

## HEATH BLACKMON

Department of Biology  
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### ACADEMIC POSITIONS

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- 2017–present Assistant Professor, Texas A&M University; Department of Biology
- Faculty of Ecology and Evolutionary Biology
  - Faculty of Genetics
- 2015–2017 Postdoctoral Associate, University of Minnesota  
Goldberg & Brandvain Labs
- 2013 Graduate Fellow, National Evolutionary Synthesis Center

### EDUCATION

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- 2015 Ph.D., Quantitative Biology, University of Texas at Arlington  
Dissertation: Synthesis and phylogenetic comparative analyses of the causes and consequences of karyotype evolution in arthropods  
Major Professor: Jeffery Demuth
- 2010 B.S., Environmental Science, Oregon State University, Summa Cum Laude

### RESEARCH GRANTS

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- 2019 \$14,768 Eppley Foundation – *The genomics of pine beetle outbreaks* Co-PI with Claudio Cassola  
\$18,000 EcoLab Grant – Evolution of sex chromosomes in Tiger beetles Graduate student  
Michelle Jonika
- 2018 \$32,500 Texas A&M University T3: Research Triad Grant – Accepted *10,000 years of genome evolution: a replicated natural experiment in the sky islands of the southwest*.  
Collaborators: J. Spencer Johnston and Alan Pepper.
- 2016 \$102,000 University of Minnesota Grand Challenges Grant – Accepted *Sex chromosome aneuploidy: reproductive health in humans and domestic animals and driving forces in the evolution of genome architecture*
- \$46,000 BARD Fellowship – Declined *The evolutionary dynamics of ploidy evolution in plants*
- \$589,881 NSF: DEB-BSF: *Breaking barriers to the study of trait-dependent lineage diversification*.  
Emma Goldberg and Itay Mayrose co-PIs. I wrote portions funding my work on discrete trait model adequacy and broader impact activities with veterans.
- 2013 \$23,000 NESCent Graduate Fellowship – Accepted *The Tree of Sex: A comprehensive synthesis of sex determination systems and their evolution in invertebrates*

### PEER REVIEWED PUBLICATIONS

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Blackmon lab members: <sup>1</sup>Undergraduate <sup>2</sup>Graduate <sup>3</sup>Postdoc

#### 2019

**24** Hjelmen<sup>3</sup>, C.E., **H. Blackmon**, V. Renee Holmes, Crystal G. Burrus, J. Spencer Johnston. Genome size evolution differs between *Drosophila* subgenera with striking differences in male and female genome size in *Sophophora*. *G3* 9:10, 3167-3179 DOI: 10.1534/g3.119.400560

