Cellular & Molecular Biology

CMB Newsletter; May 2010

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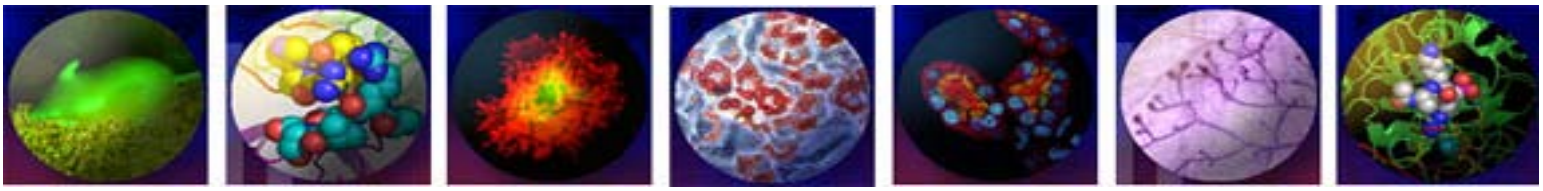


CMB Events Calendar

May 21-23 CMB Retreat, Kellogg Biological Station Conference Center, Battle Creek, MI

June 18 Thesis Defense: **Steven Philips** (mentor: Theodora Ross) 2:00 PM, 2901 TML

July 14 Thesis Defense: **Joshua Scheys** (mentor: Gary Hammer) 2:00pm, 2901 TML

July 15 Thesis Defense: **Shenghui He** (mentor: Sean Morrison) 10:00am, 5915 Buhl

July 30 Thesis Defense: **Joseph Dosch** (mentor: Charles Burant) 1:00pm, 2901 TML

July 30 Abstract deadline for CMB Fall Poster Session

Sept 10 CMB Fall Symposium and Poster Session; Levine Lecturer: Dr. Patrick Brown, Stanford Univ.

Rackham Amphitheatre. Poster Session-Michigan League

Sept 13 First session of **CMB 850 Student Seminar**

Oct-Dec Fall Short Course, CMB 630

No Cell is an Island: Exploring Stem Cell Microenvironments

Nov 4 Fiona Doetsch, Columbia Univ

Nov 11 Amy Wagers, Harvard Medical School

Dec 7 Allan Spradling, Carnegie Inst

Dr. Bruce Spiegelman to Deliver Inaugural CMB Retreat Keynote Address

CMB is delighted to have Dr. Bruce M. Spiegelman as its keynote speaker at this year's CMB Retreat. Dr. Spiegelman is professor of cell biology at the Dana-Farber Cancer Institute, Harvard Medical School. His research focuses on cell differentiation, cellular metabolism and genetic factors involved in obesity and diabetes. His team has made important discoveries including the identification of a master regulator of fat development called PPAR-γ. His team showed that a critical metabolic protein PGC-1α regulates oxidative metabolism in multiple tissues, and this may be related to diabetes, obesity and neurodegenerative disease. Among his many honors Dr. Spiegleman was elected to both the National Academy of Sciences and the American Academy of Arts and Sciences in 2002, and in addition serves on the Scientific Advisory Board of the Howard Hughes Medical Institute. Dr. Speigelman has also been recognized for his work, including the recent Naomi Berrie Diabetes Center Award for outstanding research in the development of treatments in both Type I and Type II Diabetes. His talk at the Retreat, entitled "Regulation of Adipogenesis and Systemic Energy Metabolism", will be an exciting and informative experience for all CMB students.

Letter from the Directors

CMB launched several new features this year which facilitate communication among students and faculty:

The series of monthly **Student-Faculty Lunches**, informally organized around common research interest groups, were described by students and faculty as unique and valuable events. In addition to following suggestions for discussion on topics not generally addressed in other venues, participants often spontaneously turned to discussion of career issues, where students heard multiple perspectives and personal experiences from faculty.

