

INSIDE:

- PARTNERS' NEWS
- INTERNSHIPS STATUS REPORT
- BIOMET HAPPENINGS
- X-ROS ON THE ROAD

Now BioMET

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

Mpowering the State

The Strategic Alliance (*BioMET Now* Vol. 14, No. 6) is moving forward on schedule. The first milestone was to develop a plan for implementation. The USM Board of Regents voted on March 1 to accept the plan entitled *University of Maryland: Mpowering the State*. It outlines areas of cooperation between the University of Maryland, Baltimore and the University of Maryland, College Park. An overview of the plan can be found at <http://www.usmd.edu/BORPortal/Materials/2012/FB/20120301/MPowerOverview.pdf>.

In short, the plan calls for a steering committee to oversee implementation of the vision. The committee will be appointed by and report to the two presidents. Nine initiatives have been outlined: 1) A New Academic Vision for the University of Maryland in Montgomery and Surrounding Counties; 2) University of Maryland Collaborative School of Public Health; 3) University of Maryland Ventures (UMV); 4) Bioengineering and the Health Sciences; 5) Center for Biomedical Informatics and Imaging - UMIACS Collaborative: applying advanced computer science to health-related information; 6) New Educational Offerings between UMCP and UMB; 7) Seed Grant Program; 8) Joint Appointments, Joint Grants Management, and Shared Library Resources; and 9) Strategic Communications Plan. Some of these are totally new ideas and some build on already successful programs, for instance the Seed Grant Program for collaborative research projects.

CONTINUED PAGE 3



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

Tenth Annual Retreat

The weather cooperated this year as BioMET got together for its tenth annual retreat at the Mount Washington Conference Center. The format for the retreat remained the same: representative talks from each laboratory interspersed with outside speakers. This format seems to still be working, allowing everyone to catch up on what is happening down the hall in the other laboratories and introducing current or potential collaborators from other departments and schools.

This year the outside speakers included Dr. Scott Thompson, acting chair of the Department of Physiology (right). This is the academic home for most of BioMET's faculty. The other speakers were Dr. Katia Kontrogianni-Konstantopoulos from the



CONTINUED PAGE 4





BioMET faculty are looking forward to working with Dr. Richard N. Pierson III who has been appointed a senior associate dean for academic affairs and interim director of research affairs in the School of Medicine. He replaces Dr. Bruce Jarrell who is the new Chief Academic and Research Officer, Dean of the Graduate School and Senior Vice President (*BioMET Now* Vol 15, No. 1).

Congratulations to Janet Hsu, one of Silvia Muro's students, who was a runner-up at UMCP's annual ResearchFest held March 30. Janet was one of Dr. Muro's students who attended BioMET 2011 Retreat. Dr. Muro, a faculty member in the Fischell Department of Bioengineering, is a BioMET collaborator and past retreat speaker.

Internships Status Report

Since the BioMET internships were announced in January, 23 inquiries were received. The applicants were asked if they were interested in any particular faculty member. As expected, the paid internships offered by Dr. W. Jonathan Lederer and Dr. Ilia Baskakov were of most interest, but all the faculty had one or more applicants indicate an interest in their particular research area. While BioMET offered three paid positions and five unpaid positions, to date only the three paid positions and 2 unpaid positions have been filled. The other unpaid positions will not be filled, since the faculty members involved either decided not to proceed or they accepted interns from other USM institutions.

As BioMET's first foray into formally offering internships, the response was very gratifying. The internship coordinator, Pamela Wright, noted, "We were surprised at the response. Our research areas are more biological than engineering. I think that some applicants were not aware of this. We will be evaluating how we handled the internship process and also getting feedback from the interns that will be here for the summer." When asked whether BioMET would continue the program, she said, "I do not doubt we will. BioMET has always welcomed interns. Besides College Park, we are expecting a Towson undergraduate, as well as a Meyerhoff Scholar from UMBC and a student from St. Mary's. BioMET faculty are generous with their time and resources, and they are excellent mentors. Given our mandate to develop strong ties to the Fischell Department, it just makes sense to have a formal program when it comes to College Park."

It will be interesting to see how the bioengineering students take to the more purely biological laboratories.

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Congratulations!

Dr. Ilia Baskakov's paper in *Nature Communications* entitled "Fast and ultrasensitive method for quantitating prion infectivity titre" was selected for a press release. As the editor wrote to Dr. Baskakov, only "a few papers of particular newsworthiness are highlighted." The article was published March 13th. *Nature Communications* is an online only publication.

