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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

## Record Number of Interns



Left to right, Dr. W. Jonathan Lederer, Dr. George S.B. Williams and Fischell Bioengineering student, Lauren Querido

Beginning the end of May, undergraduate and even high school students began to appear in laboratories. To date, 9 interns are currently working in laboratories, with one more expected to start in July. Never has BioMET hosted so many interns! This summer has more than usual in part due to recruiting at the Fischell Department of Bioengineering. That recruiting effort brought four undergraduate students to BioMET, all in paid positions, with another unpaid intern to start later this summer. The bioengineering students are Yasmin Kadry working with Dr. Ilia Baskakov, Lauren Querido and Christine O'Keefe working with Dr. W. Jonathan Lederer and Siddarth Plakkot working with Dr. Mariusz Karbowski. Viraj Desai is expected to join Dr. Bruce Vogel in July. In addition, Ahsal Major

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Fischell Bioengineering student, Christine O'Keefe and Dr. Saleet Jafri, Dr. W. J. Lederer's collaborator at George Mason University

## In Perspective

Besides publishing their own novel research, scientists are also called upon to discuss important findings in their field via editorials or perspective articles. These articles usually discuss discoveries published in the same issue of the journal by another group that have implications for the particular field or beyond. It is considered an honor to be asked to comment. The honor is in proportion to impact factor or prestige of the journal.

For the May 4th issue of *Science Magazine*, one of the most prestigious journals in the world, Dr. W. Jonathan Lederer, BioMET's Acting Director, and Drs. Brian Hagen and Guiling Zhao were invited to comment on an article in that issue, entitled "Elementary Ca<sup>2+</sup> Signals Through Endothelial TRPV4 Channels Regulate Vascular Function," by Sonkusare *et al.* Drs. Lederer, Hagen and Zhao discuss the importance of being able to visualize nanoscopic areas in cells. The article by Sonkusare *et al.* describes a new technique that is likely to have implications in fields that investigate calcium signaling.

The invitation to comment recognizes Dr. Lederer's and his colleagues' leadership in the field of calcium signaling in particular and in the area of nanoscopic imaging in general. Dr. Lederer is the discoverer of the transient current in heart (involved in several arrhythmias), calcium sparks (the unitary

calcium signal in excitable cells) and his most recent discovery, published in *Science* last September, X-ROS signaling (the link between the electrical and mechanical activity in contractions). He was one of the first to point out the importance of nanoscopic spaces or "fuzzy space" in the control of cellular signaling, particularly heart contraction.

### 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



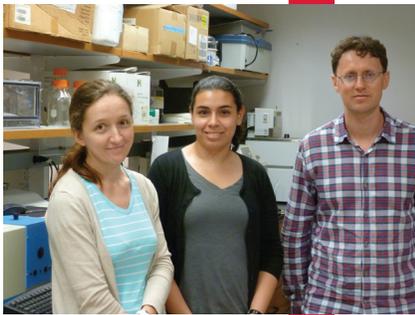
UNIVERSITY of MARYLAND  
SCHOOL OF MEDICINE

BioMET congratulates University of Maryland School of Medicine Dean E. Albert Reece, MD, PhD, MBA, on winning the 2012 Norbert Freinkel Lecture Award, presented by the American Diabetes Association (ADA). All BioMET faculty members are part of the School of Medicine.

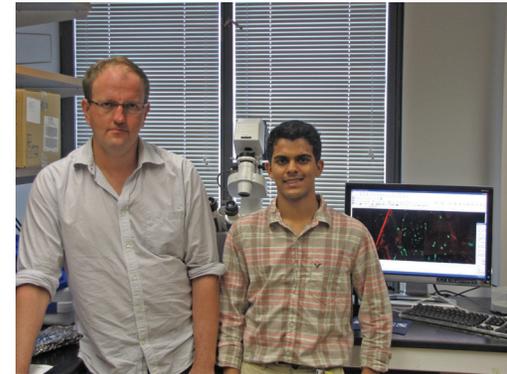
Congratulations to Dr. John Fisher on his promotion to Professor and to Dr. Silvia Muro on the occasion of her promotion to Associate Professor with tenure. Drs. Muro and Fisher are in the Fischell Department of Bioengineering and are past retreat speakers.

