

# Theses for Honors in Biochemical Sciences 2010

## **Michael Ayoub**

*A potential role for Spo13 in promoting intersister recombination during meiotic crossover formation.*

Dr. Nancy Kleckner, Laboratory Sponsor

## **Daniel Bear**

**~Recipient of Hoopes and Henderson Prizes~**

*Genome-wide and Single-cell Analysis of Neuronal Activity-regulated Gene Expression*

Dr. Michael Greenberg, Laboratory Sponsor

## **Ellora Bellows Berthet**

*An Examination of Histone (H3-H4)<sub>2</sub> Tetramer Splitting during DNA Replication In Vitro*

Dr. Nicole Francis, Laboratory Sponsor

## **Remy Bizimungu**

*Identification of Genes that Promote Myogenic Differentiation of Skeletal Muscle Precursors*

Dr. Amy Wagers, Laboratory Sponsor

## **Sarah Elizabeth Booker**

*Expression of PAX6B, ALDH1A2, & HSP47 is Regulated by Retinoic Acid at the 2-4 Somite Stage of Zebrafish Development*

Dr. John Dowling, Laboratory Sponsor

## **Anne Calkins**

*I. Localization of DNA Repair Proteins Before and After Cisplatin Treatment*

*II. Investigating nuclear/nucleolar protein activity by attachment of FLAG-HA and cloning into cell lines*

Dr. Dirk Iglehart, Laboratory Sponsor

**Bennett Caughey**

*Epstein-Barr Virus EBNA3 Proteins Differentially Repress Notch Activation*

Dr. Elliott Kieff, Laboratory Sponsor

**Christopher Tsung-jer Chen**

*Characterization of E. faecalis PBP2a peptide activation using defined peptidoglycan substrates*

Dr. Daniel Kahne, Laboratory Sponsor

**Frank Wan Chen**

*Investigating the notch pathway in zebrafish melanocytes during embryogenesis and adulthood.*

Dr. Leonard Zon, Laboratory Sponsor

**Kevin Wei-Han Chi**

*Characterization of Toll-like Receptor 8-Mediated Activation of Human Neonatal Monocytes and Neutrophils*

Dr. Ofer Levy, Laboratory Sponsor

**Alan Chou**

*The putative Bmi1 target p57 is dynamically expressed in murine lung stem cells during injury repair*

Dr. Carla Kim, Laboratory Sponsor

**Tzu-Ying Chuang**

*Site-specific pegylation of cytokines with the Staphylococcus aureus Sortase A transpeptidase enzyme*

Dr. Hidde Ploegh, Laboratory Sponsor

**Kaitlyn Ella Coil**

~ Hoopes Prize ~

*Mechanism of pre-mRNA splicing inhibition by the anti-tumor drug E7107*

Dr. Robin Reed, Laboratory Sponsor

**Robert Corty**

~ Hoopes Prize ~

*Studies on the oligomerization of the dengue envelope protein and their implications for the fusion pathway*

Dr. Stephen Harrison, Laboratory Sponsor

**Pushan Richard Dasgupta**

*Elucidation of the Molecular Mechanism Behind the Radioadaptive Response*

Dr. Jacquelyn Yanch, Laboratory Sponsor

**Guy Anthony Edouard**

*The Synthesis of Dipyrrromethene Cu and Fe Complexes and Their Reactivity as Biomimetic Hydroxylase Models*

Dr. Theodore Betley, Laboratory Sponsor

**Baris Ercal**

*Lipolysis-induced Exosomal Secretion of a Metabolically Active Adipose Tissue Lipid Chaperone*

Dr. Gokhan Hotamisligil, Laboratory Sponsor

**Lucie Y. Guo**

~ Hoopes Prize ~

*Aph-1 is a substrate-binding site within the  $\gamma$ -secretase complex*

Dr. Dennis Selkoe, Laboratory Sponsor

**Mihir Gupta**

*Studying the Dynamics of an RNA Pseudoknot Using Single-Molecule FRET*

Dr. Xiaowei Zhuang, Laboratory Sponsor

**Gina He**

*The Temporal and Spatial Regulation of ClpP Proteases in Bacillus Subtilis*

Dr. Richard Losick, Laboratory Sponsor

**Laura Huppert**

~Recipient of Hoopes and Henderson Prizes~

*Localization, Regulation, and Function of a First Type VII Protein Secretion System in Bacillus subtilis.*