CMB also held **Faculty Meetings** in April, to update CMB faculty formally on new aspects of the CMB Program, including revised curriculum and prelim exam guidelines, the comprehensive faculty review procedure to take place this summer, and plans for the upcoming CMB Training Grant renewal application to be submitted to NIH in January 2011. All faculty and students should watch for emails, starting this July, describing information needed for the Training Grant application. In addition, Rackham Dean Janet Weiss attended the faculty meetings to explain the Continuous Enrollment policy, to be implemented University-wide starting Sept 2010 (http://www.rackham.umich.edu/policies/continuous_enrollment/).

Dave Engelke, Assoc Dean at Rackham and CMB faculty member, presented information on Mentoring resources available through Rackham (http://www.more.umich.edu/) and a variety of student funding resources available from Rackham.

The much-awaited **CMB Retreat** will take place May 21-23 at Kellogg Biological Station in Battle Creek. The inaugural Retreat features a keynote address by Dr. Bruce Spiegelman of Harvard/Dana-Farber (he will also present Medical Grand Rounds on May 21st at noon). The Retreat Program also features oral and poster presentations on student research. In addition, four CMB alumni are returning to present their career experiences in academia, industry, law and government. We all appreciate the organizational efforts of the Retreat Committee composed of students Winnie Chen, Ken Krill, Grace Lin and Gautam Rajpal, and faculty Ivan Maillard and Donna Martin.

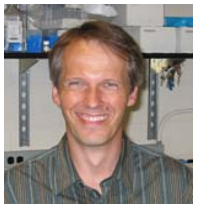
All CMB faculty and students are encouraged to link their own websites to the CMB website (www.med.umich.edu/cmb); contact the CMB Office for information or to arrange for technical assistance.

This has been an active and productive year for CMB, and we look forward to continuing participation of all CMB students and faculty.

Jessica, Kathy, Anj and Ursula

Meet the New CMB faculty

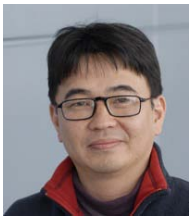
Ben Allen, Ph.D. (Asst Professor of Cell and Developmental Biology)
Research in the Allen Lab is broadly focused on understanding the mechanisms of growth factor and morphogen signaling in development and disease. Specifically, we study the regulation of Hedgehog (Hh) signaling during vertebrate embryogenesis using mouse developmental genetics, chick *in ovo* electroporation, biochemistry, and cell biology. The long-term goal of our research is to apply our knowledge of Hh signaling in normal development to the treatment of Hh-dependent diseases.



Markus Bitzer, M.D. (Asst Professor of Internal medicine, Nephrology)
My research attempts to discover new mechanisms and biomarkers for progressive organ fibrosis using the kidney as a model system. Our focus is on the identification of crosstalk between signaling cascades including TGF-beta and Growth Hormone signaling and on the role of small non-coding RNAs in this process. We are applying models of acute and chronic kidney injury to mutant and transgenic mice and rats and use cell culture systems for further analysis.

William Dauer, Ph.D. (Assoc Professor of Neurology, Cell and Developmental Biology)
The central goal of the Dauer laboratory is to unravel the molecular and cellular mechanisms of diseases that disrupt the motor system. Our primary focus is on Parkinson's disease and DYT1 dystonia. Our efforts are focused on disease genes that cause these disorders, employing a range of molecular, cellular, and whole animal studies to dissect the normal role of disease proteins, and how pathogenic mutations lead to disease.

Diane Fingar, Ph.D. (Asst Professor of Cell and Developmental Biology)
The Fingar Lab studies an evolutionarily conserved protein kinase called mTOR that promotes fundamental cell biological processes such as cell growth/size, cell proliferation, and cell metabolism. A major focus of the lab is to elucidate the poorly defined molecular mechanisms by which cellular signals directly modulate mTOR signaling, positively and negatively. As aberrant mTOR signaling is implicated in a host of human diseases, molecular understanding of mTOR regulation should allow us to better develop novel, rationally-designed therapeutics.



Ken Inoki, Ph.D. (Asst Professor of Molecular & Integrative Physiology, Life Sciences Institute)
The Inoki lab is investigating the function and regulation of the mTOR signaling pathway and also elucidating the role of mTOR signaling in the development and progression of human diseases such as diabetes and cancer.

