

# Theses for Honors in Biochemical Sciences 2012

## **Christopher Allison**

*The Role of Integrins  $\alpha 4\beta 1$  and  $\alpha 4\beta 7$  in the Migration of Pathogen-Specific CD4+ T Cells to the Genital Tract of Mice Infected with Chlamydia trachomatis and Creating a CEL1 Nuclease-based Assay to Identify Null Mutants in Chlamydia trachomatis*

Professor Michael Starnbach, Laboratory Sponsor

## **Stefan Anghel**

*A Direct Interaction between Yos9p and Hrd3p Promotes Oligomerization of a Membrane Complex Responsible for Endoplasmic Reticulum Associated Degradation of Luminal Proteins*

Professor Tom Rapoport, Laboratory Sponsor

## **Lauren Barber**

*The LRP5 Pathway in Osteogenesis Imperfecta Therapeutics*

Dr. Matt Warman, Laboratory Sponsor

## **Lydia Bunker**

*p63-dependent regulation of epithelial basal cell adhesion protein genes in permissive somatic cell types*

Professor James Rheinwald, Laboratory Sponsor

## **Andrew Chen**

*Characterizing the role of SERBP1 and Serpine1 in regulating Th1 cell-driven autoimmune disease*

Dr. Vijay Kuchroo, Laboratory Sponsor

## **Hyunje Cho**

*MicroRNA-26b in Alzheimer's Disease (AD): A potential regulator of cell cycle and apoptosis in post-mitotic neurons*

Professor Anna Krichevsky, Laboratory Sponsor

## **Xuezhi Dong**

*Role of Bmi1 in Regulating Cardiac Myosin Heavy Chain Expression*

Dr. Laurie Jackson-Grusby, Laboratory Sponsor

## **Jeremy Feng**

*The Development of a Novel Inducible Foxn1 Reporter: Generation, Characterization, and Applications*

Professor Doug Melton, Laboratory Sponsor

**George Fryhofer**

*The Roles of Rac1, Cdc42, and PACSIN2 in Regulation of Endothelial Nitric Oxide Synthase*

Professor Thomas Michel, Laboratory Sponsor

**Grecia Gonzalez**

*Structural studies of the 3' terminal stem loop of 7SK snRNA*

Professor Victoria D'Souza, Laboratory Sponsor

**Xin Guan**

*Programming modification of multivalent nanoparticle surfaces with DNA*

Professor Peng Yin, Laboratory Sponsor

**Natalie Heer**

*Identification and characterization of proteins required for the regulation of microtubule-based transport*

Professor Sam Reck-Peterson, Laboratory Sponsor

**Nikola Ivica**

*The Effect of RNA Structure on Nonenzymatic Template-Directed Polymerization in the RNA World*

Dr. Irene Chen, Laboratory Sponsor

**Isha Jain**

*Chromosome Dynamics in Cyanobacteria*

Professor Erin O'Shea, Laboratory Sponsor

**Edward Kogan**

*The DAQ Knight and the Secret Life of Dopamine: The Effects of Dopamine Quinone on in vitro  $\alpha$ -synuclein Ubiquitination by Nedd4*

Dr. Alfred Goldberg, Laboratory Sponsor

**Tomasz Kula**

*Developing a genetic approach to induce Trichomonas Vaginalis Virus infection in T. vaginalis.*

Dr. Max Nibert, Laboratory Sponsor

**Gregory Leya**

*A Real-Time, Live-Cell microRNA Reporter Library Identifies microRNA Actors in Non-Genetic Drug-Resistance Networks*

Professor Joan Brugge, Laboratory Sponsor

**Stephanie Lin**

**~ Recipient of both a Hoopes Prize and the Henderson Prize**

*Integration of the ER and Oxidative Stress Responses through SKN-1*

Dr. Keith Blackwell, Laboratory Sponsor

**Yuying Luo**

**~ Recipient of both a Hoopes Prize and a Henderson Honorable Mention**

*53BP1 Regulates the Aurora A/TPX2 Complex*  
Professor Yang Shi, Laboratory Sponsor

**Xiaoli Mi**

**~ Recipient of a Hoopes Prize**

*Embryonic Stem Cells Can Reconstitute the Epigenetic Landscape of H3K27me3 with High Fidelity after Global Erasure*  
Professor Alex Meissner, Laboratory Sponsor

**Shravani Mikkilineni**

*Disease modeling of amyotrophic lateral sclerosis (ALS): Morphometric analysis of motor neurons derived from induced pluripotent stem cells and functional characterization of astroglia derived from human embryonic stem cells*  
Professor Kevin Eggan, Laboratory Sponsor

**Julia Nagle**

*Translational genetic recoding by viral mRNA pseudoknots*  
Professor Victoria D'Souza, Laboratory Sponsor

**Nathan Nakatsuka**

*The Mammalian SID-1 RNA Transporter Ortholog SidT2 is Required For Nursing and Neonatal Survival*  
Professor Craig Hunter, Laboratory Sponsor

**Kevin Ni**

*Structural insights into asymmetric motor domains of the ABC transporter TAP*  
Professor Rachelle Gaudet, Laboratory Sponsor