## INTERNS CONTINUED

who recently graduated from Towson University is working with Dr. Shengyun Fang. Nathaniel Dirda from the College of William and Mary in Williamsburg, VA and Gibran Nasir from Cornell College in Mt. Vernon, IA can be found in Dr. Joseph P.Y. Kao's laboratory. There are also two high school students, Ian Qian from Riverhill High School in Dr. Fang's laboratory and Duncan Woodbury from Reservoir High School in Dr. Kao's laboratory.



Left to right: Natalia Makarava, Fishchell Bioengineering student Yasmin Kadry and Dr. Ilia Baskakov

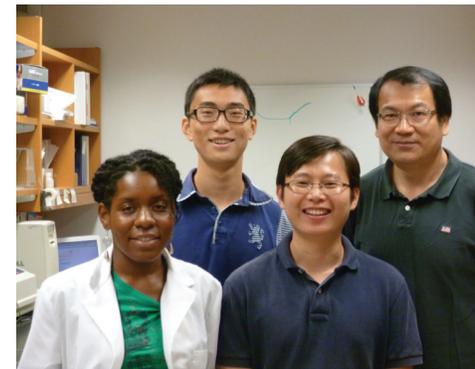


Dr. Mariusz Karbowski and Fischell Bioengineering student Siddarth Plakkot

The purpose of internships are less about producing publishable data and more about mentoring and developing the mentoring capabilities of our faculty and their laboratories, though publications can result from even these short internships. Many times it is the postdoctoral fellows in the laboratory who directly interact with interns. This gives them a taste of what it is like to be the mentor instead of the mentored. As they progress as scientists, mentoring will be an integral part of their career, so this initial foray is very important.

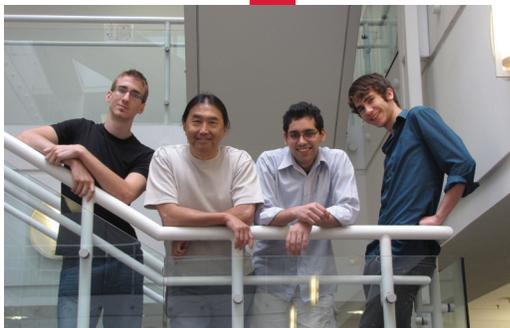
For the interns, this may be their first taste of real basic biological research. For the bioengineering students this encounter with biological research as opposed to engineering research is especially useful. It should give these students a boost in being able to move seamlessly between the biological and engineering fields, and being able to understand and communicate with biologists. In this age

where the lines defining disciplines are becoming more and more blurred, these experiences are extremely valuable



Back row: High School student, Ian Qian, Dr. Shengyun Fang, Front row: Towson University intern Ahsal Major, UMB graduate student Zhiliang Chen.

Left to right: Nathaniel Dirda from William and Mary, Dr. Joseph Kao, Gibran Nasir from Cornell College and High School Student Duncan Woodbury.



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## Congratulations!

BioMET's Acting Director, Dr. W. Jonathan Lederer, was promoted to Director at the University of Rochester on May 10. This year. In February, he gave the annual Kirby Lecture at the University of Paris, South in April. Since then, he has given a new signaling pathway in heart (*BioMET NOW*) 11 outside lectures on the topic.

## Moving Ahead

When the Medical Biotechnology Center (MBC) became the Center for Biomedical Engineering and Technology (BioMET), moving from the now defunct UMBI to the University of Maryland (UMB), the conditions and goals of the move were put forward in a Memorandum of Understanding or MOU. BioMET's MOU had to be reconciled with an existing MOU for the Institute of Human Virology (IHV), including the fate of the building that has housed both MBC/BioMET and the IHV since 1996. In an effort to reconcile the two MOUs, and to look at the long term benefit to the University, it was decided that BioMET should be moved to other accommodations on the campus, adhering as close as possible to the BioMET MOU approved by the Board of Regents. The first task then was to identify suitable space available on the campus.

This task has not been easy. Given the space crunch at UMB and the complex nature of BioMET's technology, especially in imaging, suitable space has been hard to come by. In addition, the required square footage needed to house all BioMET's current faculty and staff is significant, even with a reduction based on University guidelines. In the two and half years since BioMET began working with the President's office, many options have been rejected as unworkable, but now several have remained as real possibilities.

