# ORGANISMIC & EVOLUTIONARY BIOLOGY
and
# INTEGRATIVE BIOLOGY
# SENIOR THESES
## 2012-2016

Note: All hard copies are available for viewing in the hallway of BioLabs 1082. OEB & IB concentrators can read theses online; contact James Poolner (poolner@fas.harvard.edu) to request an electronic copy.
Red text indicates a Hoopes Prize winner and/or an "Exceptional"-graded thesis.

## OEB THESES, CLASS OF 2012

| STUDENT | *TITLE* | DIRECTOR |
|---|---|---|
| Annabel Beichman | *Gut Flora of the North Atlantic Right Whale: The 0.2µm Inhabitants of a 17m Leviathan* | James J. McCarthy |
| Bianca Lec | *The Nose Knows? A Study of MHC, Fitness, and Mate Choice in a Petrel* | Scott V. Edwards |
| Kevin Lin | *You've Got Tail: Analyses of caudal vertebral variation in the deer mouse Peromyscus maniculatus* | Hopi Hoekstra |
| Julian Moll-Rocek | *The effects of selective logging on Bertholettia excelsa natural regeneration: An investigation of compatability for multiple-use forest management in Madre de Dios, Peru* [Hoopes Winner] | N. Michele Holbrook |
| Kimberly O'Donnell | *Life in a Warmer World: Investigating the Physiological and Molecular Basis of Flowering Time Responses to Climate Change* | Elena Kramer |
| Riva Riley | *Same- and mixed-species schooling dynamics in Corydoras aeneus* [Hoopes Winner] | David A. Haig |
| Hanny Rivera | *Effects of the herbivorous gastropod Cerithium litteratum on the settlement and post-metamorphic growth and survival of the brooding coral Porietes astreoides* | Robert M. Woollacott |
| Guo Xuan Teo | *Sculpting the Flower: A Single Gene Duplication Underlies Complex Patterns of Functional Evolution in the Columbine Flower (Aquilegia)* [Graded "Exceptional"] | Elena Kramer |
| Lu Wang | *The Role of a Floral Repressor (FLM) in Environmental Adaptation of Flowering Time in Arabidopsis Arenosa Ecomorphs: subspecies arenosa and borbasii* | Kirsten Bomblies |
| Grace Xiong | *Quantifying Center of Mass Motion in Swimming Fish: effects of speed and locomotion mode* | George V. Lauder |
| Serena Zhao | *A fungus among us: the distribution of Laboulbeniales on Carabid and Coccinellid hosts* | Anne E. Pringle |

