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Baskakov Awarded Elkins Professorship

MBC Associate Professor Ilia Baskakov was awarded the 2009 Wilson H. Elkins Professorship. The award is based on nominations submitted by University System of Maryland Institution Presidents and is bestowed on those individuals who “have the greatest potential for making substantial contributions to the teaching, research, and service missions of USM.” This is one of the most prestigious awards given within USM.

Dr. Baskakov plans to use the award money to further his new research initiative into microbial production of electricity.



This is a substantial departure from his usual research on prions and prion disease. Through a new UMBI Research Council initiative called “Blue Sky,” faculty members were encouraged to brainstorm on societal problems that might be amenable to technological solutions. Through this process and subsequent discussions with colleagues from other centers, Dr. Baskakov became interested in microbial production of electricity. The work is based on the observation that some cyanobacteria which are naturally photosynthetic can also generate electric currents. As Dr. Baskakov described it in his personal statement to the Elkins

Office Upgrade

MBC’s business office, headed by Jami Kasco, was reorganized this summer. While the personnel did not change, Mary Graham and Dannielle Watkins are still hard at work, the space did. Kyleen Graham, MBC’s receptionist was moved out to the empty desk in the outer office, more accessible to visitors and where a facilities receptionist had been before that position was eliminated in budget cuts some years ago. That opened up the space in the inner office. Jami Kasco and the extensive records she keeps would move in there, but only after it was secure. Business records are not public documents. The first step then was to create a wall and a door in the inner office. Once that was accomplished, Jami moved in.

Since the business office was going to have to move much of its furniture out and around, it seemed like a good time to spruce it up as well. After emptying the entire space, painters and carpet layers were scheduled, even the windows were to be washed! However, that meant moving completely out, albeit temporarily.

Mary and Dannielle were settled in the inner office, Mary in the hall

continued page 3



The hallway is full!

continued page 3

Director Change at CARB

Dr. Ed Eisenstein has stepped down as Director of the Center of Advanced Research in Biotechnology (CARB). Dr. John Moults is the Interim Director. Dr. Eisenstein will concentrate on his research and increase his involvement in UMBI's Appalachian Center for Ethnobotanical Studies.

Faculty-Staff Senate

Dr. Frank Robb from the Center of Marine Biotechnology was elected the new senate chair. He replaces MBC's Dr. Mervyn Monteiro.

External Review Report Received

The External Review Executive Summary report was delivered to UMBI the beginning of July. As this is not a public report, access is limited, especially as this is only one step in an ongoing process. UMBI and the Centers will now go over the report. This is an opportunity for both Central and the Centers to look at the recommendations and comments and formulate both an immediate response to criticisms and action plans addressing substantive issues. It is also an opportunity to review the process in light of the report for future reference. If the report does not contain the type of content that the external process was expected to elicit, then the next time a review is done, the process needs to be adjusted. If the report does have the expected content, then the process worked. As this was the first external review done at UMBI, it is to be expected that the process would not be perfect.

The formal response to the report will also not be a public document. This will go to the Chancellor's office. The effects of the action plans developed in response to the report will be noticeable, if not immediately, at least in the near future. The real importance of the report and process is not the detailed criticisms, but UMBI's response to the recognition of the strengths and weaknesses of UMBI to the betterment of the institution.

Congratulations!

August 26, 2008: MBC's Dr. Chris Geddes, head of the Institute of Fluorescence, was named one of ten Innovators of the Year by the Daily Record. The Daily Record is one of the premier business publications in Maryland. The award recognizes the development of microwave accelerated metal enhanced fluorescence assays which are poised to revolutionize the way chemicals, biochemicals, and even microorganisms are measured in laboratories or in the field. The Geddes' laboratory is a pioneer in metal enhanced fluorescence.

The awards dinner will be held on October 17, 2008.

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Above: Mary, Danneille, right temporary desk. Jami sets up. Bottom: Dan now refurbished. Mary's desk foreground.