Over the last two months, a real solution to the problem has begun to come together. While it is not ideal, BioMET faculty are finally getting their first look at what is likely to be their new space in the near future. While there are still many issues to resolve, BioMET administration has been meeting frequently with both the campus authorities and off-campus engineers and architects assigned to the project. This work involves reviewing programmatic considerations, space and animal needs, the requirements of "adjacency" and both current needs and near-term scientific issues. Informed by this discussion, faculty, administration and campus seek to determine where every person and every piece of equipment can and should go. While some compromises must be made, it all has to fit and work effectively so that funded research can be done at the most advanced level. Everyone is committed to that goal.

Because of the absence of sufficient contiguous space, BioMET will be placed at two locations. . While the MOU supports keeping BioMET together as a unit, that is not possible in the time frame required to reconcile the two competing MOUs mentioned above. Four faculty members of BioMET will have their offices and laboratories on the fifth floor and part of the sixth floor in the School of Pharmacy (South Building - below right). This space was recently vacated by SOP faculty when the new SOP North Building was completed about two years ago. The other three BioMET faculty members and BioMET administration will be located in the old Medical Examiner's Building, now temporarily called "the General Research Building" or the GRB. BioMET will occupy the first and third floors of the GRB which is on the corner of Penn and Pratt Streets (above right). The division of faculty members was driven primarily by animal research needs; the Pharmacy building has appropriate housing for all the needed animal species and the GRB has more limited animal support. Both locations need renovation to be able to accommodate BioMET research requirements, hence the frequent meetings related to design.

Even before the space was fully identified, a full inventory of current space, equipment and infrastructure needs was compiled by Assistant Director Brian Hockenberry and Facilities Manager Mike McCrea. This significantly helped speed up the process. The architects, along with the assigned University project manager and campus planners, have toured both current space and the proposed space so that everyone is familiar with current functionality and where that functionality needs to be in the future. There are still significant hurdles to overcome, but the process has begun and there is every appearance that BioMET's future space will be adequate to continue the successful state-of-the-art research programs of the BioMET faculty, students and staff.



Dr. Lederer, gave the 2012 Paul Horowicz Lecture. This is Dr. Lederer's third named lectureship this year. The Paul Horowicz Lecture at Temple University in Philadelphia. Dr. Lederer gave the 2012 Paul Horowicz Lecture at the Air of Therapeutic Innovation Plenary Lecture at the publication of the *Science* paper describing the discovery of the (Science, Vol 14, No. 5), Dr. Lederer has already given

# BIOMET HAPPENINGS

## Comings and Goings

The following summer interns have joined BioMET: Ahsal Major and Ian Qian with Dr. Fang; Yasmin Kadry with Dr. Baskakov; Lauren M Querido and Christine O'Keefe with Dr. Lederer; Siddarth Plakkot with Dr. Karbowski; and Nathaniel Dirda and Gibran Nasir with Dr. Kao.

Antonio Gondim from the University of Minas Gerais in Brazil has joined Dr. Lederer's laboratory as a Visiting Scientist.

Dr. Xuehong Xu, Gong Li and Valeria Albornoz have moved on.

## Publications

Makarava N, Kovacs GG, Savtchenko R, Alexeeva I, Ostapchenko VG, Budka H, Rohwer RG, **Baskakov IV**. A new mechanism for transmissible prion diseases. *J Neurosci*. 2012 May 23;32(21):7345-55.

Santos MD, Mohammadi MH, Yang S, Liang CW, **Kao JP**, Alger BE, Thompson SM, Tang CM. Dendritic hold and read: a gated mechanism for short term information storage and retrieval. *PLoS One*. 2012;7(5):e37542. Epub 2012 May 22.

Hagen BM, Boyman L, **Kao JP, Lederer WJ**. A comparative assessment of fluo  $Ca^{2+}$  indicators in rat ventricular myocytes. *Cell Calcium*. 2012 Jun 19. [Epub ahead of print]

Zhong Y, **Fang S**. Live Cell Imaging of Protein Dislocation from the Endoplasmic Reticulum. *J Biol Chem*. 2012 Jun 21. [Epub ahead of print]

## Grants and Contracts

### Awards

**Dr. George S.B. Williams**, 5/16/12, NRSA Fellowship, "Molecular basis of  $Ca^{2+}$  leak in heart," \$56,211, yr 2 of 3.

