

# **2008 Undergraduate Honors Theses submitted by Biochemical Sciences, Chemical and Physical Biology, and Molecular and Cellular Biology Concentrators**

## **Michael Badgley, (BCHM)**

Quantification of the magnitude of the hematopoietic stem cell (HSC) bone marrow niche and its possible applications

*Dr. David Scadden, Laboratory Sponsor*

## **Brandon Darwin Bartch, (BCHM)**

The Role of the Groucho/transducin-like Enhancer-of-split Protein Family in the Mammalian Retina

*Dr. Connie Cepko, Laboratory Sponsor*

## **Michael Birnbaum, (CPB)**

Synthesis and characterization of four putative kinase ligands discovered through DNA-templated synthesis based in vitro selections

*Dr. David Liu, Laboratory Sponsor*

## **Kelly Massiel Cadenas, (BCHM)**

The Role of GlnA in Biofilm Formation by *Bacillus subtilis*

*Dr. Richard Losick, Laboratory Sponsor*

## **Joyce Chun-Ling Chang, (BCHM)**

Targets of DNA damage response factors in B cells during class switch recombination

*Dr. John Manis, Laboratory Sponsor*

## **Serene Imperia Chen, (BCHM)**

Synapse elimination provokes strengthening of the axonal inputs that innervate mouse submandibular ganglion neurons

*Dr. Jeff Lichtman, Laboratory Sponsor*

## **Daniel Choi, (BCHM)**

Synthesis and Reactivity of Novel Organopalladium(IV) Fluoride Complexes

*Dr. Tobias Ritter, Laboratory Sponsor*

## **Ian Dennis Chong, (BCHM)**

The Effect of WASp/WIP phosphorylation on Natural Killer Cell Cytotoxicity

*Dr. Jack Strominger, Laboratory Sponsor*

## **Jonathan Chow, (BCHM)**

The Effect of HIV Infection on Proteasome Expression and Activity

*Dr. Sylvie Le, Laboratory Sponsor*

## **Katharine Rose Clapham, (BCHM) - Henderson Prize, Hoopes Prize**

A tiny protein links two morphogenetic processes in a bacterium

*Dr. Richard Losick, Laboratory Sponsor*

## **Victoria Clark, (BCHM) - Hoopes Prize**

Alternative Splicing Factor Sfrs10 Is Required for Terminal Differentiation of Rod Photoreceptor Outer Segments in the Mouse Retina

*Dr. Connie Cepko, Laboratory Sponsor*

**Brandon Geller, (BCHM)**

A first molecular phylogeny for the timber beetle family Cerambycidae; Relationships among Subfamilies

*Dr. Brian Farrell, Laboratory Sponsor*

**Sharon Grossman, (CPB)**

Predicting Expression Patterns from Promoter Sequences in the *Saccharomyces Cerevisiae* PHO Pathway

*Dr. Erin O'Shea, Laboratory Sponsor*

**Lewis Dirk Hahn, (BCHM)**

1. Development and Characterization of a Tat-based Gene Delivery System 2. Mediation of Gene Delivery of Lyophilized pDNA-polycation Complexes by Structure

*Dr. David Mooney, Laboratory Sponsor*

**Madelyn Ho, (CPB)**

Characterization of the role of microsomal triglyceride transfer protein in human CD1d-mediated antigen presentation

*Dr. Richard Blumberg, Laboratory Sponsor*

**Jennifer W. Hsu, (BCHM)**

Investigation of Lesions in TGF- $\beta$  signaling pathways in Squamous Cell Carcinoma

*Dr. James Rheinwald, Laboratory Sponsor*

**Supriya K. Jain, (BCHM)**

Genetic Characterization of Colorectal Cancer Tumor-Initiating Cells

*Dr. William Hahn, Laboratory Sponsor*

**Divya Jayaraman, (BCHM)**

Development of a novel cell-free assay for detecting damage-induced single-stranded gaps in chromatin using *Xenopus laevis* egg extracts

*Dr. Matthew Michael, Laboratory Sponsor*

**Gregory Alan Joice, (BCHM)**

Characterization of Adult Zebrafish Renal Repair and the Role of FGF Signaling

*Dr. Alan Davidson, Laboratory Sponsor*

**Michelle Minsun Jung, (BCHM)**

Gene Expression Analysis of MLKB1KO Mice: Identifying a novel link between LKBI and the antioxidant GPX3

*Dr. Laurie Goodyear, Laboratory Sponsor*

**Han Kim, (BCHM)**

Synaptic Depression Following Postsynaptic Axotomy: Causes and Consequences

*Dr. Jeff Lichtman, Laboratory Sponsor*

**Bong Ihn Koh, (BCHM)**

Investigation of a Lymphatic Component to the Hematopoietic Stem Cell Microenvironment

*Dr. David Scadden, Laboratory Sponsor*

**Richard R. Kronfol, (BCHM)**

Acyl-Protein Thioesterase 1 and Modulation of Nitric Oxide Synthase

*Dr. Thomas Michel, Laboratory Sponsor*

**Rachel Lefebvre, (BCHM) - Hoopes Prize**

Molecular dissection of TGF- $\beta$  induced signal transduction pathways controlling T-cell

differentiation: I. Expression of inhibitor-resistant type I TGF- $\beta$  receptors in T-cells reveals that inducible T regulatory cell development requires Smad activation. II. Quantitative analysis of Foxp3 and ROR $\gamma$ t gene expression during T-cell differentiation  
*Dr. Anjana Rao, Laboratory Sponsor*