Clearly, initiative 4 involving bioengineering is of great interest to BioMET, and the Center is mentioned in this regard.

Implementation has already begun. The implementation plan can be viewed at <http://www.usmd.edu/BORPortal/Materials/2012/FB/20120301/MPowerPlan.pdf>. The Steering Committee has been selected. As noted in last month's newsletter Dr. Bruce Jarrell is representing UMB. The other members of the Steering Committee are Ann Wylie, Senior Vice President and Provost, UMCP; Pete Gilbert, Vice President for Planning and Accountability, UMB; and Michele Eastman, Assistant President and Chief of Staff, UMCP.

There is a determined effort to make sure both campuses are included in the process. On March 28th a special town meeting was held to introduce the committee and the initiatives to the Baltimore campus. Both President Perman of UMB and President Loh of UMCP spoke. BioMET Acting Director Dr. W. Jonathan Lederer, Assistant Director Brian Hockenberry and Assistant to the Director Pamela Wright all attended. BioMET was included as an important element in the discussion on the bioengineering initiative. Members of the committee and the presidents were excited and pleased to learn that 5 interns from the Fischell Department of Bioengineering at UMCP will be working with BioMET scientists during the 2012 summer (see page 2).

The town meeting did highlight the difficulties ahead, however. No new money from the legislature will be forthcoming, so creative ways to leverage current resources will be essential. Some savings may be achieved from the joining of UMB and UMCP technology transfer offices into one unit. Additionally, library costs on the two campuses may be saved by coordinating purchases and needs. It is clear, however, that the extent of these cost savings and their impact on campus needs remain speculative at this point. It is likely that outside funding will also be needed to exploit the unique opportunities that the strategic alliance provides. Foundation and donors may be eager to provide additional support given the exciting research, teaching and translational opportunities.

One of the biggest issues in implementing inter-campus programs is distance. The two campuses are not located for easy and convenient access to each other. Since public transportation plans of the state will have a large impact on inter-campus movement of students and faculty and these decisions have a large time gap between conception and implementation, temporary solutions must be implemented. Short term solutions include a regular shuttle between campuses (as is done with UMBC). BioMET faculty members are very aware of this issue since the four centers of the old UMBI (spread over roughly the same geography) had an identical problem. Since shuttle buses may not be practical for many, UMBI found that a willingness for students and faculty members to drive to the other campus was important, as was a good video conferencing system. BioMET and many of its faculty members now use GoToMeeting (a commercial system) for research meetings, seminars, student conferences and other communications. The implementation of such a system more broadly between the campuses would help ease the problem. Similarly, the process would advance faster with the development of dedicated parking on both campuses, the creation of flexible laboratory space for research needs, the development of sufficient dedicated office and meeting space, and administrative advances with respect to joint faculty and student appointments and improved inter-campus funding procedures.

What are the larger challenges? There are different institutional dispositions, as well as the overlapping but significantly different missions. Additionally, the administrative processes and financial systems are largely incompatible. These are difficult issues to address. Moreover, UMB and UMCP have had administrative and financial rivalries in the past. However, these challenges can be met by the campuses because both presidents are committed to solving the problems. Each is relatively new to his job, has a fresh approach and energetic administrative support and can marshal relevant resources while re-shaping their respective institutions. It is, therefore, BioMET's good fortune that the strategic alliance and the Mpowering Initiatives are developing and growing now. There is the political will, the financial resources and the practical need at each campus to make this happen. In brief, BioMET sees strong support for joining the two campuses through research and teaching. There is the Fischell Department of Bioengineering at the UMCP School of Engineering and BioMET at UMB School of Medicine. It is, thus, likely that key elements of the Board of Regents' mandate and the Presidents' vision will make substantial progress in the next few years.

Given the number of initiatives and the new territory they cover, communication will be essential to keep all the stakeholders and both campuses informed and involved and the mission successful. As the Mpowering alliance is implemented, BioMET expects to be actively involved along with other key players in the School of Medicine. There is already a web page, <http://mpowermaryland.com/>, up and running, giving an excellent account of the progress and possibilities. Everyone in BioMET is encouraged to take a look. These are indeed exciting and challenging times!