Dr. Briana Burton, Laboratory Sponsor

**Prajakta Jaju**

*Using Human Embryonic Stem Cells and Induced Pluripotent Stem Cells to Model Spinal Muscular Atrophy*

Dr. Kevin Eggan, Laboratory Sponsor

**Rafi Kazi**

*Determining the role of the CD244/CD48 pathway in B-cell Development, Maturation, and Activation*  
Dr. Arlene Sharpe, Laboratory Sponsor

**Daniel Killeen**

*UAF1: A study of the function of its UPL domains and its relation to USP3.*  
Dr. Alan D'Andrea, Laboratory Sponsor

**Peter Geon Kim**

~ Hoopes Prize ~

*The role of Hedgehog signaling in embryonic hematopoiesis*  
Dr. George Daley, Laboratory Sponsor

**Warakorn Kulalert**

*Molecular and Functional Distinctions in Induced Pluripotent Stem Cells of Different Somatic Origins*  
Dr. Konrad Hochedlinger, Laboratory Sponsor

**Adam Nathaniel Letvin**

*Targeted Chemotherapy: Investigating the Synthesis and Biological Activity of Avrainvillamide*  
Dr. Andrew Myers, Laboratory Sponsor

**Nicolas R. P. Lewine**

*Characterization of the effects of the gp120 V3 loop on HIV-1 resistance to vicriviroc, a small-molecule CCR5 antagonist*  
Dr. Daniel Kuritzkes, Laboratory Sponsor

**Amy Li**

*Characterization of the Nucleocytoplasmic Trafficking of NOD27, A Putative Innate Immune Receptor*  
Dr. Koichi Kobayashi, Laboratory Sponsor

**Abraham Lin**

*M13 phage decreases the rate of transmission of antibiotic resistance mediated by conjugation*  
Dr. Irene Chen, Laboratory Sponsor

**Jennifer Alys Lo**

~ Hoopes Prize ~

*Biochemical studies of primer placement in retroviruses*

Dr. Victoria D'Souza, Laboratory Sponsor

**Cher Heang Low**

~ Hoopes Prize ~

*Temperature Compensation in the Three-Protein Cyanobacterial Circadian Clock*

Dr. Erin O'Shea, Laboratory Sponsor

**Samuel Jacob Michel**

*The effect of controlled release of antigen and the immunosuppressant dexamethasone on the generation of an antigen specific tolerogenic response in a murine type 1 diabetes mellitus model*

Dr. David Mooney, Laboratory Sponsor

**Whitney Muhlestein**

*Toward Generating  $\beta$  Cells by Transcription Factor-Based Reprogramming*

Dr. Doug Melton, Laboratory Sponsor

**Huy Nguyen**

~ Hoopes Prize ~

*Structure-function analysis of newly-identified Adamantylacetamide and Adamantanecarboxamide Inhibitors of Ebola and Lassa Fever Virus Infection*

Dr. James Cunningham, Laboratory Sponsor

**Elizabeth O'Brien**

*Identification of Genes Involved in Cell Wall Integrity and Virulence in *Cryptococcus neoformans**

Dr. Eleftherios Mylonakis, Laboratory Sponsor

**Iris Odstreil**

~ Hoopes Prize ~

*Making connections: a search for genes involved in the synaptic partner choices of AII amacrine neurons in the mouse retina*

Dr. Joshua Sanes, Laboratory Sponsor

**Eddy Palacios**

*Mutations in TLS and Aberrant Splicing Protein Interactions as a Cause of Amyotrophic Lateral Sclerosis (ALS)*

Dr. Robin Reed, Laboratory Sponsor

**Visali Ramanathan**

*The Role of Melanocortin 2 Receptor Accessory Protein 2 Disruption in Mammalian Energy Metabolism*

Dr. Joseph Majzoub, Laboratory Sponsor

**Diana Ceballos Robles**

*Investigating the role of TopBP1-dependent polymerase  $\alpha$  hyperloading in the activation of the ATR-dependent checkpoint in *Xenopus laevis**