Sundeep Kalantry, Ph.D. (Asst Professor of Human Genetics)
The identification of factors and mechanisms that bring about heritable changes in gene expression is the focus of our research. We study X-chromosome inactivation (XCI). XCI is easily detected, and makes an excellent model system to investigate transcriptional memory mechanisms. The memory mechanisms that operate during XCI also apply to gene regulation elsewhere and are important in cell fate decisions during embryogenesis, in stem cell biology, and during disease progression.

Jun Li, Ph.D. (Asst Professor of Human Genetics, Center for Computational Medicine and Biology)
The Li lab studies the genetic basis of complex human diseases. Currently our interests include analyses of gene expression patterns in postmortem brain tissues associated with major depression, bipolar disorder, and schizophrenia, genome wide association study of bipolar disorder, integrated data analysis for the Cancer Genome Atlas Project, population genetics studies, copy number variation in population and disease samples, and application of massively parallel sequencing methods.

Malcolm Low, M.D., Ph.D. (Professor of Molecular and Integrative Physiology, Internal Medicine)
Dr. Low's current research focuses on the hypothalamic neurons that produce peptide transmitters from the proopiomelanocortin gene. These POMC neurons play a critical role in the regulation of appetite and metabolism and dysfunction in their associated neural circuits produces morbid obesity and type 2 diabetes.

Marina Pasca di Magliano, Ph. D. (Asst Professor of Surgery, Cell and Developmental Biology)
Dr. Pasca di Magliano's research concentrates on the formation and progression of pancreatic cancer, with a focus on signaling pathways, such as Hedgehog and Wnt., that are activated during carcinogenesis. In particular, how these signaling pathways mediate the interactions of tumor cells with components of the tumor stroma. Her work also explores the link between inflammation and pancreatic cancer.

JoAnn Sekiguchi, Ph.D. (Asst Professor of Human Genetics, Internal Medicine)
The Sekiguchi lab studies mechanisms of DNA repair and how defective repair processes impact genomic stability, predisposition to cancer and immune system development. We use biochemical, cellular and molecular approaches as well as animal models to elucidate the consequences of gene mutations associated with human cancer predisposition and immunodeficiency syndromes.

Recent CMB Graduates

Ferdous Barlaskar (mentor: G. Hammer), Identifying, modeling and targeting IGF-II overexpression in adrenocortical carcinoma. Ferdous will continue to work in the Hammer lab before returning to 3rd year medical school in the spring.

Eric Garcia (mentor: A. Telesnitsky), Moloney murine leukemia virus RNA recruitment. Eric is continuing his research projects in the Telesnitsky Lab while looking for postdoctoral opportunities.

Victoria Kelly (mentor: G. Hammer), Regulation and Role of Dax1 in Mouse Embryonic Stem Cells. Victoria will continue to work in the Hammer Lab through the summer while pursuing postdoctoral opportunities in the stem cell field.

Nathan Lanning (mentor: C. Carter-Su), Novel Roles of the Adapter Protein SH2B1β in the Modulation of Growth Hormone-Induced Regulation of the Actin Cytoskeleton. Nate is a postdoctoral fellow in the laboratory of Dr. Jeff MacKeigan at the Van Andel Research Institute in Grand Rapids, MI. There, Nate will employ a systems biology approach to study the contributions of mitochondrial dysfunction to disease.

Troy Lionberger (mentor: E. Meyhofer), Regulating gene expression through DNA mechanics: Tightly looped DNA represses transcription. Troy will be a postdoctoral fellow with a joint appointment in the labs of Noel Perkins in the Dept of Mech Eng at the Univ of Michigan and James Maher in the Dept of Biochem and Mol Biol at the Mayo Clinic Coll Med.

Mary Piper (mentor: S. Gerrard), Rift Valley Fever Virus Assembly and Release." Mary will enter the General Epidemiology Master's of Public Health program at the Univ of Michigan School of Public Health.

Elizabeth Wonderlich (mentor: K. Collins), Nef Commandeers Host Cellular Factors to Promote HIV-1 Immune Evasion. Elizabeth is a postdoctoral fellow in Dr. Simon Barratt-Boyes' lab at the Univ of Pittsburgh where she studies the mobilization of dendritic cells during SIV infection in Rhesus Macaques.

