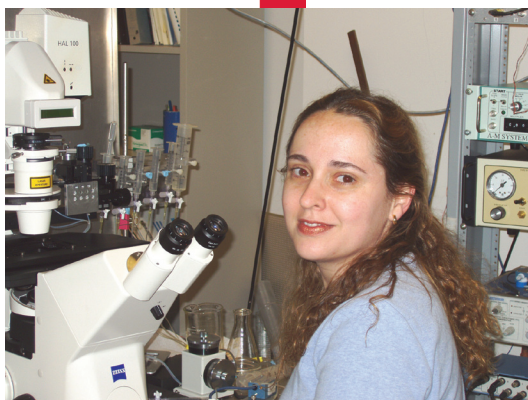
UNIVERSITY of MARYLAND
SCHOOL OF MEDICINE



The annual State of the School of Medicine address was given on September 27 by SOM Dean E. Albert Reece, MD, PhD, MBA, vice president for medical affairs, University of Maryland, and the John Z. and Akiko K. Bowers Distinguished Professor. Entitled "Leading Innovation and Discovery: Changing Lives Worldwide," Dean Reece noted among other high points that SOM research funding increased slightly and clinical revenues increased by 7%. SOM remains strong and well-regarded in both research and clinical areas. Given that BioMET faculty are all members of SOM, the solid performance of the school in difficult times helps to bolster their own chances for success as they endeavor to fund their laboratories.

The annual BioMET Retreat generally includes presentations from one or more faculty from The Fischell Department of Bioengineering. BioMET keeps track of these Retreat Alumni and is always pleased to highlight their latest accomplishments. In September, 2010 Retreat speaker, Dr. Bruce Yu's work was highlighted (http://www.bioe.umd.edu/news/news_story.php?id=6022). He has received an NSF grant to develop a multicolor MRI. In October, another 2010 Retreat speaker, Dr. John Fisher was in the news (http://www.bioe.umd.edu/news/news_story.php?id=6058) as the lead investigator of an NIH funded project for the development of bone regeneration technology. Congratulations to both colleagues.

Brazilian Connection



Former Assistant Professor Dr. Silvia Guatimosim (left) and Acting BioMET Director Dr. W. Jonathan Lederer have teamed up to receive a Fogarty International Research Collaboration Basic Biomedical (FIRCA-BB) Research Award. The award "facilitates collaborative basic biomedical research between scientists supported by the National Institutes of Health (NIH) and investigators in low- to middle-income countries (LMIC)." Drs. Guatimosim and Lederer proposed to develop new capabilities for cardiac research in Brazil, including an advanced real-time imaging facility. While most of the research will be conducted in Brazil, Dr. Lederer will train Dr. Guatimosim and her people in new imaging techniques and help to organize the new facility in Brazil. The grant supports an ongoing collaboration, which began when Dr. Guatimosim became a postdoctoral fellow in Dr. Lederer's laboratory in 1999. She left in 2004 after having obtained the rank of Assistant Professor to take a faculty position at the Federal University of Minas Gerais, Brazil, her alma mater.

Pamela B. Wright
BioMET Editor

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at: <http://biomet.umaryland.edu>

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Congratulations

Janet Ugolino from the Hopkins Bloomberg School of Public Health laboratory successfully completed her postdoctoral fellowship entitled "Characterization of a Novel Mutant Atp13a2 Protein in a Mouse Model of Niemann-Pick Disease." The newly-graduated Janet will be doing her postdoctoral fellowship at the Hopkins Bloomberg School of Public Health.

FISCHELL FESTIVAL CONTINUED

topics of BioMET faculty needed to be highlighted. In order to do this, videos were collected from a number of projects and Mike Kelly, BioMET's IT manager, put them together into a presentation. The presentation can be found on the BioMET web page.

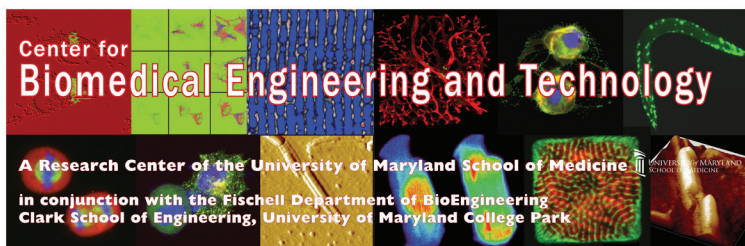
The final pieces needed to make a good impression at the Festival were a killer banner, using images from the amazing images collected from BioMET faculty members, and giveaways with BioMET's contact information on them. Pens and post-it notes were chosen to disseminate BioMET's web address.