Baskakov continued

Committee: he proposes “to produce electrical power by coupling the photosynthesis in cyanobacteria to an electron-harvesting system in a newly designed Photosynthetic Microbial Fuel Cell (PMFC). Recent studies found that under conditions of CO₂ limitation and excess light cyanobacteria produce electrically conductive ‘nanowires.’ It is believed that the nanowires provide a way to communicate between members of complex bacterial communities to support interspecies energy exchange. The nanowires also allow the bacteria to get rid of unwanted electrons by transporting them to distant ‘electron dumps.’ When cyanobacteria are unable to utilize electrons due to a low level of CO₂ fixation, nanowires seem to provide a route for donating excess electrons to the environment.” In the PMFC that Dr. Baskakov has designed, he would “exploit the natural needs of the cyanobacteria to discard their ‘waste’ electrons. The PMFC collects the discarded electrons at its anode surface and thereby ‘generates’ electricity.” Other systems rely on an intermediate step between photosynthesis which harnesses energy and the release of that energy to drive another source for generating electric currents. Sustainable microbial energy production is a particularly active area of research, though no commercial generator is actually in routine use yet. By reducing the steps involved, Dr. Baskakov hopes to increase the efficiency of the process to increase its commercial potential, but there is much left to be done. However, they have demonstrated the feasibility of this approach in the laboratory. The work has already yielded a patent disclosure and an exploratory NSF grant.

Dr. Baskakov is the second MBC faculty member to receive an Elkins professorship. Dr. John Collins received one in 2002 (*Inside MBC*, Vol. 4 No. 3).

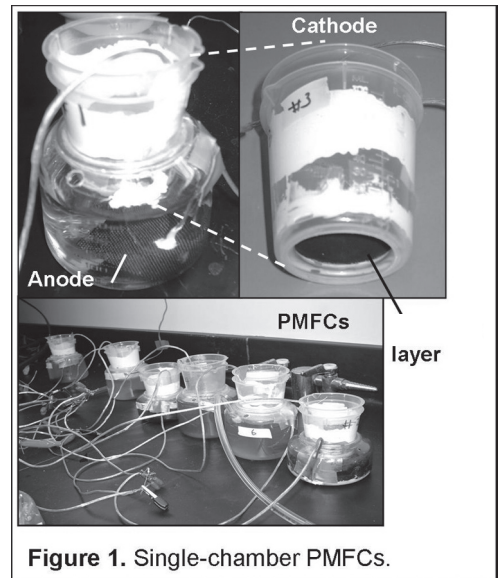


Figure 1. Single-chamber PMFCs.

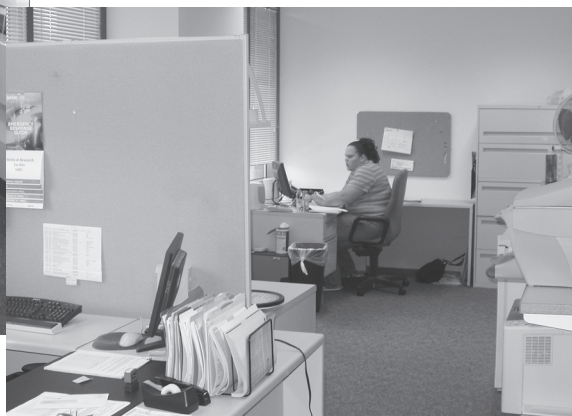
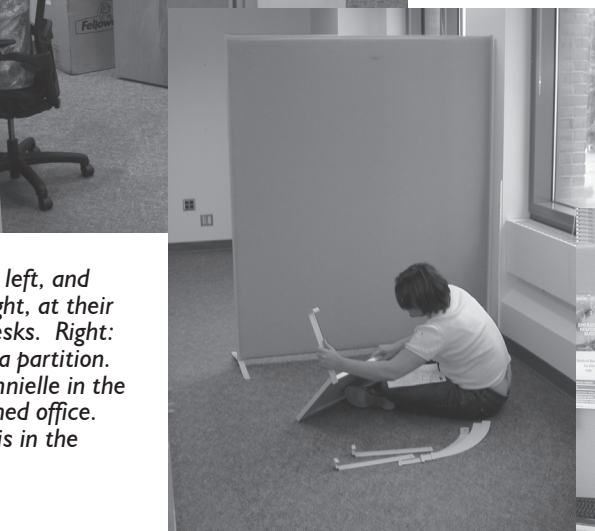
The figure is from one of Dr. Baskakov's grants. It is a battery, note the anode (negative terminal) and cathode (positive terminal). The anode is submerged in the growth medium containing the cyanobacteria. The cathode is separated from the growth chamber by a layer which will only let electrons flow through. The negatively charged electrons shed by the bacteria naturally move to the positive terminal, thereby creating a current. When linked together, enough electricity is generated to be measured by a volt meter (not shown).



