



MCDB News

Molecular, Cellular, and Developmental Biology

Fall 2005

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ERAN PICHERSKY AWARDED COLLEGIATE PROFESSORSHIP

MCDB Professor, Eran Pichersky, was recently honored by being named a Collegiate Professor by the College of LS&A in recognition of his truly extraordinary record of accomplishment in research, service and teaching. His title will be the Michael M. Martin Collegiate Professor of Molecular, Cellular and Developmental Biology.



Eran Pichersky

JAMES BARDWELL NAMED HHMI INVESTIGATOR

MCDB Associate Professor, James Bardwell, has been selected as a Howard Hughes Medical Institute investigator effective September 1, 2005. Jim will join a prestigious group of about 300 HHMI investigators



James Bardwell

serving as faculty members at host institutions, like the University of Michigan, which has a long-term collaborative relationship with the HHMI.

NEW MCDB WEBSITE

MCDB is pleased to announce the launching of our new departmental website on September 1st, 2005. We hope you will find it informative and “search friendly.” In addition to a new graphical design and greatly enhanced navigation capability, we expanded the content of the site to include new sections such as:



- Faculty News – Up-to-date information on faculty happenings in MCDB.
- People Directories – Faculty, Graduate Students, Office of the Chair and Staff directories featuring pictures and various sort capabilities.
- Research – Descriptions of the six major research areas of focus in MCDB, an Area of Interest directory to quickly identify faculty members by area of focus with

links to individual faculty lab websites.

- Alumni Section – A brand new section just for our alumni including a Directory, Newsletters, Alumni News, Donation Opportunities, Endowments, and a Donor Honor Roll.

Our goal in designing a new website was to make it easier for external and internal viewers to get in touch with and learn more about MCDB. We hope it is an enjoyable viewing experience!

You can access the new site at <http://www.mcdb.lsa.umich.edu>.

A MESSAGE FROM THE CHAIR

I am pleased to report great progress on all four of the initiatives I told you about in the 2004 newsletter.

First, we have a superb group of new faculty members. Pamela Raymond and Gyorgyi Csankovszki add strength in Developmental Biology, while Yanzhuang Wang and Tzvi Tzfira add strength in Cell Biology and Biochemistry. We continue to actively recruit new faculty to the Department with the focus of recruiting for the coming year on the areas of neurobiology and animal physiology.

Second, as far as undergraduate education, we have now activated a new major in neuroscience and reactivated the dormant major in microbiology. This year, the major topic that we will be dealing with is

the organization of courses for first and second year students.

Third, in December 2005 we will begin moving undergraduate lab courses into the new Undergraduate Science Building. This building, which is located between the Dental School and the Life Science Institute, will be the home of most of our lab classes and also has classrooms with a variety of innovative new designs that will foster interaction between students.

Fourth, the planning phase for a new building to house MCDB research has just been completed. Pei Cobb Freed and Partners and the SmithGroup have come up with an exciting plan for the building, and we are awaiting authorization to move forward to schematic design and construction.



Richard Hume
Arthur F. Thurnau Professor and Chair

We always are glad to hear from graduates of our programs, so please send a note or an e-mail message to MCDB.alumni@umich.edu if there is news you would like to share, or if you would like more information about developments in the Department.

SCIENCE SPOTLIGHT WITH URSULA JAKOB

Stress is what Ursula Jakob and her team handles best, particularly oxidative stress, which goes hand in hand with living a life with oxygen. An unavoidable



Ursula Jakob

consequence of breathing air is the continuous production of reactive oxygen species inside the cells. These are remarkably potent oxidants and are able to destroy many different cellular components including DNA, proteins and membranes. It is therefore not surprising that organisms have developed defense systems that efficiently neutralize reactive oxygen species and avert the danger. When these defense systems become overwhelmed, however, cells become oxidatively stressed and the toxic effects of reactive oxygen species prevail. Many

normal and disease conditions have now been shown to be associated with and may even be caused by the accumulation of reactive oxygen species. These include aging, neurodegenerative diseases such as Alzheimer's disease and Parkinson's disease, diabetes, and cancer.

During her postdoctoral work, Ursula Jakob discovered the protein Hsp33, which is not damaged by oxidative stress but rather uses reactive oxygen species as the trigger to turn on its

Ursula Jakob continued on page three

OUR NEW FACULTY

Pamela Raymond



Professor Pamela Raymond joins our department from the Department of Cell & Developmental Biology at UM's Medical School. Her research involves the molecular basis of cell-cell interactions that regulate retinal neurogenesis and neuronal specificity during development and regeneration.

Yanzhuang Wang



Assistant Professor Yanzhuang Wang has joined us from the Yale University School of Medicine. He served as an associate research scientist with Dr. Graham Warren in the department of Cell Biology. His research involves the Golgi apparatus, specifically the identification of proteins that help generate and maintain the Golgi structure.