The table was manned by BioMET Assistant Director Brian Hockenberry and Assistant to the Director Pamela Wright. Ms. Wright has an extensive science background herself and is familiar with all the on-going faculty research projects.

Most of the traffic at the table were students looking for internships, required for Fischell undergraduates. BioMET faculty have an extensive history in mentoring students at all levels, and the quality of Fischell students makes them much sought-after. Ms. Wright and Brian Hockenberry encouraged students to contact BioMET faculty directly.



Wright at the table.



Ms. Wright noted, "Fischell students would be a great addition to BioMET, and the biological expertise of our faculty would enhance the students' experimental experience. Brian and I will be discussing with our faculty how to foster this relationship. It is a win-win for all of us."

BioMET was also represented by Postdoctoral Fellow Dr. George S.B. Williams who presented his poster entitled "Calcium Leak and Calcium Sparks in Mammalian Heart: Insights from a Computational Model." Drs. W. Jonathan Lederer and Joseph Kao also attended.

New Record for Grant Submissions

In the current uncertain and parsimonious funding climate, BioMET faculty are well aware of the necessity of submitting proposals as often as possible. However, the last two months have seen an unprecedented number of submissions in such a short time. BioMET faculty submitted 10 proposals, from 5 different faculty members and one postdoctoral fellow. Dr. Mervyn Monteiro submitted 4 proposals himself, including a new NSF proposal, an NIH Pioneer Award, a proposal to the American Health Assistance Foundation and a resubmission to NIH. Dr. Ilia Baskakov submitted one competing renewal and one resubmission to NIH, and the rest of the submissions were from Dr. Shengyun Fang (new NIH R21), Dr. Bruce Vogel (NSF Competing Renewal), Dr. Mariusz Karbowski (new NIH R01) and postdoctoral fellow Dr. Benjamin Prosser (new NIH K99). While technically resubmissions and competing renewals are not due until November 7, faculty have to have them routing at least a week before, so routing started in October.

NIH funding levels remain at all time lows, with many study sections barely funding 10% of submissions. The budget impasse in Congress is likely to continue, given the philosophical differences between the administration and the House of Representatives in regard to spending. Despite the difficult climate, BioMET scientists are still publishing significant research results in areas of great interest to the public health.

ns!

Dr. Mervyn Monteiro's
y defended her thesis
tion of Wild Type and
ns Linked to Parkinson's
minted Dr. Ugolino will
toral work at the Johns
hool of Public Health.

BIOMET HAPPENINGS

Honors

Dr. Ilia Baskakov joined the Editorial Board of PLoS One.

Comings and Goings

Laura Dosanjh has left Dr. Mervyn Monteiro's laboratory. Guihong Peng has left Dr. Mariusz Karbowski's laboratory.

Publications

Gonzalez-Montalban N, Makarava N, Savtchenko R, **Baskakov IV**. Relationship between conformational stability and amplification efficiency of prions. *Biochemistry*. 2011 Sep 20;50(37):7933-40.

Chikando AC, Kettlewell S, Williams GS, Smith G, **Lederer WJ**. Ca^{2+} dynamics in the mitochondria - state of the art. *J Mol Cell Cardiol*. 2011 Nov;51(5):627-31.

Prosser BL, Ward CW, **Lederer WJ**. X-ROS signaling: rapid mechano-chemo transduction in heart. *Science*. 2011 Sep 9;333(6048):1440-5.

Williams GS, Chikando AC, Tuan HT, Sobie EA, **Lederer WJ**, Jafri MS. Dynamics of calcium sparks and calcium leak in the heart. *Biophys J*. 2011 Sep 21;101(6):1287-96. Epub 2011 Sep 20.

Ayrolles-Torro A, Imberdis T, Torrent J, Toupet K, **Baskakov IV**, Poncet-Montange G, Grégoire C, Roquet-Baneres F, Lehmann S, Rognan D, Pugnière M, Verdier JM, Perrier V. Oligomeric-Induced Activity by Thienyl Pyrimidine Compounds Traps Prion Infectivity. *J Neurosci*. 2011 Oct 19;31(42):14882-14892.

