Junior Fellows

2013-2014

Nathen Bopp

Elizabeth Vierling's Lab
Biochem. & Mol. Bio. Dept.

"I work on the elucidation of Hsploo localization and substrate identification in the model organism Physcomitrella patens. I also work on the identification of intragenic suppressors of mutant small heat shock proteins in synechocystis sp. PCC 6803. I hope to attend graduate school and pursue a doctoral degree in virology."

Kathryn Brow

Samuel Hazen's Lab
Biology Dept.

"I am working in the Hazen Laboratory to increase the current understanding of cell wall biosynthesis and regulation in grasses. I am specifically attempting to determine the regulation of the transcription factor BdMYB48 that has been shown to regulate several cell wall genes in the model species Brachypodium distachyon. The overall goal of this project and of the lab as a whole is to aid in the design of more efficient, cost effective biofuel crops. Many of these proposed crops are grass species thus it would be beneficial to understand cell wall regulation in a grass such as Brachypodium. By the end of this year I hope to identify the transcription factors which regulate BdMYB48 as well as the potential binding sites where these transcription factors interact."

Katherine Day

Ana Caicedo's Lab
Biology Dept.

"With my time in the Caicedo lab, I intend to investigate the genetic and evolutionary mechanisms controlling fruit ripening. In particular, interested in the genes involved coloration across the tomato clave. By amplifying and sequencing three genes, crti-b2, cyc-b, and crtl-e, which encode proteins in the carotenoid pathway, I hope to determine if the phenotypic differences and observed between species are due to selective pressures or genetic drift."

Jaymes Farrell

Steve Sandler's Lab
Microbiology Dept.

"I work with mutations in E. coli which affect the structure and maintenance of the nucleoid. I am currently working to characterize the effects that deletions of replication fork helicase Rep and various nucleoid associated proteins (NAPs) have on both cellular SOS response and general nucleoid form. Previous experiments have shown that cells with rep deletions grow much longer; this filamentation can be reversed with an additional deletion of one of several NAPs. I expect to show that though these double mutants look 'normal', they are in fact much 'sicker' than wild type."

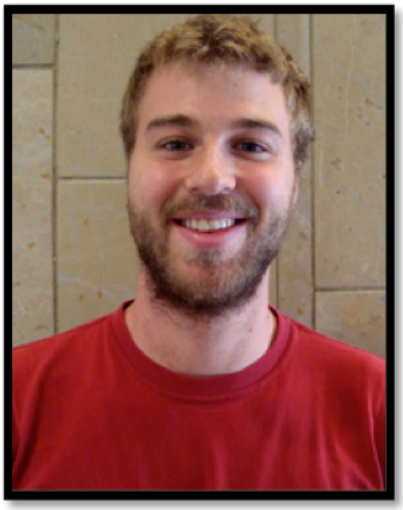
Joseph Homsi

Barbara Osborne's Lab
Vet. & Animal Sci. Dept.

"My research interests are focused on the P13Kinase pathway and how the intracellular protein Notch crosstalks with the protein P13K. Previous experiments I have conducted suggest that Notch is downstream of P13Kinase; however, I want to better understand what Notch's exact role is in the P13Kinase pathway. As a result, I am currently utilizing various specific inhibitors in my experiments that manipulate more precise components of the P13Kinase pathway. By understanding this particular mechanism and interaction, I hope to contribute a novel understanding to the greater immunological and scientific community."

Sean McDougall

Heather Richardson's Lab
Psychology Dept.



"As a collaborative effort with Geng-Lin Li's lab *my project seeks to understand how callosal fiber conduction velocity in the prefrontal cortex changes over development using rodent models. This circuitry undergoes extensive myelination during post-natal and adolescent development, which is thought to affect the speed of action potential propagation. However, the actual functional consequences of this process in the prefrontal cortex have not been well established experimentally. My work incorporates electrophysiological as well as biochemical labeling and microscopic analysis of tissue samples.."*

Veronica Pace

Rolf Karlstrom's Lab
Biology Dept.

"I'm working to engineer a new tool for my lab that can be used to study Sonic Hedgehog (Shh) signaling. Shh is a mitogen that is important for embryogenesis and adult tissue maintenance. We are interested in Shh's role in the development of the pituitary gland. Using zebrafish as a model species, I am implementing the Tetracycline-in system, which allows for spatial and temporal regulation of Shh. With this tool, we can increase or decrease the effects of Shh in the pituitaries and determine the specific mechanisms that lead to pituitary development. Working on this project has given me a good understanding of developmental biology and has inspired my research in medicine as a career."

Kayla Pelland

Rolf Karlstrom's Lab
Biology Dept.

"I am a research assistant in Dr. Rolf Karlstrom's lab. I am shadowing a postdoctoral researcher who is leading a project to describe the role of the pituitary hormone prolactin in directing the development of osmoregulatory tissues in zebrafish. Specifically, I am interested in how prolactin regulates transcription of the gene hcc, which is a cotransporter involved in Na^+/Cl^- ion uptake in embryonic zebrafish ionocytes. When I graduate from UMass, I would like to earn a Master's degree in Education."

Cassandra Pelletier

Pat Wadsworth's Lab
Biology Dept.

"I am working in the Wadsworth lab investigating TPX2's role and localizations throughout mitosis. TPX2 is a mitotic associated protein involved in spindle assembly that interacts with EG5. It is believed to be phosphorylated by cell cycle regulatory kinases, thus activating its functions. Through PCR, I am inducing mutations in the TPX2 at site 738 to prevent phosphorylation, transfecting LLC-Pk1 pig epithelial cells with the mutant, and then using siRNA to knockdown the endogenous copy. Observing spindle phenotypes of the mutants may provide some insight into how TPX2 performs its functions during mitosis. After graduation, I hope to attend medical school."

Andrew Taylor

R. Craig Albertson's Lab
Biology Dept.

"I am a senior biochemistry and molecular biology major in the Albertson lab. My current research focuses on elucidating the roles of Wnt/B-catenin signaling in zebrafish craniofacial development. Recently, I have been utilizing lithium chloride to up-regulate Wnt-B-catenin signaling at several timepoints during early craniofacial morphogenesis and characterizing the resulting patterning defects using a cartilage/bone double-stain. Ultimately, the goal of my research is to help provide a better understanding of craniofacial development with implications for relevant clinical therapies in humans."

Alexis Tomaszewski

Magdelena Bezanilla's Lab
Biology Dept.

"I am currently exploring the role of phytolongin on membrane trafficking in the moss Physcomitrella patens in the Bezanilla lab. There are three phytolongin genes in P. patens; I stitched together and knocked down these three genes in the coding sequence using a RNAi construct. I found that the plants were roughly 65% the size of the WT plants, indicating a problem with cell expansion that may be a result in alterations in membrane trafficking. I plan on making a RNAi construct in the untranslated region and once this construct phenocopies the coding sequence construct, I will attempt to rescue with the most highly expressed phytolongin. I will then attempt to make a phytolongin GFP construct to view localization to get a better understanding if these proteins play a role in endocytosis, exocytosis, or both processes."

Mike Vilkhovoy

Susan Robert's Lab
Chem. Engineering Dept.

"I work on enhancing the accumulation of paclitaxel from taxus suspension cultures. Paclitaxel is a chemotherapeutic agent that inhibits the depolymerization of microtubules; it is used to treat breast, non-small cell lung, and ovarian cancers. Currently, I am investigating the effects of culturing two different cell lines together. A cell line known to produce paclitaxel will be cultured within a cell line producing phenolic and flavonoid precursors. The addition of these precursors may drive the metabolic flux towards higher yields of paclitaxel."