

Molecular Biology Research

BAHS Faculty



Kate A. Beishline, Ph.D.

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Research Interests

My current research interests are focusing on pathways which regulate the transcription and replication of eukaryotic telomeres. More specifically I am focused on the mechanism by which the genome binding factor CTCF, and its only paralog BORIS are participating in the maintenance of telomere structures and how these functions may be important in cancer and normal cellular aging. I am currently working on two main projects with students. First we are interested in identifying the mechanism by which CTCF binding at the telomere is regulating telomere replication. Two undergraduate honors students, Lauren Bunnell (Junior HS/BS) and Kyle Mausteller (Junior Bio/BS), addressing different experimental aspects of this question. A former student, Justin Salak began this work in the laboratory in the summer of 2018. In addition, a graduate student, Ian Whiteside and several other undergraduates, including Tara Full (Chem/BS), will be continuing work on addressing the role of BORIS in telomere regulation beginning this summer.



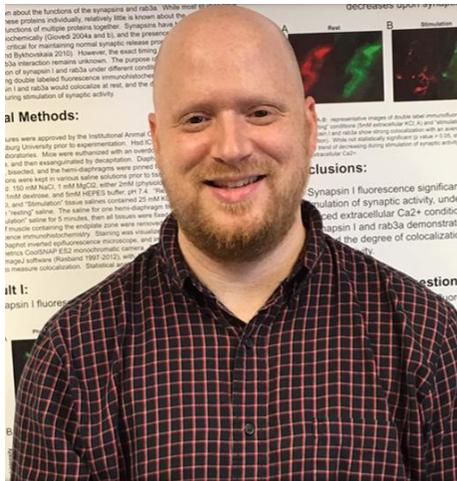
Kristen D. Brubaker, Ph.D.

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Research Interests

My research interests lie in the regulation of the stress response in bees. I have been studying transcription factors that aid in the survival of invasive bees in conditions where honey bees would normally not survive. Students working under my supervisions have cloned, sequenced and characterized expression of factors linked to stress response and survival, *daf-16*, *hsf-1*, and *nrf2* in *Megachile rotundata*, a solitary thermotolerant bee. Summer of 2017, we also looked at expression of a hypoxia related factor, *hif1 α* , in response to heat stress. This past year, in collaboration with Dr. John Hranitz, we conducted experiments to verify changes in genes linked to stress, behavior and metabolism in honey bees in response to ethanol.

In 2016, I applied for a yearlong sabbatical, which was approved for the Spring/Fall 2018 semesters. In fall of 2017, my students and I treated honey bees with ethanol (or control) and isolated RNA for real time PCR experiments. We conducted these experiments to study gene expression changes indicated by an initial microarray experiment. In the spring/fall 2018 semesters, my students and I conducted real- time PCR experiments to verify gene expression changes in *hsc70-4*, *nrf2*, *egln1* and *foxp2* to name a few genes, in the ethanol treated bee samples. One of my students, Justin Heller, decided to work with me on his Master's degree pursuing genes in alcohol tolerance starting the fall 2018 semester.



William L. Coleman, Ph.D.

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Research Interests

Synaptic Physiology, Molecular Regulation of Cellular Secretion



Abby Hare-Harris, Ph.D.

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Research Interests:

Genetics of Neurodevelopmental Disorders, Human Genetics, Bioinformatics



Angela Hess, Ph.D.

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Research Interests:

My lab explores the molecular mechanisms that promote melanoma development and progression to a metastatic phenotype. I focus specifically on the receptor tyrosine kinase, EphA2, whose expression is increased in highly aggressive melanomas. Current research projects are aimed at investigating the role of melanoma tumor cell plasticity and EphA2 in mediating resistance to the clinical inhibitors vemurafenib and dabrafenib.



Candice Klingerman, Ph.D.

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Research Interests:

My research laboratory is dedicated to understanding the neuroendocrine mechanisms underlying diseases of energy dysregulation (e.g. obesity, anorexia). These mechanisms are studied from an evolutionary perspective – traits evolve if they increase reproductive success. Therefore, we examine both ingestive as well as reproductive behaviors simultaneously, using zebrafish as our animal model.



William Schwindinger, Ph.D.

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Research Interests:

Research Interests My research interest is in G-protein coupled signal transduction. G-proteins initiate the cellular response to activation of cell surface receptors for numerous signals including hormones, neurotransmitters, paracrine factors, odorants, and light. G-proteins are composed of three subunits, an α -subunit and a $\beta\gamma$ dimer; each of these subunits is encoded by a gene family. My aim is discover the specific roles of individual G-protein γ -subunits in signal transduction.



Cynthia Surmacz, Ph.D.

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Research Interests:

Pesticides have been shown to cause sublethal effects in honey bees, impairing memory, mobility, and foraging behavior that may affect hive health and contribute to the decline of honey bee populations. We are collaborating with Dr. Hranitz to investigate the effects of commonly used neonicotinoid pesticides as indicators of sublethal stress in honey bees. This year's work has investigated the potential use of oxidative enzymes to gauge oxidative stress in bees exposed to neonicotinoids. This research has involved BAHS undergraduates Erin Smith and Andrew Cross. Graduate student Heather Llewellyn has continued her thesis research on the effects of pesticides on the honey bee transcriptome.



Jennifer Venditti, Ph.D.

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Research Interests:

Andrology, fertilization, and sperm architecture/morphology.



Marianna Wood, Ph.D.

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Research Interests:

Foraging Behavior, Mammalogy, Forest Ecology, Biology Education. In 2018, Dr. Wood collaborated with undergraduate students on projects to assess learning gains in biology courses, to measure decomposition in forest soils and contribute to a global decomposition database, and to document behavior and space use by grey squirrels and eastern chipmunks on campus.