### Submissions

**Dr. Joseph P.Y. Kao**, 5/1/12, TEDCO, "Contrast Agents for Electron Paramagnetic Resonance Imaging," Total Request: \$50,000.

**Dr. Mervyn Monteiro**, 5/21/12, NSF, "Genetic and functional analysis of misfolded protein expression in *C. elegans*," Total Request: \$749,537.

**Dr. Bruce Vogel**, 5/21/12, NSF, "Assembly and Composition of Elastic Fiber-like Structures in the Nematode *C. elegans*," Total Request: \$1,196,042.

**Dr. Joseph P.Y. Kao**, 5/18/12, NIH, "Targeting tailored probes for imaging tumors by electron paramagnetic resonance," Total Request: \$2,455,286.

**Dr. Mervyn Monteiro**, 6/16/12, NIH, "Identifying ubiquitin ligases that regulate APP processing," Total Request: \$422, 125.

**Dr. Mervyn Monteiro**, 6/16/12, NIH, "Validation of ubiquitin for Huntingtons disease," Total Request: \$422, 125.

## Talks and Travels

**Dr. W. Jonathan Lederer**, Annual ENAFRA Meeting, Boston, MA, May 8-9, 2012.

**Dr. Ilia Baskakov**, invited talk, "Genesis of mammalian prions," International Meeting PRION 2012, Amsterdam, The Netherlands, May 10-12, 2012.

**Dr. W. Jonathan Lederer**, 2012 Paul Horowicz Lecture, "Tuning the Heartstrings: How the Heart Regulates its Beat," Department of Pharmacology and Physiology, University of Rochester Medical

## 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](http://mpowermaryland.com) for current information.*

One of the first major undertakings of the new initiative, *MPowering the State*, was a joint effort of the technology transfer processes at both UM Baltimore and College Park campuses called University of Maryland Ventures. This is unified approach to maximizing the potential of university discoveries for economic benefit through licenses, patents, and spin-off companies. The first activity of UM Ventures was a symposium on entrepreneurship held at the UM Biopark on May 11. The symposium theme was how to start a company from discoveries made by UM faculty members. There are advantageous and disadvantages for faculty members in regard to starting a company. The biggest advantage is having control of how your discoveries are used and developed. The biggest disadvantage is that starting a business is time consuming and requires capital, and few faculty members have any clue at all on how to proceed. MDs and PhDs do not include business classes! UM Ventures expects to be a major source of support and information for faculty member contemplating starting their own company.

More information about the symposium can be found at <http://mpowermaryland.com/news/university-of-maryland-hosts-first-um-ventures-symposium-on-entrepreneurship/>.

Center, May 10, 2012.

**Dr. W. Jonathan Lederer**, seminar speaker, "X-ROS in the heart: a novel nanoscopic signaling pathway," Department of Biochemistry, The Johns Hopkins Bloomberg School of Public Health, May 21, 2012.

**Dr. Ilia Baskakov**, invited talk, "Genesis of Mammalian Prions: from protein to diseases" INRA, Paris, France, May 26, 2012.

**Dr. W. Jonathan Lederer**, invited talk, "X-ROS signaling: Rapid mechano-chemo transduction in heart," 33rd International Society for Heart Research, North American Section Meeting, May 28, 2012.

**Dr. W. Jonathan Lederer**, invited talk, "NOX ROS in mechano-chemo transduction in the heart," Gordon Research Conference: *Nox Family NADPH Oxidases*, Waterville Valley, NH, June 3, 2012.

**Dr. W. Jonathan Lederer**, invited talk, "X-ROS signaling in heart: discoveries and insight from a new signaling pathway," Gordon Research Conference: *Cardiac Regulatory Mechanisms*, New London, NH, June 13, 2012.

**Dr. W. Jonathan Lederer**, Annual Meeting of EuTrigTreat, FP7 Programme Grant, Berne, Switzerland, June 24-26, 2012.

**Dr. Mervyn Monteiro**, NIH Study Section ZRG 1 F03A-N20, June 28-29, 2012.