Recent Student Publications

Brackenbury WJ, **Calhoun JD**, Chen C, Miyazaki H, Nukina N, Oyama F, Ranscht B, Isom LL. Functional reciprocity between Na+ channel Nav1.6 and beta1 subunits in the coordinated regulation of excitability and neurite outgrowth. PNAS. 2010. 107(5):2283-8.

Dosch JS, Pasca di Magliano M, Simeone DM. Pancreatic Cancer and Hedgehog Pathway Signaling: New Insights. Pancreatology. 2010. 10: 151-157.

Dumas KJ, Guo C, Wang X, Burkhart KB, Adams EJ, Alam H, Hu PJ. Functional divergence of dafachronic acid pathways in the control of C. elegans development and lifespan. Dev Biol. 2010. 15;340(2):605-12.

Moore P, Bernardi K, and Tsai B. The Ero1alpha-PDI redox cycle regulates retro-translocation of cholera toxin. Mol Biol Cell. 2010. 21(7): 1305-13.

Pan Q, **Rosenthal DT**, Bao L, Kleer CG, Merajver SD. Antiangiogenic tetrathiomolybdate protects against Her2/neu-induced breast carcinoma by hypoplastic remodeling of the mammary gland. Clin Cancer Res. 2009.15(23):7441-6.

Xu T, **Shively CA**, Jin R, Eckwahl MJ, Dobry CJ, Song Q, Kumar A. A profile of differentially abundant proteins at the yeast cell periphery during pseudohyphal growth. J Biol Chem. 2010. 285(20):15476-88.

30th CMB Symposium - Sept 10, 2010

The Annual CMB Symposium is scheduled to take place on Friday, September 10, 2010.
The Myron Levine Lecture will be given this year by Dr. Patrick O. Brown from Stanford University School of Medicine. Dr. Brown is a proponent of open access publishing, and was a founding member of PLoS, the Public Library of Science. According to his PLoS biography, he joined the Howard Hughes Medical Institute and Stanford University School of Medicine in 1988, where he is currently a professor in the department of biochemistry. His current research activities include systematic studies of global gene expression programs and their regulation; the use of DNA microarrays and other "genomic" approaches to explore fundamental questions in cell biology, physiology, and development; and the development and application of new high-dimensional molecular profiling methods for detection and diagnosis of disease.

Dr. Brown's lecture will take place in Rackham Amphitheatre, and will be followed by the Annual Poster Session in the Michigan League Ballroom.

Winter 2010 Short Course

The theme of the Winter 2010 short course, Genetics of Neurodegeneration, attracted large audiences of interested faculty and students. The fields of human disease genetics and neurodegeneration have intersected and produced a burgeoning field.

Dr. Jonathan Haines, from Vanderbilt University, discussed examples of his work using Genome-Wide Association Study (GWAS), in particular the finding that a common coding variant in the complement factor H gene increases the risk for age-related macular degeneration (AMD) and may account for >40% of AMD cases. Dr. Robert Brown, from the University of Massachusetts, Worcester, presented a translational medicine project with the goal of using viral-mediated knockdown of toxic mutant proteins such as human SOD1 in Lou Gehrig's disease as a potential treatment for human patients. Dr. James Lupski, from Baylor College of Medicine, focused his talk on recent work proposing a detailed mechanism for the generation of non-recurrent genomic rearrangements which have been associated with genomic disorders.

CMB students gained an appreciation for how geneticists approach the problem of elucidating the etiology of neurodegenerative disorders. The lunch/discussion sessions were attended by CMB students and discussions were wide-ranging, from the potential for viral-mediated silencing as gene therapy for human disease to the merits of next-generation whole-genome sequencing as a research tool.

CMB Newsletter. Editors: Hilary Archbold, Jeff Calhoun, and Dara Leto. Contributors: Winnie Chen, Ken Krill, Grace Lin Gautam Rajpal, Mindy Waite, and Cathy Mitchell.

Spotlight on: CMB Retreat Career Panel

Four CMB alumni/ae are attending the CMB Retreat to discuss their career paths after graduating from CMB.