**Lauren Onofrey**

*Dendritic Cell Immunoreceptor (DCIR) silencing using CD4 aptamer-DCIR siRNA chimeras: a model to investigate mucosal transmission of the Human Immunodeficiency Virus (HIV)*  
Professor Judy Lieberman, Laboratory Sponsor

**Anirudh Penumaka**

*Transient Receptor Potential Channels on Intracellular Membranes in Ca<sup>2+</sup> Signaling and Apoptotic Pathways*  
Professor David Clapham, Laboratory Sponsor

**Eduardo Perez-Torres**

*Understanding the biological risk of chromosome 4 locus triplication for Parkinson's Disease*  
Dr. Ole Isacson, Laboratory Sponsor

**Briana Prager**

*Characterization of Dysfunctional Mitochondrial Stress Response in Parkinson's Disease*

Dr. Ole Isacson, Laboratory Sponsor

**Antonia Pugliese**

*The Search for Novel Sporulation Genes in Bacillus subtilis*

Professor Richard Losick, Laboratory Sponsor

**Robert Qi**

*Effects of the Loss of Red-Cone Photoreceptors on Cone Mosaic Formation and Horizontal Cell Morphology in Zebrafish (Danio rerio).*

Professor John Dowling, Laboratory Sponsor

**Mark Ragheb**

**~ Recipient of a Hoopes Prize**

*Spatial and Temporal Regulation of Genetic Diversity in Mycobacteria*

Dr. Sarah Fortune, Laboratory Sponsor

**Jason Sandler**

*Investigating small molecules that bind p16INK4a and their effects on cellular senescence*

Dr. Stanley Shaw, Laboratory Sponsor

**Nandini Sarma**

*Targeting Casein Kinase 1 and 2 to inhibit invasion of red blood cells by the human malaria parasite, Plasmodium falciparum*

Dr. Manoj Duraisingh, Laboratory Sponsor

**Susan Seav**

*Developmental Basis of Craniofacial Variation in Anolis Carolinensis*

Dr. Arkhat Abzhanov, Laboratory Sponsor

**Daniel Selgrade**

*A Split-Intein Based Approach to Protein Sensing in Mammalian Cells*

Professor Pamela Silver, Laboratory Sponsor

**Kailan Sierra-Davidson**

*Mechanisms of Immune Control of Human Immunodeficiency Virus (HIV) in Absence of Protective HLA Class I Alleles*

Dr. Bruce Walker, Laboratory Sponsor

**Fei Song**

**~ Recipient of a Hoopes Prize**

*Expression and Function of the Mammalian SID-1 Orthologs, SidT1 and SidT2*

Professor Craig Hunter, Laboratory Sponsor

**Zuri Sullivan**

*Probing functional consequences of the lprG/Rv1410c double knockout in Mycobacterium bovis Bacille Calmette-Guérin*  
Professor Eric Rubin, Laboratory Sponsor

**Lillian Tsai**

**~ Recipient of a Henderson Honorable Mention**

*Identification of immunogenic Salmonella enterica serotype Paratyphi A proteins uniquely expressed in humans and not under standard laboratory conditions*  
Dr. Edward Ryan, Laboratory Sponsor

**Herbert Virgin-Downey**

*The role of Protein Phosphatase 2A in HIV-Specific Human T Cell Dysfunction*  
Dr. Daniel Kaufmann, Laboratory Sponsor

**Priscilla Wang**

**~ Recipient of both a Hoopes Prize and the Henderson Prize**

*Netrin-1 Promotes Glioblastoma Invasion and Angiogenesis Through a Cathepsin B-Dependent Mechanism*  
Professor Michael Klagsbrun, Laboratory Sponsor

**Shitong Wang**

*Translational Frameshifting in Trichomonas Vaginalis Virus*  
Dr. Max Nibert, Laboratory Sponsor

**Vernon Wu**

**~ Recipient of a Hoopes Prize**

*CD1 Modulation of Decidual Immune Cell Activity*  
Professor Jack Strominger, Laboratory Sponsor

**Maria Xu**

*Engineering an Injectable, Macropore-Forming, Biocompatible Scaffold for the Delivery of Cancer Immunotherapies*  
Professor David Mooney, Laboratory Sponsor

**Caleb Yeung**

*A STAT3-iNOS Pathway Drives Malignancy in EGFRvIII-Activated Glioma*  
Professor Azad Bonni, Laboratory Sponsor

**Chung Yu**

*Exploring Differences in Carbon Metabolism Between Short-Fat and Long-Skinny Ridgeia piscesae*  
Professor Peter Girguis, Laboratory Sponsor

**Chi Zhang**

*Functional Characterization of the NOD-like receptor NLRC3 in T Cell Activation*

Dr. Koichi Kobayashi, Laboratory Sponsor

**John Zhao**

*Finding the Antidote for Fanconi Anemia Deficient Cells*

Dr. Alan D'Andrea, Laboratory Sponsor

**Lillian Zhao**

*Determining the Mechanism of Action of R7, A Small Molecule Inhibitor of the Anaphase-Promoting Complex/Cyclosome (APC/C)*

Dr. Randall King, Laboratory Sponsor

**Wenchi Zhou**

*Lipid Composition Dependence and Hemifusion in Atlastin-Mediated Homotypic Membrane Fusion*

Professor Tom Rapoport, Laboratory Sponsor