# OEB THESES, CLASS OF 2013

| STUDENT | *TITLE* | DIRECTOR |
|---|---|---|
| Joseph Brancale | *A Bird's Eye View of Beak Shape: Understanding patterns and constraints on beak morphogenesis* | Arkhat Abzhanov |
| Zachary Herring | *The color of promiscuity: How personality influences the timing of molt and extra-pair paternity In the Superb Fairy-Wren (Malurus cyaneus)* | Scott V. Edwards |
| Natalie Jacewicz | *Ontogenetic transitions in morphology and behavior in anoles of the southern Dominican Republic* | Jonathan Losos |
| Fiona Jevon | *The importance of age and competition in driving red maple decline in a northeastern mixed deciduous forest* | J. William Munger |
| Courtland Kelly | *Old Ways and New Ways: Utilizing classic and revolutionary tools to examining the effects of temperature on flowering time* | Charles C. Davis |
| Alexander Kim | *Across the Bridge of the World: Isthmian sister species, canal-mediated invasion, and transoceanic dispersal in Macrobrachium, a pantropical genus of amphidromous prawns (Decapoda: Caridea: Palaemonidae)* | Gonzalo Giribet |
| Amanda Lu | *The recent evolution of Mycoplasma gallisepticum in house finches* | Scott V. Edwards |
| Anna McKenney | *Which side is up: The conserved role of ASYMMETRIC LEAVES1 in promoting adaxial identity in compound leaves* | Elena Kramer |
| Anita Murrell | *Energetic Costs of Ascending Flight in Bumblebees Bombus impatiens: To Bee or Not to Bee a Large or Small Individual* | Stacey Combes |
| Yangshu Pan | *Born to Burrow: The ontogeny of burrowing behavior in deer mice (Peromyscus)* | Hopi Hoekstra |
| Akhilesh Pathipati | *More Than Meets the Eye: Sensory Integration and Motion Prediction* | John Assad |
| Julianne Pelaez | *A Community of Third-Party Organisms on Ant-Plants* | Naomi E. Pierce |
| Ian Shields | *Driving Adaptive Radiations: Pressure of thermoregulation on display and microhabitat selection in three cybotoid anoles* | Jonathan Losos |
| Charesa Smith | *TRIM6: A Sentry for Antiviral Defense* | Joern Schmitz |
| Richard Stanley | *Effects of habitat disturbance on a montane bird community* | Jonathan Losos |
| Lila Strominger | *The role of dominant fungi in convergent carnivorous pitcher plants* | Anne E. Pringle |
| Alena Tofte | *How Trees Cope With Cavitation: Stem Xylem Refilling and Leaf Safety Margins* | N. Michele Holbrook |
| Elaine Tran | *Applications of Population Diversity Analysis in Malaria Eradication* | Dyann Wirth |
| Emily Unger | *Reconstructing the RNA World: A Study of Primerless Non-Enzymatic RNA Replication* [Hoopes Winner] [Graded "Exceptional"] | Jack W. Szostak |
| Olivia Weeks | *The molecular basis of dental development in A.mississippiensis, the American Alligator* [Hoopes Winner] | Arkhat Abzhanov |
| Bonnie Wong | *Reciprocal crosstalk of dendritic cells and natural killer cells* | Jack L. Strominger |
| Jelle Zijlstra | *Erinaceids and tarsiers from the Miocene of Pakistan: A study of systematics, phylogeny, and biogeography, with the description of a new genus and two new species*[ Graded "Exceptional"] | Hopi Hoekstra |

# OEB THESES, CLASS OF 2014

| STUDENT | *TITLE* | DIRECTOR |
|---|---|---|
| Emily Burke | *Genetic variation and geographic differentiation in the ectocommensal marine triclad Bdelloura candida (Platyhelminthes, Tricladida, Maricola)* | Gonzalo Giribet |
| Inanna Carter | *Insect Community Assembly of Hawaiian Lobelioideae Plants (Campanulaceae): A Community Phylogenetic Study* [Graded "Exceptional"] | Charles C. Davis |
| Julia Clark | *Infection Dynamics of Syphilis in Communities of Men Who Seek Sex With Men Using Geo-Social Networks* | Rumi Chunara |
| Alexander Cunha | *Salmon-Derived Nutrient Flow in an Impacted Southern Watershed* | Andrew Richardson |
| Thomas Dai | *Wing Spectral Properties and Androconial Structures in Eumaeine Butterflies* | Naomi E. Pierce |
| Fayola Fears | *Uncovering the Genetic Basis of Adaptive Sperm Morphology in Peromyscus* | Hopi Hoekstra |
| Kristina Funahashi | *Six-Year Trends in Anterior Cruciate Ligament Injury Incidence in the General Population: Gender Differences in Injury and Reconstruction Rates* | Andrew A. Biewener |
| Tyler Gamble | *On Anolis bicaorum* | Jonathan Losos |
| Min Lee | *Impact of Diffuse Radiation Measurements on Modeling Carbon Budgets: A Model-Data Fusion Experiment at Bartlett Experimental Forest* | Andrew Richardson |
| Alison Liou | *Non-Enzymatic RNA Replication: Towards An Understanding of the Origins of Life* | Jack W. Szostak |
| Yue Meng | *A Candidate Gene Screen for Germ Line Markers and A Characterization of Oogenesis in the American House Spider Parasteatoda tepidariorum* | Cassandra Extavour |
| Alberto Rivera | *Assessing the role of tendon elastic energy, granular substrate, and pitch stabilization in J. Jaculus Jumps.* | Andrew A. Biewener |
| Georgia Shelton | *The Biodiversity of the Bees at the Arnold Arboretum* [Hoopes Winner] | Brian D. Farrell |
| Alex Stote | *A morphological analysis of the suction disc performance and inter-specific host association in the remoras (Percomorpha: Carangiformes: Echeneidae)* | George V. Lauder |
| Tanner Strickland | *Lizards bridging the gap: Phylogeography of the Puerto Rican Crested Anole (Anolis cristatellus) across the Puerto Rican Bank* [Hoopes Winner] [Graded "Exceptional"] | Jonathan Losos |
| Kathy Wang | *Revealing novel properties of a hybrid antibiotic and drug resistance interactions through evolution and whole-genome sequencing* [Graded "Exceptional"] | Roy Kishony |
| Felix Wu | *Small Colonies and Dwarf Cells: The Effects of Starvation Stress on* Escherichia coli | Ralph Mitchell |