Government:

Dr. Paul Graf is Head of the Parasitology Dept at Naval Medical Research Center Detachment in Lima, Peru, and has been since November 2008. He is a Lieutenant in the Medical Service Corps of the United States Navy. The main lab is located in Lima, while two satellite facilities are in the Amazon jungle and along the northwestern Pacific coast of Peru. The laboratory focuses on malaria vaccine development, surveillance of antimalarial drug resistance, and surveillance and improved diagnosis for cutaneous Leishmaniasis. Other ongoing protocols include infection of *Anopheles* mosquitoes with blood from malaria patients to produce the vector-borne stages of malaria, and the evaluation of a novel topical cream developed by the US Army for treating cutaneous Leishmaniasis. Paul received his Ph.D. in Dr. Ursula Jakob's lab.

Industry:

Dr. Marsha Ousman Blauwkamp comes to us from the San Francisco Bay area where she works as a staff scientist at Affymetrix Corporation. Affymetrix GeneChip microarray technology is the industry-standard for analyzing complex genetic information. Affymetrix scientists have been dedicated to developing innovative products that provide researchers with a more complete view of the genome. These products enable scientists to develop diagnostics and treatments for individual patients by measuring the genetic information associated with complex diseases. Marsha received her PhD in 2007 from CMB, where she was co-mentored by Ron Koenig and Kate Barald. Marsha's research focused on the role of Bone Morphogenetic Protein 4 (BMP4) signaling in the development of the inner ear.

Patent Law:

Dr. Anavelys Ortiz-Suárez is a patent attorney in Wilson Sonsini Goodrich & Rosati's intellectual property and patent practice. She focuses on the preparation and prosecution of immunology and biotechnology patents, freedom-to-operate and validity analysis, and research related to intellectual property. Prior to joining the firm, Anavelys was a postdoctoral fellow in the laboratory of Dr. Eugene Butcher at Stanford University. She received her Ph.D. at the University of Michigan (mentor: Richard Miller) where her thesis project was to characterize a subset of CD8+ T cells with higher levels of CD28 present only in old mice.

Continued next column

CMB Students Receive Awards

Grant Rowe (left) received the Distinguished Dissertation Award. He is shown with his mentor, **Stephen J. Weiss.**

Grant Rowe was awarded the Distinguished Dissertation Award, the highest honor the University confers to recognize graduate student accomplishments.

Grace Lin received a Rackham Predoctoral Fellowship, which supports outstanding doctoral candidates who are actively working on dissertation research and writing.

Jolie Leonard was awarded the Lipschutz, Ayers Host and Olcott Smith Award, which recognizes and supports outstanding female graduate students University-wide.

Stephanie Linn was the recipient of the Rackham Graduate School Outstanding GSI Award. This award honors Graduate Student Instructors who have demonstrated exceptional ability and creativity as teachers.

Heather Krueger was awarded a Department of Defense Predoctoral Breast Cancer Research Program Fellowship.

Jill Haenfler and **Charlie Kuang** were recipients of Burroughs Wellcome Fund Travel Grants.

Andrew Chervenak received an ARO MidWinter Meeting Travel Award, the Development Traveling Fellowship, and a Rackham International Research Award for a collaboration in Australia. He was also appointed to the HBCS Training Grant.

Guoxiao (Grace) Wang received a Rackham International Student Fellowship.

Jeffrey Calhoun was the recipient of a Rackham Graduate Student Research Grant.

Devin Rosenthal and **Lauren Van Wassenhove** were awarded research grants from the University of Michigan Center for the Education of Women.

Michael Steinbaugh received a Rackham Travel Grant.

Academia:

Dr. Steven Triezenberg received his Ph.D. in CMB in 1984 (mentor: William Folk). He was a postdoctoral fellow at the Carnegie Institution of Washington Department of Embryology in Baltimore from 1984-1987. Dr. Triezenberg then joined the faculty of the Department of Biochemistry and Molecular Biology at Michigan State University where he later also served as Associate Director of the interdepartmental graduate program in Cell and Molecular Biology. Dr. Triezenberg joined the Van Andel Institute in May 2006 as a Scientific Investigator and the founding Dean of Van Andel Institute Graduate School. He became the Director of the Van Andel Education Institute in 2009.