Office continued

and Dannielle in Jami's new office. For about a week, Mary and Dannielle were quite literally in the center of it all! Once the workers were done, the new arrangement of the business office was started—some of which the business office ladies did themselves., as Jami demonstrates. But it was worth all the trouble. Mary now can see who is coming

in to find her and Dannielle has enough space to have new hires and others with HR issues do paperwork and counseling next to her desk area. And the bright walls and new carpeting gives the office a well-kept and organized appearance, suitable for MBC's capable business staff.



left, and
right, at their
tasks. Right:
a partition.
Dannielle in the
new office.
is in the

MBC Happenings

In Memoriam

Cecilia Frederick, Dr. Lederer's long-time laboratory manager, lost her oldest son, Andrew, unexpectedly. He was 16. Our deepest condolences go out to her.

Comings and Goings

Research Assistants, Rebecca Danner and Angela Weese, have left Dr. Monteiro's laboratory. The following summer students returned to school: Robert Billmyre (Baskakov), Stephanie Sarbanes (Monteiro), Rushi Talati (Lederer) and Brian King (Kao).

Grants and Contract

Dr. Julio Altamirano, AHA, "Fellowship - Spontaneous Ca Sparks and the Regulation of the Sarcoplasmic Reticulum Ca Leak in Cardiac Myocytes," 7/1/08, \$35,000, yr 2 of 2.

Dr. Kadir Aslan, AHA, "Rapid Cardiac Risk Assessment in a Clinical Setting," 7/1/08, \$66,000, yr 2 of 4.

Dr. Brian Hagen, AHA, "Fellowship - Photolytic Dissection of Arrhythmogenic Calcium Handling," 7/1/08, \$40,000, yr 1 of 2.

Dr. Shengyun Fang, NIH, "Novel Functions for gp78 in ER-associated degradation," 7/1/08, \$281,610, yr 3 of 5.

Dr. Kadir Aslan, NIH K25, "Ultra Fast and Sensitive Fluorescence-Based Clinical Assays," 7/1/08, \$127,440, yr 1 of 5.

Dr. Chris Geddes, Medimmune Inc., "Ultra-Fast DNA Immunoassays," 8/1/08, \$156,141, yr 1 of 1.

Dr. Ilia Baskakov, NSF, "Generating Electrical Power by Coupling aerobic microbial photosynthesis to an electron-harvesting system," 8/15/08, \$90,000, yr 1 of 1.

Publications

Wang W, Fang H, Groom L, Cheng A, Zhang W, Liu J, Wang X, Li K, Han P, Zheng M, Yin J, Wang W, Mattson MP, **Kao JP**, Lakatta EG, Sheu SS, Ouyang K, Chen J, Dirksen RT, Cheng H. Superoxide flashes in single mitochondria. *Cell*. 2008 Jul 25;134(2):279-90.

Apostolou A, Shen Y, Liang Y, Luo J, **Fang S**. Armet, a UPR-upregulated protein, inhibits cell proliferation and ER stress-induced cell death. *Exp Cell Res*. 2008 Aug 1;314(13):2454-67.