BIOMET HAPPENINGS

Publications

Ostapchenko V, Gasset M, **Baskakov IV**. Atomic force fluorescence microscopy in the characterization of amyloid fibril assembly and oligomeric intermediates. *Methods Mol Biol*. 2012;849:157-67.

Makarava N, **Baskakov IV**. Purification and Fibrillation of Full-Length Recombinant PrP. *Methods Mol Biol*. 2012;849:33-52.

Makarava N, Savtchenko R, Alexeeva I, Rohwer RG, **Baskakov IV**. Fast and ultrasensitive method for quantitating prion infectivity titre. *Nat Commun*. 2012 Mar 13;3:741.

Liu A, Gong P, Hyun SW, Wang KZ, Cates EA, Perkins D, Bannerman DD, Puché AC, Toshchakov VY, **Fang S**, Auron PE, Vogel SN, Goldblum SE. TRAF6 couples TLR4 signaling to Src family kinase activation and opening of the paracellular pathway in human lung microvascular endothelia. *J Biol Chem*. 2012 Mar 23. [Epub ahead of print]

Grants and Contracts

Submissions

Dr. Mervyn Monteiro, 3/5/12, NIH, "Validation of ubiquitin for treat-

ment of Huntington's disease," Total Request: \$1,535,000.

Dr. W. Jonathan Lederer, 3/21/12, NIH, "Superresolution imaging microscope," Total Request: \$600,000.

Talks and Travels

Dr. Ilia Baskakov, grant reviewer, Agence Nationale de la Recherche, France.

Dr. W. Jonathan Lederer, Seminar Speaker, "Tuning the heartstrings: how the heart regulates its beat," University of Calgary, March 8, 2012.

Dr. W. Jonathan Lederer, Seminar Speaker, "Tuning the Heartstrings: How the Heart Regulates Its Beat," University of Iowa Cardiovascular Research Center, March 23, 2012.

Dr. Shengyun Fang, Seminar Speaker, "Protein quality control in the endoplasmic reticulum," Department of Internal Medicine, University of Kentucky School of Medicine, March 29, 2012.

Dr. W. Jonathan Lederer, Plenary Lecture, "X-ROS in the heart: a novel nanoscopic signaling pathway," International Chair of Therapeutic Innovation, University of Paris, South, April 20, 2012.

RETREAT CONTINUED

Department of Biochemistry and Molecular Biology in the School of Medicine (below left) and Dr. Edward Eisenstein from the Fischell Department of Bioengineering at College Park (below right). Dr. Eisenstein is a former UMCI colleague and a member of the Institute for Bioscience and Biotechnology Research, the successor of both CBR and CARB (*BioMET Now*, Vol. 15, No. 1).



Other guest participants included Lulu Chu from Johns Hopkins University who is visiting Dr. W. Jonathan Lederer's laboratory as part of a project between Dr.

Lederer, Johns Hopkins and George Mason University. Dr. Chris Ward, also part of another collaboration with Dr. Lederer, attended. Their joint postdoctoral fellow, Ramzi Khairallah was one of the speakers. Dr. Maegen Ackermann from Dr. Kontrogianni-Konstantopoulos's laboratory also attended as well as Daniel Serrano a bioengineering graduate student from UMCP in Dr. Silvia Muro's laboratory.

A small emergency with an early speaker necessitated the

rearrangement of the schedule, but everyone was understanding and cooperative and there were no further glitches. "After ten years, the retreat practically organizes itself," according to Pamela Wright who does most of the organizing. Participants are already looking forward to next year.

X-ROS on the Road

While publications are the primary means of communicating new research, another significant means of communicating truly interesting and ground-breaking work is through seminars and talks. The X-ROS story coming out of Dr. W. Jonathan Lederer's laboratory, though published in the high profile journal *Science*, has generated a significant number of invitations for Dr. Lederer to speak. In March, Dr. Lederer traveled to the University of Iowa and the University of Calgary. In April, he gave the Plenary Lecture, International Chair of Therapeutic Innovation at the University of Paris South.

X-ROS is a new and unexpected signalling pathway found in heart cells that links calcium signaling and the physical contraction of the cell. Calcium was known to propagate the electrical signal that underlies contraction, but the link between the electrical signal and the mechanical contraction had not been made. The X-ROS pathway is the 'missing link.' Abnormal X-ROS has already been linked to cardiac issues in muscular dystrophy.

