ERIN E. VAUGHN, PHD

Curriculum Vitae

Areas of Expertise

Population Genetics, Genomics, Epigenetics, Conservation Genetics, Ancient DNA

Academic Qualifications

PhD, Genetics **July 2016**

University of Arizona; Graduate Interdisciplinary Program in Genetics

Dissertation Title: *Genetics and epigenetic investigation of pronghorn, Antilocapra americana.*

Supervisor: Dr. Melanie Culver

Committee Members: Dr. Rebecca Mosher (UA), Dr. David Christianson (UA), Dr. Christina Richards (U. South Florida), *past – Dr. Michael Nachman (U.C. Berkeley), Dr. Giovanni Bosco (Dartmouth), Dr. Noah Whiteman (U.C. Berkeley), Dr. Scott Bonar (UA)*

B.S. (summa cum laude), Biology with Conservation Emphasis **2008**

University of New Mexico

Honors Thesis Title: Direct interactions between pre-mRNA and the DEAD-box Prp5 protein in the commitment complex of the *Saccharomyces cerevisiae* spliceosome

Honors Thesis Committee: Dr. Stephanie Ruby (supervisor), Dr. Mary Anne Nelson

Research Experience

Dissertation Work **2011 – 2016**

Graduate Interdisciplinary Program in Genetics, University of Arizona

My dissertation work focused on population genetics and ecological epigenetics of the American pronghorn. I have employed 454 pyro-sequencing, microsatellite genotyping, mitochondrial sequencing, and MS-AFLP epigenotyping in these pursuits.

Genomics Traineeship **2011-2014**

NSF Integrative Graduate Education and Research Traineeship, University of Arizona

IGERT is a traineeship program designed to facilitate interdisciplinary collaborations between young scientists. As an IGERT fellow, I engaged in intensive coursework studying functional, computational, and evolutionary genomics. I collaborated with students and UA faculty in the design and execution of research projects involving the mining of existing genomics data.

Research Rotation **March – June 2011**

Department of Ecology and Evolutionary Biology, University of Arizona

In the lab of Dr. Noah Whiteman, I studied the genomics of species interactions. I performed hiTAIL PCR to sequence the allene oxide synthase gene in *Cardamine cordifolia* and 3'5' RACE PCR to sequence the glutathione S-transferase transcript in *Scaptomyza flava*.

Research Rotation **February – May 2010**

Department of Immunology, University of Arizona

In the lab of Dr. Maggie So, I studied the evolution of pathogenesis in the bacterial genus *Neisseria*. I explored the genomes of two pathogenic species, *N. meningitidis* and *N. gonorrhoeae*, to find DNA uptake sequences (DUSs). I then calculated the relative prevalence of DUSs within newly acquired genes.

Research Technician **August 2009 – January 2011**

Department of Chemistry and Biochemistry, University of Arizona

I the lab of Dr. Matthew Cordes, I studied the evolution of protein structure. I worked to verify a putative "evolutionary code" behind direct interactions between nucleotides and amino acids. I adapted a bacterial one-hybrid system for determining Cro protein substrate specificity.

Research Technician **January – June 2009**

Department of Molecular Genetics and Microbiology, University of New Mexico

Extending my honors thesis work, I developed a purification scheme for His-tagged Prp5p.

Undergraduate Honors Researcher **August 2006 – December 2008**

Department of Molecular Genetics and Microbiology, University of New Mexico

In the lab of the late Dr. Stephanie Ruby, I studied pre-mRNA splicing in yeast, specifically, the role of Prp5p. I developed an *in vitro* UV cross-linking assay for detection of direct binding of Prp5p and radiolabeled pre-mRNA in yeast whole cell extract.

Software and Programming Experience

I have experience programming in Perl, Python, and R. I am proficient in operating UNIX systems. I have experience utilizing the University of Arizona's super computing system. I have utilized a variety of algorithms and software packages in my research, including PAML, msatcommander, Structure, GeneLand, QDD, ClustDB, Bowtie2, Cufflinks, BEAST, GenAlEx, and Velvet.

Publications

Vaughn, E.E., and M. Culver (in prep for submission) Maintenance of epigenetic diversity in the face of genetic diversity loss in endangered Sonoran pronghorn, *Antilocapra americana sonoriensis*

Vaughn, E.E., and M. Culver (recently submitted to Conservation Genetics) Genetics of pronghorn, *Antilocapra americana*, in Arizona

Vaughn, E.E., and M. Culver (in prep for submission) Subspecies assignment of extirpated California pronghorn populations from museum sample analyses

Vaughn, E.E., and M. Culver (invited review for Conservation Genetics) Conservation Epigenetics: review and future directions

Vaughn, E.E., J. F. Dwyer, M. Culver, and J. Morrison (2015) Development and characterization of polymorphic microsatellite markers for the crested caracara, *Caracara cheriway*. *Conservation Genetics Resources* 7(2):557-559.

B.M. Hall, **E.E. Vaughn**, A.R. Begaye and M.H. J. Cordes (2011) Reengineering Cro protein functional specificity with an evolutionary code. *Journal of Molecular Biology*, **413**, 914-928.

Academic Presentations

Joint Annual Meeting of the Arizona and New Mexico Wildlife Society **2016**

Flagstaff, AZ; talk (delivered *in absentia* by M. Culver)

Vaughn, Erin E. and **Melanie Culver** "Conservation Epigenetics: application of epigenetic analyses in the management of Sonoran pronghorn."

IGERT Population Genetics Symposium **2013**

Tucson, AZ; poster

Vaughn, Erin E., Melanie Culver. "Development of microsatellite markers for the crested caracara from next generation sequencing data."