Gyorgyi Csankovszki



Assistant Professor Gyorgyi Csankovszki is joining Michigan from the University of California, Berkeley, where she served as a postdoctoral research fellow in the lab of Dr. Barbara Meyer. Her research focuses on the role of condensin complexes in establishing higher order chromosome structure and regulating gene expression.

Tzvi Tzfira



On January 1, 2006, Assistant Professor Tzvi Tzfira will join the department from the State University of New York, Stony Brook, where he completed his postdoctoral research in the lab of Dr. Vitaly Citovsky. His research focuses on the identification and characterization of plant protein(s) involved in T-DNA nuclear import, uncoating, and integration.

Ursula Jakob continued
activity. This work was published in the journal *Cell*, regarded by many as the most prestigious biological journal in the world. She found that Hsp33 is member of a rapidly growing family of redox-regulated proteins that form part of a sophisticated cellular strategy that allows cells to fight excess levels of reactive oxygen species. Hsp33 is a highly potent molecular chaperone,

When these defense systems become overwhelmed... cells become oxidatively stressed and the toxic effects of reactive oxygen species prevail.

which becomes specifically activated in cells exposed to oxidative stress, and protects other cellular proteins from oxidative damage. During her tenure as a faculty member, Ursula Jakob and her lab discovered the mechanism by which Hsp33 senses and responds to oxidative stress, making Hsp33 a paradigm for redox sensing proteins that use zinc centers as redox switches.

The major focus in her lab is now to find other redox-regulated proteins and to identify sources and targets of oxidative stress during the aging process. To achieve this goal, the Jakob lab has developed a global screen to detect and identify redox sensitive proteins in the cell and use oxidative stress sensors to monitor oxidative stress *in vivo*. These techniques provide them with the ability to obtain an *in vivo* snapshot of the redox status of proteins during the aging process and to possibly even determine which oxidants are responsible for aging.

EMERITUS HONORS

Lewis Kleinsmith, Ph.D., was named Professor Emeritus of Molecular, Cellular, and Developmental Biology on December 31, 2004, following 35 years as a faculty member at the University of Michigan. Professor Kleinsmith joined the University of Michigan faculty as Assistant Professor in 1968, and was subsequently promoted to Associate Professor (1971) and Professor (1975). Much of Professor Kleinsmith's research at Michigan was devoted to a further elucidation of the role of phosphorylation of proteins of the cell nucleus in regulation of gene expression. For his research accomplishments he was named a fellow of the American Association for the Advancement of Science. Professor Kleinsmith was also named an Arthur F. Thurnau Professor and received awards from the Governor of Michigan and the Michigan Technology Council.

IN MEMORIAM

Dr. Patricia Stocking Brown
(1942 – 2004)

Dr. Patricia Stocking Brown passed away at her home on November 13, 2004. Dr. Brown earned her BS, MS, and Ph.D. (1968) in Zoology from the University of Michigan. She was a Biology member at Siena College (New York) from 1969 to 1980 where she was professor and department chair for several years.

Barb Madsen

Barb Madsen passed away over the weekend of June 11th, 2005. Barb was an alumna of the Botany Department and a longtime friend and associate of many of the plant ecologists and systematists in the Department. Barb's two great passions were her work on Michigan botany, particularly bogs and vocal ensemble Vox.



The Michigan Difference

Funding priorities for MCDB
and detailed descriptions are
available at:

[http://www.lsa.umich.edu/
UofM/Content/lsa/
document/MCDB-product.pdf](http://www.lsa.umich.edu/UofM/Content/lsa/document/MCDB-product.pdf)

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MCDB FACULTY HAPPENINGS

Bob Denver assumed regular member status of an NIH Study Section. He also served as Secretary/Treasurer of the International Federation of Comparative Endocrine Societies (IFCES) and chair-elect of the Division of Comparative Endocrinology of the Society for Integrative and Comparative Biology.

Daniel Klionsky became Editor-in-Chief of *Autophagy*, a new peer-reviewed journal with an international audience.

Janine Maddock was elected for a three year term as an LSA representative on the University Senate Assembly.

Laura Olsen was selected by the University to attend the 2005 national Center for Integration of Research, Teaching & Learning Forum held in Madison, Wisconsin.

Kathryn Tosney was Keynote Speaker at the 7th Annual Enriching Scholarship Conference held at the University of Michigan.

