BEN EWEN-CAMPEN

Department of Organismic and Evolutionary Biology
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EDUCATION

Degree

• 2008-Present: Harvard University
PhD Candidate, Department of Organismic and Evolutionary Biology.
Advisor: Dr. Cassandra Extavour.
Interests: Evolutionary Developmental Biology, Germ Cells, Insects.

• 2006: Swarthmore College.
B.A. with High Honors and Phi Beta Kappa.
Major: Biology. *Minor*: English Literature.

Non-degree

• 2009: Evo-Devo Summer School:
Venice, Italy. Course directors: A. Minelli, M. Akam, G. Müller and G. Fusco.

• 2007: MBL Embryology Summer Course
Woods Hole, MA. Course directors: N. Patel and L. Niswander.

• 2006-2007: Research Technician
University of Montana, Missoula. Advisors: Dr. Doug Emlen and Dr. Lila Fishman.

AWARDS

2012. Certificate of Distinction of Teaching, Harvard University (based on student evalulations).
2009. National Science Foundation Predoctoral Fellowship.
2008. James Mills Peirce Fellowship, Harvard University.
2007. Zeiss MicroImages Contest, Honorable Mention. www.zeiss.de/image-contest.
2007. Horned beetle photographs included in New York Times profile of Dr. Emlen's research:
http://www.nytimes.com/slideshow/2009/03/23/science/032409-Armor_index.html
2005. Lande Field Grant (Swarthmore College).

PUBLICATIONS (FIRST AUTHOR)

2013. Germ cell specification requires zygotic mechanisms rather than germ plasm in a basally branching insect. **Ewen-Campen, B.**, Donoughe, S., Clarke, D.N., and Extavour, C.G**.** *Current Biology* (*in press*). doi:10.1016/j.cub.2013.03.063

2013. Evidence against a germ plasm in the milkweed bug *Oncopeltus fasciatus*, a hemimetabolous insect. **Ewen-Campen, B.***, Jones, T.*, and Extavour, C.G. *Biology Open* (*in press*). doi:10.1242/bio.20134390

2012. *oskar* Predates the Evolution of Germ Plasm in Insects. **Ewen-Campen, B.**, Srouji, J.R., Schwager, E.E. and Extavour, C.G. *Current Biology* 22(23): 2278-2283.

2011. The maternal and early embryonic transcriptome of the milkweed bug *Oncopeltus fasciatus*. **Ewen-Campen B**., Shaner N., Panfilio K.A., Suzuki Y., Roth, S. and Extavour C.G. *BMC Genomics*. 12(1): 61.

2010. The molecular machinery of germ line specification. **Ewen-Campen B.***, Schwager E.E.*, and Extavour C.G. *Molecular Reproduction and Development* 77(1): 3-18.

** = equal contribution*

ADDITIONAL PUBLICATIONS

2013. Gene discovery in a hemimetabolous insect: a *de novo* transcriptome for the cricket *Gryllus bimaculatus.* Zeng, V., **Ewen-Campen, B**., Horch, H.W., Roth, S., Mito, T., and Extavour, C.G. *PLoS ONE* (*in press*).

2011. *De novo* assembly and characterization of a maternal and developmental transcriptome for the emerging model crustacean *Parhyale hawaiensis***.** Zeng, V., Villanueva, K.E., **Ewen-Campen, B**., Alwes, F., Browne, W.E. and Extavour, C.G**.***BCM Genomics* 12(1): 581.

2011. Delta/Notch signalling is not required for segment generation in the basally branching insect *Gryllus bimaculatus*. Kainz, F., **Ewen-Campen, B**., Akam, M. and Extavour, C.G. *Development* 138(22): 5015-5026.

2010. Habitat type is related to nest mass and fledging success of Arctic Warblers. Hagelin J.C., Perry M.L., **Ewen-Campen B.**, Sikes D.S. and Sharbaugh S. *Wilson Journal of Ornithology* 122(4):699-705.

2007. On the origin and evolutionary diversification of beetle horns. Emlen D.J., Corley Lavine L., and **Ewen-Campen B**.*PNAS* 104: suppl 1: 8661-8668.

RESEARCH EXPERIENCE – *Laboratory*

2008-Present. Harvard University (Cambridge, MA)
PhD Student with Dr. Cassandra Extavour, Dept.of Organismic and Evolutionary Biology

- I study the evolution of germ cell specification across insects. This project combines high-throughput sequencing, functional knockdown studies, and gene expression analysis to understand how germ cells are differentiated from somatic cells during embryogenesis.

