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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

Penn Street Building Ready for First Tenants



The renovations in the old Medical Examiners Building, currently called the General Research Building, have finally wound down, though not everything is complete. The third floor was finished first, and plans for the first faculty move got underway. Dr. Bruce Vogel did the honors of initiating the building for BioMET. His move started the first week of February. Of course, Assistant Director Brian Hockenberry who coordinated the move is by now very experienced, having moved three faculty into the School of Pharmacy location last year.

As soon as Dr. Vogel was moved and somewhat organized, Dr. Shengyun Fang began his move. That also went fairly smoothly, though there were glitches. A freezer decided to quit just after getting settled into the new equipment room, causing considerable loss of its valuable contents. Getting everything in to a much smaller space is very disconcerting, but both laboratories had culled much unused paraphernalia. Though unused in up-to-date laboratories, there was much that was still usable. After letting other BioMET faculty members search for treasures among the leftovers, Research Coordinator Pamela Wright packed up what was left and delivered it to the science

department at Randallstown High in Baltimore County. Her son is a social studies teacher there and had put her in

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BIOMET SCIENTIFIC PROGRAMS

LABORATORY OF
MOLECULAR CARDIOLOGY

LABORATORY OF
NANOBIOLGY

LABORATORY FOR
NEURODEGENERATIVE DISEASES

LABORATORY FOR
PRION DISEASES

PROGRAM IN
CANCER BIOLOGY

PROGRAM IN
CELL STRUCTURE AND
DEVELOPMENT

PROGRAM IN
MITOCHONDRIAL DYNAMICS

*Assistant Director Brian
Hockenberry inspects
one of the third floor
laboratories in mid-January.*

Moving On

UMSOM faculty both teach and mentor graduate students and postdoctoral fellows in the expectation that they will continue careers in science. These careers could be in academia or in industry. However, academic careers are often difficult to find and in the current funding climate not always attractive. It is, therefore, of particular pleasure when a young researcher lands a faculty position at a premier institution. Dr. Benjamin Prosser, who got his PhD with Dr. Martin Schneider here at UMSOM, is one such young researcher. He had gone from Dr. Schneider's laboratory to a postdoctoral fellowship with Dr. W. Jonathan Lederer, BioMET's director. The project he started with Dr. Lederer was almost an immediate success, with both a patent and a paper in one of the highest profile journals, *Science*. This led to a mentored NIH K99 award. After two years



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AND TECHNOLOGY

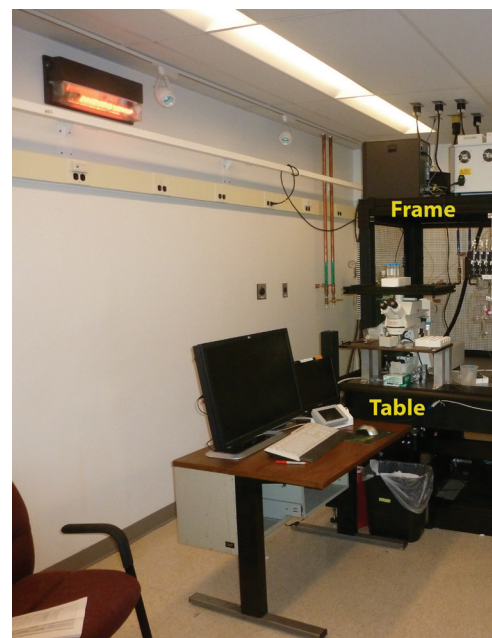
January begins a new legislative year in Maryland. UMB President Jay M. Perman addressed the legislature on February 20. This annual appearance allows Dr. Perman to highlight accomplishments and fiscal issues in relationship to the state's contribution. More about Dr. Perman's testimony can be found at <http://www.umaryland.edu/news/?ViewStatus=FullArticle&articleDetail=22301>.

Congratulations to Dr. William Bentley, Chair of the Fischell Department of Bioengineering, on receiving the American Chemical Society's Marvin J. Johnson Award from the society's Division of Biotechnology. Dr. Bentley's work on using microbes and insects as mini-bioreactors and on machine-cell communications is extremely novel and has already found many practical applications. Dr. Bentley has been assisting BioMET with the hire of a computational biologist who is expected to develop strong ties to the Fischell Department.

Pharmacy South Update

As has been discussed in previous issues, the final faculty member to move into Pharmacy South was supposed to be Dr. W. Jonathan Lederer. His move has been delayed because the sensitivity of his equipment was incompatible with the building's basic structure. The proposed solution to the problem was the purchase of active vibration dampening tables. However, since there was some concern as to whether this would in fact be a solution, only one table was purchased to be tested before going ahead with replacement of all the current passive vibration dampening tables, since each table is approximately \$60,000. The table was ordered in December and delivered in mid January. Once delivered, the custom framework that is needed by the equipment was built and the confocal microscope was unpacked and installed by Zeiss (see the picture above). This complicated operation was coordinated by Dr. Brian Hagen, BioMET's Confocal Facility Program Manager. Testing began as soon as the microscope was operational. A full set of experimental protocols in current use in the Lederer laboratory was designed to rigorously test the table. The testing was expected to take several weeks.