FOURTH AND FIFTH PRISCILLA CONNELL MEMORIAL LECTURES

The fourth Priscilla Connell Memorial Lecture held Tuesday, November 16,



Dr. Roger Tsien

2004, featured Dr. Roger Tsien, Professor of Pharmacology, Chemistry, & Biochemistry University of California, San Diego and HHMI

Investigator. Dr. Tsien presented his talk on “Genetically and Proteolytically Targeted Contrast Agents: From Ultrastructure to Clinical Samples.” Dr. Roger Tsien’s research has been at the interfaces between organic chemistry, cell biology, and neurobiology. He is best known for designing and building molecules that either report or perturb signal

transduction inside living cells. He is also developing new ways to target contrast agents and therapeutic agents to tumor cells based on their expression of extracellular proteases.

Monday, March 21, 2005, Dr. Susan L. Lindquist presented her talk on “The Amazing Biology of Protein Folding and Misfolding” at the fifth Priscilla Connell Memorial Lecture. Dr. Susan Lindquist is a Professor of Biology at the Massachusetts Institute of Technology and member of the Whitehead Institute for Biomedical Research. Dr. Lindquist is a pioneer in the study of the stress response and protein folding. Lindquist is widely known for her groundbreaking work on how changes in protein conformation affect processes such as



Dr. Susan Lindquist

stress tolerance, neurodegenerative disease and heredity. Her research has provided critical support for a new genetic theory wherein biological changes are passed from generation to generation through assemblies of misshapen proteins rather than through changes in DNA and RNA.

These lectures were made possible from a generous endowment by Mr. Paul Connell, in loving memory of his wife Priscilla Harrison Connell. Priscilla Connell was a renowned nature photographer whose work has appeared in Sierra Club and Audubon Society magazines and calendars, as well as other notable publications. She won the Roger Tory Peterson award for her breathtaking simplicity in capturing the beauty of nature.

2004 SPONSORED RESEARCH HIGHLIGHTS



Cadigan, Kenneth

AHA The Role of Direct Transcriptional Repression by Wnt Signaling in Heart Development and Repair

Cadigan, Kenneth

AHA Genetic and Biochemical Characterization of Tou, a Putative Chromatin Remodeling Factor Involved in Wnt Signaling

Duan, Cunming

NSF Regulation of IGF action by 16F Binding Proteins in Fish

Denver, Robert

NIH Hormone and Activity-Dependent Neural Gene Expression

Pichersky, Eran

USDA Biosynthesis of Methylketones in Tomato Glands

Schiefelbein, John

USDA Molecular Control of Root Hair Cell Specification



POSTDOCTORAL FELLOWS WHERE ARE THEY NOW?

Chen, Feng, Assistant Professor at the University of Tennessee in Knoxville, TN.

Crespi, Erica, Assistant Professor at Vassar College in Poughkeepsie, NY.

Fridman, Eyal, Lecturer at the Hebrew University of Jerusalem in Rehovot, Israel.

Guan, Ju, Research Scientist at the University of Tennessee in Knoxville, TN.

Li, Yun, Associate Professor at Southwest Agricultural University in Chongqing, China.

Nakamoto, Hitoshi, Associate Professor at Saitama University in Saitama, Japan.

Shintani, Takahiro, Associate Professor at Tohoku University in Sendai, Japan.

Katherine Steinkraus (Klionsky) “Analysis of Genetic Components in the Cytoplasm to Vacuole Targeting Pathway and Autophagy in *Saccharomyces cerevisiae*.” Katherine is currently a postdoctoral fellow at the Division of Basic Sciences at the Fred Hutchinson Cancer Research Center.

Ashwini Joglekar (Hay) “Characterization of Structure and Function of a Mammalian ER/Golgi SNARE complex.” Ashwini is currently an associate licensing manager at the Intellectual Property Office of the Children’s Hospital in Boston.

PHD DEGREES GRANTED

Hua Lin (Cadigan) “Molecular and Genetic Mechanisms Underlying Wingless Signal Transduction and Signaling Dependent Cell Fate Determination.” Hua is currently a postdoctoral fellow at Columbia University.

Qin Li (Kuwada) “Functional Analysis of Chemokine Signaling in Zebrafish Development.” Qin is currently a postdoctoral fellow in the lab of Doug Black, an Associate Investigator of the Howard Hughes Institute and Associate Professor of the Dept. of Microbiology and Molecular Genetics at UCLA.

Brody DeYoung (Clark) “Genetic and Biochemical Characterization of BAM1 and BAM2, Regulators of Multiple Aspects of Development in *Arabidopsis Thaliana*.” Brody is currently a postdoctoral fellow with Roger Innes at Indiana University studying disease resistance in plants.

Aaron Wyman (Yocum) “Analysis of the Heat Stability, Folding Dynamics, and Structure of the Manganese Stabilizing Protein of Photosystem II.” Aaron is currently an assistant professor in the Chemistry Department at Wabash College in Crawfordville, IN, teaching organic chemistry and biochemistry.