Hund TJ, Ziman AP, **Lederer WJ**, Mohler PJ. The cardiac IP3 receptor: uncovering the role of "the other" calcium-release channel. *J Mol Cell Cardiol*. 2008 Aug;45(2):159-61.

Guatimosim S, Amaya MJ, Guerra MT, Aguiar CJ, Goes AM, Gómez-Viquez NL, Rodrigues MA, Gomes DA, Martins-Cruz J, **Lederer WJ**, Leite MF. Nuclear Ca^{2+} regulates cardiomyocyte function. *Cell Calcium*. 2008 Aug;44(2):230-42.

Patents

J. Lakowicz, Z. Gryczynski and **Chris Geddes**, Optical Structures for Metal-Enhanced Sensing, US Patent No. 7,400,397 B2, issued July 15, 2008.

Talks and Travels

Dr. W. Jonathan Lederer, Invited Speaker, FASEB Conference on Calcium and Cell Function, "Calcium sparks and muscle function," Snowmass, CO, July 6-11, 2008.

Dr. Mariusz Karbowski, Invited Speaker, Gordon Research Conference Cell Death: Molecules That Specify the Variety of Cell Death Mechanism, "Identification of a novel E3 ubiquitin ligase that controls turnover of Bax and apoptosis," Lucca (Barga) Italy, July 6-11, 2008.

Bits and Pieces

Faculty Time Sheets Go Online: Keeping track of vacation days or holidays just got easier for the faculty. They can now log in the UMBI's Human Resources computer site through UMCP to enter leave and check their totals. Staff members have been doing it online for sometime. This eliminates substantial paperwork for Dannielle Watkins, our own HR person who had to keep track of the monthly time sheets.

Tim Hughes Back to Work: After his open heart surgery the end of June, Tim finally got back to work in August, first coming in several days a week and then finally full time. He was not allowed to drive until then. Welcome back!

MBC's Lederer Organizes Gordon Research Conference: MBC Director W. Jonathan Lederer was co-organizer of the Cardiac Regulatory Mechanisms conference sponsored by the Gordon Research Conferences held July 20-25 at Colby-Sawyer College. The nearly week-long conference is one of the more prestigious research meeting in cardiology. Other MBC participants included Dr. Brian Hagen, Dr. Julio Altamirano, Dr. Leyla Teos, Dr. Andrew Ziman and Dr. Didier Brochet.

Summer Seminars:

- Dr. Sorin Luca, NIH, presented a seminar entitled "Solid-state NMR studies of protein aggregates: Amyloid fibrils and bacterial inclusion bodies" on July 31, 2008.
- Dr. Tara Hessa from NICHD/NIH gave a talk entitled "Membrane Proteins Insertion and Mislocalization: Structural and Mechanistic Studies" on August 27, 2008.
- Blake Billmyre, a summer intern from UMCP in Dr. Ilia Baskakov's laboratory, spoke on "Photosynthetic Microbial Fuel Cells," August 28, 2008.

Dr. Chris Geddes, Seminar Speaker, "Metal-enhanced Fluorescence: A change in the way we both use and think about fluorescence spectroscopy," COMB, UMBI, July 23, 2008.

Dr. Shengyun Fang, invited speaker, "Protective cellular responses to ER stress," National Institute on Drug Abuse, Bethesda, MD, August 5, 2008.

Dr. Chris Geddes, invited speaker, "Metal-Enhanced Fluorescence", University of Maryland BioPark, August 11, 2008.

Dr. Chris Geddes, invited speaker, "Metal-Enhanced Fluorescence: A paradigm shift in fluorescence and its applications", NIST, August 14, 2008.

Dr. Chris Geddes, invited speaker, "Metal-Enhanced Fluorescence: Anthrax detection in less than 30 seconds", National Defence Laboratory, Porton Down, UK, August 23, 2008.

Dr. Chris Geddes, invited speaker, NIH NIAID Webinar, "Microwave-Accelerated Metal-Enhanced Fluorescence", August 27, 2008.