By the end of February, most of the testing was complete, and the table was performing as hoped. The next step will be to order the rest of the tables and arrange installation. Delivery takes approximately 6 weeks after the order is placed. In addition, the tables cannot be delivered and installed all at once, but must be coordinated with the installation of the surrounding framework and the packing and unpacking of the instruments by Zeiss. The entire process is expected to take 6-8 weeks, with two table-microscope combinations being installed at one time. The Lederer laboratory is hoping to be moved completely by May.



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contact with the science department. They were thrilled with the donation.

The third faculty member who was scheduled to move, Dr. Ilia Baskakov, has been delayed. His new secured biosafety level II facility requires certification by the United States Department of Agriculture. Until that has been obtained, he cannot move at all. In addition, it was discovered that the anteroom to the facility that contains the autoclave was not properly ventilated causing overheating. That too would have to be fixed before Dr. Baskakov could move. Those repairs are expected to be quickly initiated.

The other expected tenants for the Penn St. building is BioMET's administrative group, as well as IT. In addition, once the hire of the new faculty member is complete, he would also have space there. So there are still loose ends to be tied up before the Penn St. Building is completely occupied.

Biophysical Impact

The Annual Meeting of the Biophysical Society held February 15-19 in San Francisco again saw the extraordinary contributions of Dr. W. Jonathan Lederer and his laboratory and collaborators. Each year the number of contributions has grown. It would be interesting to see how many of the other posters, platform sessions and invited speakers have ties to the Lederer laboratory. Dr. Lederer's influence in the field is considerable.

Abstracts:

*Williams, G.S.B., Wescott, A.P., Lederer, W.J., Jafri, M. S. Dynamics of Calcium Sparks and SR Calcium Leak During Excitation-Contraction Coupling in Mouse Heart Cells.

*Hagen, B.M., Kao, J. P.Y., Lederer, W. J. Investigation of Arrhythmogenic Calcium Events by Initiating Local Calcium Release in Cardiomyocytes.

Chu, L., Boyman, L., Williams, G.S.B., Greenstein, J.L., Winslow, R. L., Lederer, W.J., Hagen, B.M. Dynamics of Ca^{2+} -Dependent Regulation of the Cardiac $\text{Na}^+/\text{Ca}^{2+}$ Exchanger.

*Wescott, A.P., Lederer, W.J., Williams, G.S.B. Modeling Mitochondrial Calcium Dynamics in Heart.

Kerr, J.P., Prosser, B.L., Shi, G., Becerra, N., Lederer, W. J., Raiteri, R., Ward, C.W. Microtubule Network Density Tunes Both Stretch and Contraction Activated X-ROS.

Limbu, S., Hoang-Trong, T.M., Prosser, B.L., Williams, G.S.B., Lederer, W.J., Jafri, M.S. Mechanisms of Stretch-Activated Reactive Oxygen Modulation of Excitation-Contraction Coupling: Computational Studies.

Borile, G., Urbani, A., De Mauro, C., Alfieri, D., Lederer, W.J., Pavone, F., Mongillo, M. Multisite Multiphoton Ca^{2+} Imaging in Acute Myocardial Slices of CPVT Hearts.

Hoang-Trong, T.M., Lederer, W.J., Jafri, M.S. Exploring SR Calcium and Cytosolic Calcium Wave Dynamics using a 3D Stochastic Myocyte Model.

*Greiser, M., Prosser, B.L., Khairallah, R., Ward, C.W., Lederer, W. J. Stretch-Dependent Sub-Cellular Ca^{2+} Signaling in Atrial Myocytes.

*Prosser, B.L., Ward, C.W., Kerr, J.P., Shi, G., Lederer, W. J. Stretch-Dependent Regulation of Calcium Signaling in Heart - Who are the Key Players?

*Zhao, G., Brochet, D.X.P., Li, T., Rosenberg, P., Lederer, W. J. STIM1 Enhances SR Ca^{2+} Refilling through Activating SERCA2a in Rat Ventricular Myocytes.

Walker, M.A., Williams, G.S.B., Kohl, T., Jafri, M.S., Lehnart, S.E., Greenstein, J.L., Lederer, W. J., Winslow, R.L. Super-Resolution Modeling of Calcium Release in Heart.

*Bamgboye, M.A., Lederer, W. J. (2014) ROS in Cardiac Calcium Signaling.

Platform Sessions:

Ullah, A., Trong, M.T.H., Williams, G.S.B., Winslow, R.L., Lederer, W.J., Jafri, M.J. Critical Requirements for the initiation of Cardiac Arrhythmia in Heart: Cell Number. February 18, 2014.

*Brochet, D.X.P., Lederer, W.J. Decomposition of a Calcium Spark in Cardiac Myocytes. February 18, 2014.