# OEB & IB THESES, CLASS OF 2015

| STUDENT | *TITLE* | DIRECTOR |
|---|---|---|
| Hannah Borowsky | *A Biological Perspective on Why Teenagers Do Stupid Stuff* [Hoopes Winner] | Margaret Sheridan |
| Stephanie Caty | *Dressed to Kill: Toxicity in the Little Devil Poison Frog* [Hoopes Winner] | Lauren O'Connell |
| Aubrey Faust | *Development of a single nucleotide polymorphism barcode for Plasmodium vivax* | Pardis Sabeti |
| Alex Heyde | *Geometric morphometrics of adaptive cranial diversity in phyllostomid bats* [Hoopes Winner] [Graded "Exceptional"] | Arkhat Abzhanov |
| Alexander Jaffe | *Geographic variation in morphology and its environmental correlates in a widespread American lizard, Anolis carolinensis* | Jonathan Losos |
| Sang Il Kim | *Phylogeny, Systematics, and Evolution of the Family Lucanidae Latreille (Insecta: Coleoptera)* [Graded "Exceptional"] | Brian D. Farrell |
| Young Kwon | *The genetic basis of parental care in Peromyscus* [Hoopes Winner] | Hopi Hoekstra |
| Nicholas Lee | *Cell-specific transcriptional networks underlying epigenetic induction of adult cortical plasticity* | Takao Hensch |
| Bonnie Lei | *Tracking disease emergence: Contrasting patterns in mammal-bacteria coevolution* | Kevin Olival |
| Tess Linden | *The role of Agouti isoforms in the evolution of convergent pigmentation phenotypes in Peromyscus mice* [Hoopes Winner] [Graded "Exceptional"] | Hopi Hoekstra |
| Mikhaila Marecki | *Overcoming a Mechanical Disadvantage: Design and Evaluation of Feeding Performance in a Biorobotic Viperfish (Chauliodus sloani)* | George V. Lauder |
| Jenna McGugan | *A Deadly Diet: Dietary contributions to chemical defenses in the Little Devil frog, Oophaga sylvatica* | Lauren O'Connell |
| Emily Mistick | *Effects of wing flexibility on bumblebee flight stability* | Stacey Combes |
| Li Murphy | *A Bee's Chemical Cues of Sociality: Insights into Origins of Social Insect Behavior from Lasioglossum albipes* | Naomi E. Pierce |
| John Pulice | *It Takes Two: A Population Genomics Approach to Detecting Pairing Preference in Autotetraploid Arabidopsis Arenosa* | Kirsten Bomblies |
| Radhika Rastogi | *Structure Function Analysis of Ubiquitin-Specific Protease 1* | Alan D'Andrea |
| Valentina Rodriguez | *Trees and Treetops: A Study of Phylogeny and Natural History of the Orbiliomycetes in New England* | Donald H. Pfister |
| Michael Seward | *Nutrition Interventions at University Dining Halls* | Avik Chatterjee |
| Sam Smith | *A Comparative Characterization of Cranial Base Development as it Relates to Facial Growth in Seba's Short-tailed bat, Carollia perspicillata, and mouse, Mus musculus* | Arkhat Abzhanov |
| Julie Vu | *Investigating gene expression differences due to genome doubling in the autotetraploid Arabidopsis arenosa* | Kirsten Bomblies |
| Charlie Wolock | *Exploring the functional diversity of microbial communities within carnivorous pitcher plants* | Naomi E. Pierce |