**Yin Li, (BCHM)**

FMRamide-like Neuropeptides Modulate *C. elegans* Posture  
*Dr. Robert Horvitz, Laboratory Sponsor*

**Yuen-Joyce Liu, (BCHM)**

Effect of Crohn's disease associated mutations on the NOD2 signaling pathway  
*Dr. Koichi Kobayashi, Laboratory Sponsor*

**Eva Marie Luo, (BCHM)**

Molecular Neuropathology of Aging: Characterization of Aging in the Caribbean Vervet  
*Dr. Cynthia Lemere, Laboratory Sponsor*

**Matthew R. McFarlane, (BCHM)**

Analysis of Multiple cis-Regulatory Elements Governing a Graded Transcriptional Response of a Single Gene to a Mammalian Morphogen  
*Dr. Andrew McMahon, Laboratory Sponsor*

**Kevin McMullen, (BCHM)**

Reproductive Survival and DNA Double-Strand Breakage in Desiccated Bdelloid Rotifer *Adineta vaga*  
*Dr. Matt Meselson, Laboratory Sponsor*

**Danny Mou, (BCHM) - Hoopes Prize**

Edgetic-profiling of Disease-associated TP73L Mutant Proteins  
*Dr. Marc Vidal, Laboratory Sponsor*

**Melissa A. Mueller, (BCHM)**

Involvement of Reactive Oxygen Species in Signaling Pathways Regulating Cisplatin-induced Death of Zebrafish (*Danio rerio*) Sensory Hair Cells  
*Dr. John Dowling, Laboratory Sponsor*

**Christopher Nabel, (BCHM)**

Dynamics of Clathrin Coated Pit Formation at the Leading Edge of Migrating Cells  
*Dr. Tomas Kirchhausen, Laboratory Sponsor*

**Lachezar Atanasov Nikolov, (BCHM)**

Discovery of New Genes from the Intergenic Regions of *Bacillus subtilis*  
*Dr. Richard Losick, Laboratory Sponsor*

**Rejoice Opara, (BCHM)**

Biochemical and Structural Studies of the *Bacillus Cereus* MCM-Primase N-Terminal Domain  
*Dr. David Jeruzalmi, Laboratory Sponsor*

**Jin Park, (BCHM)**

Regulation of Neuronal Subtype Specification of Motor Neurons and Midbrain Dopaminergic Neurons by bHLH factor Neurogenin2  
*Dr. Michael Greenberg, Laboratory Sponsor*

**Adam Xianpeng Sang, (BCHM) - Hoopes Prize**

Zebrafish primordial germ cells require insulin-like growth factor signaling for directional

migration

*Dr. Antony Wood, Laboratory Sponsor*

**Timothy Hunter Schmidt, (CPB)**

Overclocking a Three-Protein Circadian Oscillator: Mutations in KaiC in a Model of Ordered Phosphorylation

*Dr. Erin O'Shea, Laboratory Sponsor*

**Lauren Maxine Snyder, (BCHM)**

Confirmation and Characterization of the Human Cytomegalovirus UL27 Protein as an In Vitro Substrate of the UL97 Protein Kinase

*Dr. Donald Coen, Laboratory Sponsor*

**Zachary Zhipeng Sun, (CPB)**

Developing enabling technologies for high-throughput genomic manipulation in *Escherichia coli*

*Dr. George Church, Laboratory Sponsor*

**Jillian Sylvester, (BCHM)**

Identification and Characterization of Novel S6 Kinase Interactors

*Dr. John Blenis, Laboratory Sponsor*

**Monica Thanawala, (BCHM)**

Design, Construction, and Characterization of a Postsynaptic Marker and Studies of Dystrophin Regulation in the Central Nervous System of *Drosophila melanogaster*

*Dr. Samuel Kunes, Laboratory Sponsor*

**Melissa Yuwono Tjota, (BCHM)**

Peripheral Tissue Antigen and Cytokine Expression in Human Mesenchymal Stem Cells and Murine Lymph Node Stromal Cells

*Dr. Shannon Turley, Laboratory Sponsor*

**Tave Annamey van Zyl, (BCHM)**

Asymmetric Catalytic Synthetic Studies and Biological Evaluation of Peloruside A and Analogues

*Dr. Eric Jacobsen, Laboratory Sponsor*

**Eunice Yang, (BCHM)**

NPAS4 and the Critical Period Plasticity

*Dr. Takao Hensch, Laboratory Sponsor*

**Jessica Yang, (BCHM)**

Elucidating the mechanism of spreading of PRC2-mediated histone methylation

*Dr. Nicole Francis, Laboratory Sponsor*

**Darwin Yeung, (BCHM)**

Developing a structural model of the rhesus monkey TRIM5 $\alpha$  coiled-coil domain and linker 2 region by comparative modeling and mutation analysis.

*Dr. Joseph Sodroski, Laboratory Sponsor*

**Alvin Yiu Chun Yu, (BCHM)**

A novel model of vasculogenesis: Fluidic shear stress influences endothelial differentiation of human embryonic stem cells

*Dr. Debra Auguste, Laboratory Sponsor*

**Elisa T. Zhang, (MCB) - Hoopes Prize**

Distinct sets of mRNA targets exhibit differential miRNA dose responses

*Dr. Tom Maniatis, Laboratory Sponsor*

**Ning Zhou, (BCHM)**

Characterization of the Neuropathy of Mucopolysaccharidosis I in a Murine Model

*Dr. Jakub Tolar, Laboratory Sponsor*