Dalu Xu (Hay) “Reconstitution of Homotypic COPII Vesicle Fusion to Generate a Pre-Golgi Intermediate Compartment.” Dalu is currently a postdoctoral fellow at the Goethe University medical school.

Haruki Hasegawa (Hay) “Molecular mechanism that regulates solubility, subcellular localization, and SNARE assembly activity of neuronal SNARE ykt6.” Haruki is currently a postdoctoral fellow at NIH in Rockville, MD.

Peng Peng (Li) “Functional Investigation of the Role of a Plant GSK3 Kinase (BIN2) in Brassinosteroid Signaling Pathway.” Peng is currently working in Steven Jacobsen’s lab as a postdoctoral research associate at UCLA, Department of MCDB.

Kaustuv Datta (Maddock) “Characterization of Mtg2p, a Mitochondrial Ribosome Associated GTP-binding protein.” Kaustuv will be moving to a postdoctoral fellow



PhD Degrees continued on page seven

position in the lab of Larry Gerace at the Scripps Research Institute in La Jolla, CA.

Christopher Rosario (Bender)
“Multiple Modes of Regulation by the LysR-type the LysR-type Protein,

NAC.” Christopher will be moving to a postdoctoral fellow position at UC Davis in the lab of Professor Mitch Singer, working on developmental biology of *Myxococcus xanthus*.

James Regeimbal, Jr. (Bardwell)
“Investigating the Mechanism of the

DsbB Holoenzyme.” James is currently a postdoctoral fellow with Darren Higgins at the Department of Microbiology and Molecular Genetics at Harvard Medical School.

2004 UNDERGRADUATE HONORS RECIPIENTS

Honors in Cell and Molecular Biology

Highest Honors

Janna Hutz, The Mouse *adrenocortical dysplasia (acd)* Mutant Phenotype is caused by a Splicing Defect in a Ubiquitously Expressed Novel Gene.

High Honors

Nisha Duggal, The Role of CRE and C/EBP Sites in the Regulation of ATF3 by GH.

Amanda Elliott, A Study of Tumor Identification, Angiogenesis and Cytokine Involvement.

Emily Fox, Mechanisms of Leukemic Transformation by MLL-CALM: Identification of a CALM-derived Transcriptional Regulatory Domain.

Andrea Hunt, Genetic Mapping of a Novel Gene Resulting in Skeletal Dysplasia and Male Infertility.

Rosalyn E. Maben, Consumption of Phenolic Compounds Causes Oxidative Stress in the Midgut Tissues of *Malacosoma*.

Karl A. Merrick, Development of the Biological Tools Necessary to Detect Protein-Protein Interactions in the Rho Family by FRET/FLI.

Shilpa S. Murthy, Transcriptional Regulation and Functional Characterization of Hepsin, a Type

II Transmembrane Serine Protease, in Prostate Cancer.

Brandon Stone, Vascularization and Cell Proliferation of the Pituitary Gland during Development.

Stephen A. VanHaerents, C-terminal Regulation of the Redox-regulated Chaperone Hsp33.

Joshua W. Ziel, Characterization of Villin Expression in the Mouse Stomach: Villin Marks a Pool of Early Progenitor Cells.

Honors

Casey D. Curtis, Plant Species Diversity Enhances the Fungal Biomass and Activity in an Experimental Grassland.

Richard G. Everson, The Modulation of Zebrafish Development and Retinogenesis by the Novel Growth Factor Progranulin.

Yael Holoschitz, Glucocorticoid Regulation of Dopamine Activity in the Periventricular Nucleus of the Hypothalamus.

Kevin M. Kapadia, RNA Pol II and RNA Pol III-driven Promoter Elements in Neighboring Genes.

Gerald Tomasek, Characterization of Atg6 and Atg3: Two Proteins Required for the Proper Functioning of Autophagy in *Arabidopsis thaliana*.

Honors in Biology

High Honors

Margaret M. Hopeman, Strain Distribution of LOS Genes in Nontypeable *Haemophilus influenzae*.

Megan H. Shilts, Flat Oysters (Mollusca: Bivalvia: Ostreinae) Show Evidence of Allopatric Speciation, an Evolutionarily Rapid Ecological Transition and Introgression among Developmentally Heterogeneous Taxa.

Lyssa A. M. Sperlich, *Myotis septentrionalis* (Northern Long-Eared Bats) Outperform *Myotis lucifugus* (Little Brown Bats) in a Flight-cage Foraging Experiment.

Honors

Jonathan Egle, *Drosophila melanogaster* as a Model for Stress Response: Drugs of Abuse and Oxidative Stress.

Emily V. Moran, A Revision of the Genus *Erato* (Asteraceae: Liabeae).

Kevin I. Rosenberg, Does the *Pitx2* Transcription Factor Regulate Wnt Signaling during Eye Development?

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