Joint Annual Meeting of the Arizona and New Mexico Wildlife Society **2012**

Albuquerque, NM; talk

Vaughn, Erin E. "Applications of "epigenetic" tools in wildlife management and conservation."

Academic Presentations (continued)

IGERT Population Genetics Symposium **2012**

Tucson, AZ; poster

Vaughn, Erin E., Melanie Culver. "Development of epigenetic biomarkers to assess aquatic toxicity."

Protein Society Meeting **2010**

San Diego, CA; poster

Vaughn, Erin E., Branwen M. Hall, and Matthew H.J. Cordes. "Reengineering lambda Cro specificity with an evolutionary code: evidence from a bacterial one-hybrid assay."

RNA Society Meeting **2008**

Berlin, Germany; poster

Hahn, Erin E. and Stephanie W. Ruby. "Mapping pre-mRNA interactions of Prp5 protein *in vitro* using TEV protease."

University of New Mexico Biology Research Day **2008**

Albuquerque, NM; poster

Hahn, Erin E. and Stephanie W. Ruby. "Mapping pre-mRNA interactions of Prp5 protein *in vitro* using TEV protease."

University of New Mexico Biology Research Day **2007**

Albuquerque, NM; poster

Hahn, Erin E., Michelle Tsinnajinnie, and Stephanie W. Ruby. "Mapping molecular interactions *in vivo* using targeted TEV protease cleavage."

Academic Associations

Tucson Women in STEM (TWiSTEM) **2013 – present**

Board member – January through May 2013

Scholarships/Grants/Awards

IGERT in Comparative Genomics **2011 – 2014**

The prestigious Integrative Graduate Education and Research Traineeship (IGERT) is a National Science Foundation funded program providing a $30,000 stipend and training in functional, computational, and evolutionary genomics. I received three competitive one-year fellowships.

Summer Institute for Statistical Genetics Travel Award **2013 & 2014**

In the years of 2013 & 2014 combined, I was awarded funds ($2275) to cover attendance of 4 modules and travel assistance.

University of New Mexico S-CAP Travel Grant **2008**

The Student Conference Award Program (S-CAP) is awarded to undergraduate and graduate students to help cover travel costs associated with research presentation. I received $600 for travel to the 2008 RNA Society Meeting.

Honorable Mention for presentation of a poster at UNM Biology Research Day **2008**

NSF S-STEM Scholarship **2007 & 2008**

S-STEM is awarded to exceptional undergraduate students in STEM disciplines. The award provides $5000 towards tuition per academic year. S-STEM also provides career development opportunities in the form of workshops and career fairs. I received two S-STEM awards.

National Science & Mathematics Access to Retain Talent (SMART) Grant **2007**

The SMART grant is awarded to third and fourth year undergraduate students in STEM disciplines with GPAs above 3.0. I received $2000.

Teaching/Mentoring

College Teaching Certification Program **Completed Fall 2015**

I received a graduate certificate in college teaching from the Office of Instruction and Assessment at the University of Arizona. The program prepares academics for teaching careers focusing on the learner-centered teaching philosophy.

Guest Lecturer – *Conservation Genetics; University of Arizona* **Fall 2015**

I prepared lessons for six class periods covering natural selection, mutation, migration, drift, neutral theory, and genomics. The course is cross-listed for undergraduate and graduate students. I re-engineered the content to implement learner-centered teaching methods.

Teaching/Mentoring (continued)

Teaching Assistant – *Molecular and Cellular Biology, University of Arizona* **Fall 2015**

I was the teaching assistant for Dr. Lisa Elfring. My duties included facilitating group discussions, holding tutoring sessions, and grading.

Teaching Assistant – *Introductory Biology Lab, University of Arizona* **Fall 2014**

I was the primary lecturer for two introductory biology laboratory sections. I was also tasked with grading for this course.

Guest Lecturer – *Conservation Genetics; University of Arizona* **Fall 2014**

I presented a lecture on forensic genetic applications in conservation.

Mentor to Tucson High School Students **2013 – 2014**

I have guided several high school students through their senior research projects. They have learned genetic lab techniques and conservation theory.

Guest Lecturer – *Conservation Biology; University of Arizona* **Spring 2014**

I lectured on the applications of genetics in wildlife conservation to an undergraduate course.

Guest Lecturer – *Wildlife Management, University of Arizona* **Fall 2012**

I presented two lectures on the application of genetics in wildlife management and led students through laboratory exercises in this undergraduate course.

Graduate Student Guide for Visiting Middle School Students **2012 – 2015**

I have hosted several small groups of 8th graders interested in genetics. I discussed my project, took them on a tour of the lab, and engaged them in a small molecular genetics procedure, such as extracting DNA or setting up PCR reactions.

Arizona Science Teacher Advancement and Research Training **Summer 2010**

I mentored a Tucson middle school science teacher as part of the AZ-START program. Over 8 weeks, I taught her to perform typical biochemical assays, discussed ways to incorporate the scientific method into her curriculum, and assisted her in putting together a poster presentation.

Workshops Attended

Women in Computer Science Programming Workshop **April 2015**

University of Arizona; Tucson, AZ

Modules: Python, C

19th Summer Institute in Statistical Genetics **July 2014**

University of Washington; Seattle, WA

Module: Probability and Statistical Inference

Workshops Attended (continued)

18th Summer Institute in Statistical Genetics **July 2013**
University of Washington; *Seattle, WA*
Modules: Population Genetics and Association Mapping, Bayesian Statistics for Genetics, and Introduction to R

Fieldwork Safety Workshop **2010**
University of Arizona; Tucson, AZ

Additional Certifications

Certificate in College Teaching Program **2015**

SCUBA: PADI Open Water Diver **2009**