Dr. Matthew Michael, Laboratory Sponsor

**Lauren T. Schumacher**

*Role of CAPS2 in BDNF-induced chemotaxis of cerebellar granule cells*

Dr. Rosalind Segal, Laboratory Sponsor

**Charlotte Allen Seid**

*Purification and Characterization of Clock Proteins from the Cyanobacterium *Prochlorococcus marinus* MED4: Implications for the Evolution of Circadian Timing Mechanisms*

Dr. Erin O'Shea, Laboratory Sponsor

**Lev A. Shaket**

*Improving the Transvascular Delivery of Adeno-Associated Virus Vectors to the Brain*

Dr. Miguel Sena-Esteves, Laboratory Sponsor

**Maren A. Shapiro**

*An Investigation into the Regulation of Sirt3 Levels by Metabolic Stresses*

Dr. Marcia Haigis, Laboratory Sponsor

**Koning Shen**

*Life at the Origin: Structural Studies of Nucleo-Protein Complexes at the Replication Origin in Bacteriophage Lambda*

Dr. David Jeruzalmi, Laboratory Sponsor

**Yongtian Tan**

*The Effect of Antibody Mobility on Liposome Targeting to Endothelial Cells under Flow*

Dr. Debra Auguste, Laboratory Sponsor

**Amy Tao**

~ Hoopes Prize ~

*The Role of Phr Peptides in the Development of B. subtilis Biofilms*  
Dr. Roberto Kolter, Laboratory Sponsor

**Gerald Chunt-Sein Tiu**

*Discover of biologically active small molecules via in vitro selections of a DNA-templated macrocycle library*  
Dr. David Liu, Laboratory Sponsor

**Alice Tzeng**

~ Hoopes Prize ~

*Host-Microbe Characterization of an Antibiotic-Treated Mouse Model*  
Dr. Michael Starnbach, Laboratory Sponsor

**Voronadha Vacharathit**

~ Hoopes Prize ~

*Biochemical Design and Optimization of Biodegradable Alginate Scaffolds for Angiogenic Cell Therapy*  
Dr. David Mooney, Laboratory Sponsor

**Belinda Wang**

*From Blood Coagulation to Protein Folding: The Electron Transfer Pathway.*  
Dr. Tom Rapoport, Laboratory Sponsor

**Xin Wang**

*Towards Photostable Rainbow Fish*  
Dr. Alexander Schier, Laboratory Sponsor

**James Jonathan Watts**

*GCC185 and Golgi-microtubules in NK Cell cytotoxicity.*  
Dr. Jack Strominger, Laboratory Sponsor

**Devin Thomas Worster**

~ Hoopes Prize ~

*p57<sup>Kip2</sup> is Positively Regulated by Akt and Limits Insulin-Induced proliferation in mammary epithelial cells*  
Dr. Joan Brugge, Laboratory Sponsor

**Michael Wu**

*Design of a high-throughput screen to identify novel proteins required for microtubule-based organelle transport*

Dr. Samara Reck-Peterson, Laboratory Sponsor

**Chen Yan**

*The Anti-Inflammatory Role of SIRT1 as a Possible Mechanism for the Observed Atheroprotective Benefits of Sirtuin-Activating Compounds*

Dr. David Sinclair, Laboratory Sponsor

**Shu Yang**

*The Role of Paxillin-Erk Interactions in the Mediation of Natural Killer Cell Cytotoxicity*

Dr. Jack Strominger, Laboratory Sponsor

**Vanisha Rochelle Yarbrough**

*Increased Expression of miR-125a, miR-125b and miR-143 in OVCAR3, 5 and 8 Mitigates Cell Proliferation and the Expression of ERBB2, KRAS, and VEGF*

Dr. David MacLaughlin, Laboratory Sponsor

**Denise Fay Ye**

*The role of the Gfi-1 family of transcriptional repressors in normal MLL-ENL-Induced Myeloid and Lymphoid leukemia*

Dr. Hanno Hock, Laboratory Sponsor

**Julia Ye**

*Rett syndrome gene Mecp2 regulates the expression of multiple downstream targets in mouse neocortex.*

Dr. Jeffrey Macklis, Laboratory Sponsor

**Wendy Ying**

*Induction of myogenic gene expression during differentiation of embryonic stem cells under defined conditions*

Dr. Amy Wagers, Laboratory Sponsor

**Ruby Yu**

*A Role for Antisense Transcription in siRNA-mediated Silencing in S. pombe*

Dr. Danesh Moazed, Laboratory Sponsor