# OEB & IB THESES, CLASS OF 2016

| STUDENT | *TITLE* | DIRECTOR |
|---|---|---|
| Gabriel Amador | *Exploring differential regulation of a neofunctionalized paralog of APETALA3 that controls novel organ identity in Aquilegia* | Elena Kramer |
| Caitlin Andrews | *Sex Differences in Habitat Use and Ranging of Spider Monkeys (Ateles geoffroyi yucatanensis) in the Calakmul Biosphere Reserve, Mexico, and Implications for Conservation* | Kathy Slater |
| Prerna Bhat | *Of Mice and Mystacial Whiskers: Adaptive Evolution of Vibrissae Morphology in Peromyscus and Apodemus Mice* | Hopi Hoekstra |
| Imani Bunn | *Developing in Style: The Role of STYLISH1 in Aquilegia Carpel and Petal Spur Development* | Elena Kramer |
| Andrew Clark | *How do yellow jackets (Vespula germanica) fly while carrying loads?* | Stacey Combes |
| Laura Clerx | *How Do Trees Maintain Photosynthate Transport from Leaves to Roots as they Grow Taller? A study of the ontogenetic scaling of phloem sieve tube hydraulic resistance with tree height in Quercus rubra* [Hoopes Prize & Exceptional-graded] | Missy Holbrook |
| Chesley Ekelem | *Effects of wood pollution on pore water sulfide levels and eelgrass germination* | Peter R. Girguis |
| Kate Freedberg | *Development and ecological function of the novel floral organ staminodia in Aquilegia* | Elena Kramer |
| Sally Gee | *Adding timing to the framework of functional traits: A study of phenology across temperate deciduous angiosperm trees* | Lizzie Wolkovich |
| Simone Hasselmo | *Social Connections: Relationships between white matter integrity of the uncinate fasciculus and social awareness and cognition in typically developing children* [Hoopes Prize] | Charles A. Nelson |
| Ariana Kam | *A Comparative Study of the Effects of Pregnancy on Burrowing and Nesting Behaviors in Sister Species of Peromyscus* | Hopi Hoekstra |
| Liz Karan | *The scales of cnidarian associated fishes and their functional implications* | George V. Lauder |
| Paige Kouba | *Aedes Dance Party: Interbreeding and Hybridization Between Aedes triseriatus and Aedes hendersoni in Eastern Massachusetts* | Brian D. Farrell |
| Sam Lin | *Identifying Potential Regulatory Elements of Human and Canine Osteosarcoma Using the Type II CRISPR/Cas-9 Genome Editing System* | Jessica Alfoldi |
| Samantha Martin | *The role of the type 1 pilus in Streptococcus pneumoniae biofilm formation* | Rick Malley |
| Veeral Mehta | *Insights into dsRNA Export: Mapping a Potential Export Mutant, Social RNA, and Characterizing SID-5 Membrane Localization* | Craig P. Hunter |
| Rachel Moon | *Examining the Ecological, Morphological, and Behavioral Correlates of Dorsal Pattern Variations in Female Brown Anole Lizards (Anolis sagrei)* | Jonathan Losos |
| Gaby Ruiz-Colon | *Characterization and Contextualization of Flux Through the Polyol Pathway as a Biomarker for the Presence of Risk Factors of Vascular Complications of Type 1 Diabetes in Children and Adolescents* | Lori Laffel |
| Ellen Shrock | *Genome Engineering for Porcine-to-Human Xenotransplantation* | George Church |
| Layla Siraj | *Mutation, Selection, and the Cost of Artificial Genes* | Jeffrey Way |
| Emilie Thompson | *Mapping Adaptive Immune Development in Zebrafish* | Len Zon |
| Nia Walker | *Characterizing Differential Gene Expression in Probing Larvae of the Caribbean Coral Species Porites astreoides Lamarck, 1816* [Hoopes Prize] | Gonzalo Giribet |
| Tristan Wang | *Herpomyces: The Phylogeny, Taxonomy, and Ecology of a Fungal Genus Parasitic on Cockroaches* | Donald H. Pfister |
| Alex Weickhardt | *Dorsal fin structure and stiffness in the freshwater perches (Acanthomorpha: Percomorpha: Percidae)* | George V. Lauder |