*Lederer laboratory



BIOMET HAPPENINGS

Comings and Goings

Dr. Sukumaran Muralidharan has left Dr. Kao's laboratory. Dr. Benjamin Prosser has moved on to the University of Pennsylvania (see story page 1). Dr. Irina Kolosova has left Dr. Baskakov's laboratory.

Publications

Wang H, Ke Z, Alimov A, Xu M, Frank JA, **Fang S**, Luo J. Spatiotemporal Expression of MANF in the Developing Rat Brain. *PLoS One*. 2014 Feb 28;9(2):e90433.

Baskakov IV. The many shades of prion strain adaptation. *Prion*. 2014 Feb 11;8(2). [Epub ahead of print] Review.

Safren N, El Ayadi A, Chang L, Terrillion CE, Gould TD, Boehning DF, **Monteiro MJ**. Ubiquitin-1 Overexpression Increases the Lifespan and Delays Accumulation of Huntingtin Aggregates in the R6/2 Mouse Model of Huntington's Disease. *PLoS One*. 2014 Jan 27;9(1):e87513.

Ward CW, Prosser BL, **Lederer WJ**. Mechanical Stretch-Induced Activation of ROS/RNS Signaling in Striated Muscle. *Antioxid Redox Signal*. 2014 Feb 20;20(6):929-36.

Grants and Contracts

Awards

Lederer, W. Jonathan 1/1/2014, NIH-NHLBI, "Calcium Entrained Arrhythmias," \$888,970, yr 4 of 5.

Submissions

Boyman, Liron, 1/17/14, AHA, "Mitochondrial calcium signaling in heart: physiological and pathophysiological implications," Total request: \$308,000.

Brochet, Didier X.P., 1/17/14, AHA, "Mechanisms of Arrhythmogenesis in Aging," Total request: \$308,000.

Greiser, Birte Maura, 1/17/14, AHA, "Altered Mechano-Transduction as a Novel Arrhythmogenic Mechanism in Atrial Fibrillation," Total request: \$308,000.

Williams, George S.B., 2/12/14, NIH, "Mitochondrial Calcium Signaling in Heart," Total Request: \$725,085.

Talks and Travels

Dr. Mervyn Monteiro, NIH Study Section Reviewer, ZRG1 F03A-N 20, 2/20/2014 - 2/21/2014.

Dr. Mariusz Karbowski, Retreat Speaker, "Transient polymerization of actin on the outer mitochondrial membrane contributes to Drp1-mediated mitochondrial fission," UMB Department of Biochemistry and Molecular Biology Retreat, January 10/2014.

Dr. Shengyun Fang, invited speaker, "A novel protein quality control mechanism in the nucleus," UMB Department of Biochemistry and Molecular Biology, 2/17/2014.

Dr. Didier X.P. Brochet, platform speaker, "Decomposition of a Calcium Spark in Cardiac Myocytes," Annual Meeting of the Biophysical Society, San Francisco, CA, February 18, 2104.

MPower Update

Editor's Note: While BioMET may not participate in all activities relating to the new initiative, the success of the entire enterprise benefits everyone. Thus, all activities of the new initiative will be highlighted in BioMET Now. As before, all members of the BioMET community are encouraged to look at the MPower web site at mpowermaryland.com for current information.

The two campuses continue to discuss new ways of collaborating and sharing resources. There are several areas that have long been difficult to bridge: joint appointments, joint grants, shared library access and shared recreational facilities. While the last one has been solved, the other areas have yet to be fully implemented, though mechanisms have begun to be developed. Several "University of Maryland Professor" joint appointments have been made, though the exact process is still not clearly defined. In addition, there are memoranda of understanding for cosubmission and comanagement of grants that should yield viable administrative mechanisms in the near future. There also continues to be talks for shared library access, but this remains a difficult issue, in part because of the way in which journal access is financed. Publishers' rules for journal access are neither accommodating nor inexpensive.

For more information see the MPowering Web Site: <http://mpower.maryland.edu/initiatives/joint-appointments-joint-grants-management-shared-library-resources/>

Congratulations!

Moradeke Bamgboye, a graduate student in Dr. Lederer's laboratory, successfully defended her thesis in January.

PROSSER CONTINUED

of the mentoring, K99 awardees are expected to move to a faculty position and on their own. Dr. Prosser has done that in an exceptional way. He accepted an assistant professorship at the University of Pennsylvania in the Department of Physiology, Perelman School of Medicine.

The University of Pennsylvania is one of the oldest universities and medical schools in the United States and a member of the Ivy League.

While Dr. Prosser's appointment started in January, he will not physically move for several months. His laboratory at Penn is still being renovated. In the meantime, he will continue his research in Dr. Lederer's laboratory. He has already acquired his first postdoctoral fellow, Dr. Patrick Roberson, who also got his PhD with Dr. Martin Schneider. Dr. Roberson is remaining at UMB until the Penn laboratory is operational.

Dr. Lederer and BioMET are extremely proud of Dr. Prosser and wish him continued success at his new institution.