

Ioulia Bespalova

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Education

Arizona State University, Tempe AZ

PhD candidate in Animal Behavior August 2012-present

GPA: 4.0

Mount Holyoke College, South Hadley, MA

Bachelor of Arts May 2011 *cum laude with high honors in biology*

Major: Biology Minor: Philosophy GPA: 3.63 Major GPA: 3.81

Research

Collaborative Project *exploring the function of antennation networks in division of labor* (January 2013 - present)
Arizona State University, Tempe, AZ Supervisor: Jennifer Fewell

Analyzing a dataset of ant antennation and colony task performance using graph theory techniques, along with an undergraduate researcher and collaborators from the ASU math department. This project explores the interplay of network dynamics and division of labor in *Pogonomyrmex californicus*.

Independent Project *exploring morphological adaptations in fighting ant queens* (September 2011 - present)
University of Vermont, Burlington, VT Supervisor: Ken Helms

Measuring head width and petiole width in *Messor pergandei* ant queens to determine whether specimens from populations with more aggressive queens have morphological adaptations for fighting. Using Image J to measure images taken with microscope camera, plotting allometric graphs, and analyzing data with SPSS. Performed background research to inform experimental design.

Independent Project *exploring genetic introgression between hybridizing ants* (2011 – 2012)
University of Vermont, Burlington, VT Supervisor: Sara Helms-Cahan

Using bioinformatics to analyze SNPs that have introgressed between hybridizing *Pogonomyrmex* (*P. rugosus* and *P. barbatus*) in two lineages that practice genetic cast determination. Analysis uses online nuclear and protein databases such as NCBI and Fourmidable, software such as MEGA (Molecular Evolutionary Genetics Analysis) and IGV (Integrative Genomics Viewer), and the web-based genome analysis platform Galaxy. Weekly lab meetings entail learning the basics of computer programming to use in data analysis. Includes instruction in using text editors, terminal, and writing shell scripts and Python programs.

Research Assistant to graduate student *exploring foraging success in ants of different sizes* (July - August 2011)
University of Houston, Houston, TX Supervisor: Diane Wiernasz

Aided UH graduate student Lara Appleby in literary research, design, and set up of behavioral experiment to test foraging success in colony fragments of small, large, and mixed sized *Pogonomyrmex occidentalis* workers. Built foraging arena and helped troubleshoot experimental design. Currently discussing results of experiments, possible revisions, and planning to help with writing up research for publication.

Research Aid to graduate student *in ant identification by eye facet number* (June - July 2011)
University of Vermont, Burlington, VT Supervisor: Sara Helms-Cahan

Aided UVM graduate student Heather Axen on work supplemental to her research on populations of *Solenopsis* (*S. geminata* and *S. amblychila*) that practice genetic cast determination. Research question explored whether obligatory hybridization in these populations causes speciation from their non-hybridizing counterparts. Photographed with microscope camera and counted eye facets using Image J to help identify workers to species.

Honors Thesis exploring the benefits of genetic diversity in social insect colonies (September 2010 - April 2011)
Mount Holyoke College, South Hadley, MA Supervisor: Stan Rachootin

Researched the changing attitudes and theories regarding polyandry and polygyny in the Hymenopterans, reviewed various studies presenting empirical evidence of the benefits of genetic diversity within a colony's workforce, and discussed ideas for studies that would further understanding of these benefits. Carried out self-designed experiments on colonies of *Pogonomyrmex californicus* to perfect techniques for testing individual aggression and temperature response, as well as proposed additional tests to determine behavioral variation in individuals.

Research Assistant to graduate student exploring network structure in the harvester ant (June - August 2011)
Arizona State University, Tempe, AZ Supervisors: Jennifer Fewell and Jon Harrison

Aided ASU graduate student James Waters in an experiment analyzing network motifs used in antennal communication in the ant *Pogonomyrmex californicus*. Helped to design and troubleshoot the experiment, gathered data from video recordings, learned how to collect queens and maintain colonies in lab, and various colony manipulation techniques. Results were presented in a poster at the annual meeting of the Animal Behavior Society (2010) by Jennifer Fewell.

REU Internship exploring the systematics of the giant pill-millipedes of Madagascar (June - August 2009)
Field Museum of Natural History, Chicago, IL Supervisors: Thomas Wesener and Petra Seirwald

Aided with description of four new species as well as several new specimens of giant pill-millipedes from Madagascar (genus *Zoosphaerium*). Created pen-and-ink illustrations of phylogenetically relevant morphological features using camera lucida, as well as produced images using Scanning Electron Microscopy. Wrote detailed descriptions of relevant morphology and proofread various scientific papers on the subject of millipedes. Participated in a phylogenetics workshop.