- 23** Lo<sup>1</sup>, J., M.M. Jonika<sup>2</sup>, and **H. Blackmon**. micRocounter: Microsatellite Characterization in Genome Assemblies. *G3*. 9:10 3101-3104 DOI: 10.1534/g3.119.400335
- 22** Perkins<sup>1</sup>, R.D., J.R. Gamboa<sup>2</sup>, M.M. Jonika<sup>2</sup>, J. Lo<sup>1</sup>, A. Shum<sup>1</sup>, R.H. Adams, **H. Blackmon**. A Database of Amphibian Karyotypes. *Chromosome Research* 27:4 313-319 DOI: 10.1007/s10577-019-09613-1
- 21** Schield, D.R., D.C. Card, N.R. Hales, B.W. Perry, G.I.M. Pasquesi, **H. Blackmon**, R.H. Adams, A.B. Corbin, C.F. Smith, B. Ramesh, J.P. Demuth, E. Betrán, M. Tollis, J.M. Meik, S.P. Mackessy, and T.A. Castoe. The origins and evolution of chromosomes, dosage compensation, and mechanisms underlying venom regulation in snakes. *Genome Research*, 29:4 590-601 DOI: 10.1101/gr.240952.118
- 20** Armstrong, A.<sup>1</sup>, N. Anderson<sup>1</sup>, **H. Blackmon**. Inferring the potentially complex genetic architectures of adaptation, sexual dimorphism, and genotype by environment interactions by partitioning of mean phenotypes. *Journal of Evolutionary Biology*, 32:4 369-379 DOI: 10.1111/jeb.13421
- 19** **Blackmon, H.**, J. Justison, I. Mayrose, E.E. Goldberg, Meiotic drive shapes rates of karyotype evolution in mammals. *Evolution*, 73:3 511-523 DOI: 10.1111/evo.13682
- 18** Passow, C., A.M. Bronikowski, **H. Blackmon**, S. Parsai, T.S. Schwartz, S.E. McGaugh, Contrasting patterns of rapid molecular evolution within the p53 network across mammal and sauropsid lineages. *Genome Biology and Evolution*, 11:3 629-643 DOI: 10.1093/gbe/evy273
- 17** Gale, C.C., E. Borrego, **H. Blackmon**, J.K. Harper, D. Richardson, and H. Song. Investigating a Photolytic Metabolite in the Nocturnal Grasshopper *Schistocerca ceratiola* (Orthoptera: Acrididae). *Annals of the Entomological Society of America*, 112:1, pp.50-55. DOI: 10.1093/aesa/say048
- 2017**
- 16** **Blackmon H.**, Y. Brandvain. Short-term resolution of sexual antagonism dominates long-term fragility of Y chromosomes. *Genetics* 207:4 1621-1629 DOI: 10.1534/genetics.117.300382
- 15** **Blackmon H.**, L. Ross, D. Bachtrog. Sex determination, sex chromosomes and karyotype evolution in insects. *Journal of Heredity* 108:1 78-93— *recommended by Faculty of 1000*. DOI: 10.1093/jhered/esw047
- 14** Adams R., D Schield, D. Card, **H. Blackmon**, and T. Castoe. GppFst: Genomic posterior predictive simulations of Fst and dxy for identifying outlier loci from population genomic data – *Bioinformatics* 33:9 1414-1415 DOI:10.1093/bioinformatics/btw795
- 2016**
- 13** **Blackmon, H.** and J.P. Demuth. An information-theoretic approach to estimating the composite genetic effects contributing to variation among generation means: moving beyond the joint-scaling test for line cross analysis. – *Evolution* 70:2 420-432. DOI: 10.1111/evo.12844
- 12** Asian Longhorn Beetle Consortium (67 Authors). Genome of the Asian longhorned beetle (*Anoplophora glabripennis*), a globally significant invasive species, reveals key functional and evolutionary innovations at the beetle-plant interface. *Genome Biology* 17:1 227 - *Responsible for analysis of genome structure evolution*. DOI: 10.1186/s13059-016-1088-8
- 11** Ross, L. and **H. Blackmon**. Sex Determination. In R. Kliman (Ed.) *Encyclopedia of Evolutionary Biology*. 81-88 Elsevier Academic Press. DOI:10.1016/B978-0-12-800049-6.00146-3
- 10** Adams R.; **H. Blackmon**; J. Reyes-Velasco; D. Schield; D. Card; A. Andrew; N. Waynewood; T. Castoe. Microsatellite landscape evolutionary dynamics across 450 million years of vertebrate genome evolution. *Genome* 59:5, 295-310 - *Editor's choice*. DOI: 10.1139/gen-2015-0124

**2015**

9 **Blackmon, H.**, N. Hardy, L. Ross. The evolutionary dynamics of haplodiploidy: genome architecture and haploid viability. *Evolution* 69:11 2971-2978. DOI: 10.1111/evo.12792

8 **Blackmon, H.**, and J. P. Demuth. The fragile Y hypothesis: Y chromosome aneuploidy as a selective pressure in sex chromosome and meiotic mechanism evolution. *Bioessays* 37:9 942-950. DOI: 10.1002/bies.201500040

7 **Blackmon, H.**, and J. P. Demuth. Coleoptera Karyotype Database. *The Coleopterists Bulletin* 69:1 174-175. DOI: 10.1649/0010-065X-69.1.174

6 Ross, L., **H. Blackmon**, P. Lorite, V. Gokhman, and N. Hardy. Recombination, chromosome number and eusociality in the Hymenoptera. *Journal of Evolutionary Biology* 28:1 105-116. DOI: 10.1111/jeb.12543

5 **Blackmon, H.**, and J. P. Demuth. Genomic origins of insect sex chromosomes. *Current Opinion in Insect Science* 7 45-50. recommended by Faculty of 1000. DOI: 10.1016/j.cois.2014.12.003

## 2014

4 **Blackmon, H.**, and J. P. Demuth. Estimating tempo and mode of Y chromosome turnover: explaining Y chromosome loss with the fragile Y hypothesis. *Genetics* 197:2 561-572. DOI: 10.1534/genetics.114.164269

3 Streicher, J. W., T. J. Devitt, C. S. Goldberg, J. H. Malone, **H. Blackmon**, and M. K. Fujita. Diversification and asymmetrical gene flow across time and space: lineage sorting and hybridization in polytypic barking frogs. *Molecular Ecology* 23:13 3273-3291. DOI: 10.1111/mec.12814