2006-2007. University of Montana (Missoula, MT)
-Research technician with Dr. Doug Emlen, Dept. of Biological Sciences

- I studied the developmental mechanisms underlying horn growth and dimorphism within and between beetle species. My work focused on the relationships between nutrition-dependent insulin signaling, larval gene patterning events, and the varying allometric relationships between body size and the size of different appendages.

2006-2007. University of Montana (Missoula, MT)
-Research technician with Dr. Lila Fishman, Dept. of Biological Sciences

- I used high-throughput genotyping methods to examine the role that chromosomal inversions play in the suppression of recombination in the hybrids between two closely related *Mimulus* species, a project involved in the creation of a QTL map for these species.

2005-2006. Swarthmore College (Swarthmore, PA)
-Undergraduate research with Dr. Scott Gilbert, Dept. of Biology.

- I used HNK-1 antibody staining of sectioned alligator embryos to provide evidence that the gastralia ("ventral ribs") are derived from neural crest cells. This project was related to a larger project in Dr. Gilbert's lab to explore the neural crest origin of the ventral portion of the turtle shell.

RESEARCH EXPERIENCE – *Field*

2008. Arctic National Wildlife Refuge (Alaska)
-Field technician with Steve Kendall (Ornithologist, U.S. Fish and Wildlife) & Teri Wild (University of Alaska)

- I helped estimate population density and habitat requirements for Smith's Longspurs in one of the most remote wilderness areas of ANWR. Smith's Longspurs are considered a species of concern, and are one of the most poorly understood bird species in North America.

2008. Arctic National Wildlife Refuge (Alaska)
-Field technician with Steve Kendall, Ornithologist, U.S. Fish and Wildlife

- I lived in a remote, fly-in only camp on the northern costal plane of Alaska to help examine the reproductive biology of shore-birds in a pristine wilderness area versus those in near-by areas experiencing oil drilling.

2004-2005. Denali Highway (Alaska)
-Undergraduate research with Julie Hagelin (Swarthmore College) and Alaska Bird Obsevatory (Fairbanks, AK)

- I worked with ABO for two years on the first major study of the Arctic Warbler in North America. I did my undergraduate honors thesis research on the nest insulation and reproductive success of these birds, and I was the first person to document Arctic Warbler nest-building behavior in North America.

PRESENTATIONS

2012. "The *oskar* gene is present in a basally branching insect which lacks germ plasm" and "Germ cell specification in the basal insect *Gryllus bimaculatus*." Poster presentations. Germ Cells Meeting, Cold Spring Harbor, NY.

2011. "Applying the awesome power of Evo-Devo to germ cells: insights from crickets." Invited Seminar. Swarthmore College: Themes in Biology Seminar Series.

2011. "*oskar* predates the evolution of insect germ plasm." Poster presentation. 70th annual Meeting of the Society for Developmental Biology. Chicago, IL.

2009. "Evolution of arthropod germ line specification mechanisms." Invited Seminar. Institute for Developmental Biology, University of Cologne, Germany: Molecular Basis of Evolutionary Innovations.

2009. "Germ line specification in the milkweed bug, *Oncopeltus fasciatus*." Poster presentation. 16th International Society for Developmental Biologists Congress.

2009. "Oocyte patterning in non-model insects: creating transcriptomes of the ovaries and embryos of two insect species using 454 sequencing." Poster presentation. 16th International Society for Developmental Biologists Congress. Also presented at Arthropod Genomics Symposium.

TEACHING AND OUTREACH

Teaching Experience:

- 2010 and 2011. Teaching Fellow. Invertebrate Zoology (Harvard University).
- 2005. Teaching Assistant. Cellular and Molecular Biology (Swarthmore College).

- 2004-2006. “Writing Associate” Peer Editor (Swarthmore College).
  I worked individually with 8-14 Swarthmore students each semester to help improve their academic writing, focusing on Biology and English Literature.

Popular science writing

- I wrote an article for the general public on the evolution of sexual reproduction (“What’s the point of sex?” *Popular Science* 278: 89-90).

Undergraduate advising

- I’ve supervised the independent research of four undergraduate researchers in the Extavour Lab.

Public outreach: the interface between science and art.

- I presented a talk on bee eusociality in MIT’s “Negative Feedback” forum for idea exchange between art and science (2009).
- I lectured about parasites at the Boston CyberArts Festival on the intersections of computers and art (2008).
- I co-founded and frequently lectured in a multimedia performance venue in Philadelphia, PA, called *The Weekly Revue*, which was dedicated to integrating ideas from the sciences, arts, politics, and history.