Work Experience

- **Teaching Assistant for Animal Physiology Lab (BIO 361)** – Spring 2013
- **Teaching Assistant for General Biology 2 Lab (BIO 182)** – Fall 2012

Additional Training

- **California Academy of Sciences Ant Course, Portal, AZ** (August 4-14, 2011)

Outreach Experience

Ant Lab Activity for Biology Engineering Science Technology (BEST) Summer Camp, Arizona State University, Tempe AZ (June 2013)

Co-created and lead a short lab activity for BEST summer camp that on nest mate recognition in ants. Presented this activity on three separate occasions.

Summer Camp Special Guest Activity, Desert Botanical Garden, Tempe AZ (June 13 2013)

Co-lead an activity on ants for a summer camp group (1st-3rd grade). We led an arts-and-crafts activity, along with a short lesson on ant diversity and ant colony dispersal.

Girl Scout Bug Badge Activity, Grayhawk Elementary School, Scottsdale AZ (April 16 2013)

Co-lead an activity on ants for a group of local girls scouts (2nd grade). We created an arts-and-crafts activity, along with a short lesson on ant diversity.

Bug Theater Assistant, Cave Creek Regional Park, Cave Creek AZ (August 2012 – present);

San Tan Mountain Regional Park, Queen Creek AZ (June 2013 – present)

Assisting with “Bug Theater”, a black lighting and insect-education activity for children and parents. Includes live specimen show-and-tell activities, where the public was invited to interact with and learn about ants and other arthropods. Presented in association with rangers at Cave Creek and San Tan Mountain Regional Parks.

Ask A Biologist Volunteer Expert, <http://askbiologist.asu.edu/>

Answer ant-related e-mail questions from curious people around the nation.

ECHO Education Interpreter, Burlington, VT (September 2011- present)

Volunteer at the ECHO Lake Aquarium and Science center. Responsible for teaching visitors (mostly young children and parents) about marine invertebrates in an exhibit called *Champlain Sea Tank*. Hold educational demos about the horseshoe crab. Help with set up, sound and tech for monthly ECHO After Dark series, where local academics present on interesting topics to the public.

Papers

Wesener, Thomas, Bespalova, Ioulia & Sierwald, Petra. (2010) Madagascar's living giants: discovery of five new species of endemic giant pill-millipedes from Madagascar (Diplopoda: Sphaerotheriida: Arthrosphaeridae: *Zoosphaerium*). *African Invertebrates* 51 (1): 133-161.
http://www.africaninvertebrates.org.za/Wesener_etal_2010_51_1_466.aspx

Bespalova, Ioulia. (2011) The Kindness of Strangers: Genetic Diversity Within Social Insect Colonies. Honors Thesis: Mount Holyoke College.

Presentations

Bespalova, Ioulia, Alyssa Holmes, John McKay, Oyita Udiani, James Waters, Jennifer Fewell, Yun Kang. (2013) The Function of Antennation Networks in Modulating Division of Labor. Poster presented at national meeting of the Animal Behavior Society in Boulder, CO.

Bespalova, Ioulia and Ken Helms. (2013) Meathead Queens: Lethal Fighting Linked to Larger Heads in *Messor Pergandei*. Poster presented at national meeting of the Society for Integrative and Comparative Biology in San Francisco, CA.

Bespalova, Ioulia and Ken Helms. (2012) Meathead Queens: Lethal Fighting Linked to Larger Heads in *Messor Pergandei*. 20-minute oral presentation given to the Social Insect Research Group of Arizona State University, Tempe AZ.

Bespalova, Ioulia and Ken Helms. (2012) Meathead Queens: Lethal Fighting Linked to Larger Heads in *Messor Pergandei*. Poster presented at International Union for the Study of Social Insects North American Section meeting in Greensboro, NC.

Bespalova, Ioulia. (2011) The Kindness of Strangers: Genetic Diversity Within Social Insect Colonies. Oral presentation given for Thesis Symposium at Mount Holyoke College, South Hadley MA.

Bespalova, Ioulia. (2011) Variable success of two colony founding strategies: A case study using the California seed-harvester ant *Pogonomyrmex californicus*. Poster presented at national meeting of the Society for Integrative and Comparative Biology in Salt Lake City, UT.

Leadership Activities

- *Graphics Editor for the Mount Holyoke News* (September 2008 - May 2011)

Honors and Affiliations

ASU Dean's Fellowship (2012-2013)

NSF Graduate Research Fellow - (2012 - present)

Sigma Xi, The Scientific Research Society - *member* (2011- present)

Mary Lyon Scholar - *honor for academic excellence* (2011)

Abby Howe Turner Award - *for excellence in biology* (2011)

Ira S Stryker Fellowship - *departmental fellowship funding alumni for biology-related summer work* (2011)

Scion Natural Science Association Research Grant - *funded summer research ASU* (2010)