Zhong Y, Wang Y, Yang H, Ballar P, Lee JG, Ye Y, **Monteiro MJ**, **Fang S**. Importin beta interacts with the endoplasmic reticulum-associated degradation machinery and promotes ubiquitination and degradation of mutant alpha1-antitrypsin. *J Biol Chem*. 2011 Sep 30;286(39):33921-30.

Burks SR, Legenzov EA, Rosen GM, **Kao JP**. Clearance and biodistribution of liposomally encapsulated nitroxides: a model for targeted delivery of electron paramagnetic resonance imaging probes to tumors. *Drug Metab Dispos*. 2011 Oct;39(10):1961-6.

Ugolino J, **Fang S**, Kubisch C, **Monteiro MJ**. Mutant Atp13a2 proteins involved in parkinsonism are degraded by ER-associated degradation and sensitize cells to ER-stress induced cell death. *Hum Mol Genet*. 2011 Sep 15;20(18):3565-77.

Grants and Contracts

Dr. Mariusz Karbowski, 9/1/2011, NIH-NIGMS, "The Role of Mitochondria-associated RING finger Proteins in Mitochondria Quality," \$ 270,000 yr 4 of 5.

Dr. W. Jonathan Lederer, 10/1/2011, Georg-August University (European Commission), "Identification and therapeutic targeting of common arrhythmia trigger mechanisms," \$ 139,671, yr 3 of 5.

Dr. W. Jonathan Lederer, 10/1/2011, Leducq Foundation, Leducq European-North American Atrial Fibrillation Research Alliance," \$119,490, Yr 5 of 5.

Talks and Travels




Dr. Mariusz Karbowski, Invited talk, "Role of AAA-ATPase, p97 in regulation of the outer mitochondrial membrane protein turnover," 8th Conference on Mitochondrial Physiology; Bordeaux, France, September 5, 2011.

Dr. Mariusz Karbowski, session speaker, "Regulation of outer mitochondrial membrane protein turnover and mitochondria-specific autophagy by ubiquitin/proteasome system and AAA-ATPase, p97,"

STICKING, CONTINUED

Vol. 14, No. 4). The bioglue, as well as the stretch apparatus are being marketed, as shown by the flyer below. The UM website also featured the work at <http://www.oea.umaryland.edu/communications/news/?ViewStatus=FullArticle&articleDetail=14255>.

Science Magazine is one of the top ranked journals in the world with an impact factor of 31.377, making it 15th overall as of 2010. The impact factor is a measure of how widely read and cited a journal's articles have been.



MyoTak is a specially-formulated biocompatible adhesive that permits the attachment of cells to surfaces that are smooth or otherwise difficult to adhere to. Developed and patented by researchers at the University of Maryland, MyoTak provides a bond strong enough to allow direct force measurements from single primary myocytes yet without damage to cell membranes (B. Prosser, C. Ward and W.J. Lederer, Science, 2011).

MyoTak will readily coat a variety of materials including carbon fibers (P. de Tombe, unpublished data) as well as small glass rods (B. Prosser, C. Ward and W.J. Lederer, Science 2011).

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Conference entitled, "Mitochondrial dynamics; from mechanism to disease" Sardinia, Italy, September 13, 2011.

Dr. Ilia Baskakov, Chair, Program Project Scientific Review, European Commission, Goettingen, Germany, September 14-16.

Dr. Mariusz Karbowski, seminar speaker, "Regulating Mitochondrial Outer Membrane Proteins by Ubiquitination and Proteasomal Degradation," The Center for Vascular and Inflammatory Diseases, University of Maryland School of Medicine, September 28, 2011.

Dr. Mariusz Karbowski, seminar speaker, "New players in an old game: the role of ubiquitin conjugation system in the maintenance of mitochondrial function," John Hopkins University Mitochondrial Interest Group, October 10, 2011.

Dr. Mariusz Karbowski, invited talk, "Regulating mitochondrial proteostasis by ubiquitination and proteasomal degradation," University of Maryland/John Hopkins University Mitochondrial Research Retreat, October 29, 2011.

Dr. W. J. Lederer, Session Speaker, "Stretch-dependent Ca^{2+} signaling in cardiac ventricular myocytes: X-ROS signaling and ROS transport," 17th International Biophysics Congress, Beijing, China, October 30-November 1, 2011.