2 Ashman T., D. Bachtrog, **H. Blackmon**, E.E. Goldberg, M.W. Hahn, M. Kirkpatrick, J. Kitano, J.E. Mank, I. Mayrose, R. Ming, S.P. Otto, C.L. Peichel, M.W. Pennell, N. Perrin, L. Ross, N. Valenzuela, and J.C. Vamasi. Tree of Sex: A database of sexual systems. *Nature Scientific Data* 1:140015. – responsible for 11,526 invertebrate records and all figures. DOI: 10.1038/sdata.2014.15

## 2012

1 **Blackmon, H.**, and J. P. Demuth. Ring Species and Speciation. *Encyclopedia of Life Science*. www.els.net. DOI: 10.1002/9780470015902.a0001751.pub3

## SOFTWARE AND DATABASES

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### R Packages

1. chromePlus: Probabilistic models of chromosome evolution <https://github.com/coleoguy/chromePlus/>
2. SAGA2: Software for the Analysis of Genetic Architecture. <https://github.com/coleoguy/SAGA2>
3. EvobiR: Evolutionary biology analysis in R. <https://github.com/coleoguy/EvobiR>
4. micRocounter: Microsatellite quantification. <https://github.com/johnathanlo/micRocounter>

### Databases

1. Coleoptera Karyotype Database. <https://karyotype.org>
2. Polyneoptera Karyotype Database. <https://karyotype.org>
3. Amphibian Karyotype Database. <https://karyotype.org>
4. Tree of Sex Database – responsible for invertebrates <https://treeofsex.org>

### Pedagogy

1. PopGenSim: Wright-Fisher Simulator <https://github.com/coleoguy/popgensim>

## INVITED SEMINARS

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### 2019

*Making sense of biological data with Bayesian approaches*, Statistic symposium; Texas A&M University  
*The evolution of alternative forms of meiosis*, Reproductive biology group; Texas A&M University CVM  
*Drivers of Chromosome Evolution across the tree of life*; Evolution Conference; Spotlight talk  
*Evolution of Genome Architecture*; Texas A&M University; Department of Entomology  
*Theoretical Approaches in Evolutionary Biology*; Texas A&M University; Department of Math

## 2018

*Effective population size and chromosome evolution*; University of Arizona; Department of Ecology, Evolution and Behavior

*Linking traits and rates in comparative analyses*; Saint Edwards University; Department of Biology

*Outreach Symposium – Success entering graduate school*; Saint Edwards University; Department of Biology

## 2017

*Causes of chromosome evolution*; Louisiana State University; Department of Biology

*Evolution of genome organization*; University of Houston; Department of Biology and Biochemistry

*Karyotype evolution in arthropods*; Texas A&M University; Genetics and Genomics Seminar Series

*The evolutionary fate of Y chromosomes*; Texas A&M University; Biology Department

*The evolutionary fate of Y chromosomes*; University of Minnesota, Department of Plant and Microbial Biology

## 2016

*The impact of binary traits on rates of chromosome evolution*; Tel Aviv University, Department of Plant Biology

*The fragile Y Hypothesis*; James F. Crow early career researcher award symposium - GSA. Florida

## 2015

*Y chromosome evolution and its impact on meiosis*; American Genetics Association: President's Symposium, Bainbridge Washington

## 2013

*Karyotype evolution in Coleoptera*; University of Texas at Austin, Department of Population Biology

## CONFERENCE PRESENTATIONS (T – talk, P – poster, † coauthored with a student/postdoc)

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### 2019

- *The impact of operational sex ratio bias on sexually antagonistic variation in finite populations*; Evolution Conference. Rhode Island – P† (co-author Julio Rincones-Gamboa)
- *Evolution of chromosome number and sex chromosomes in Polyneoptera*; Evolution Conference. Rhode Island – P† (co-author Terrence Sylvester)
- *The evolution of microsatellite content during the evolution of insects*; Evolution Conference. Rhode Island – P† (co-author Michelle Jonika)
- *Tempo and Mode of Microsatellite Evolution in Insects*; Texas Genetic Society Meeting. Texas A&M – P† (co-author Michelle Jonika)
- *micRocounter: and R package for microsat analysis*; Texas Genetic Society Meeting. Texas A&M – P† (co-author Johnathan Lo)
- *Operational Sex Ratio Bias and the fate of sexually antagonistic variation*; Texas Genetic Society Meeting. Texas A&M – P† (co-author Amy Shum and David Gafford-Gabey)
- *Chromosome evolution in Polyneoptera*; Texas Genetic Society Meeting. Texas A&M – P† (co-author Terrence Sylvester)
- *Incorporating environmental and sex effects in line-cross analysis*; Texas Genetic Society Meeting. Texas A&M – P† (co-author Andrew Armstrong)
- *How much water is in the fountain of youth – 1<sup>st</sup> place undergraduate poster*; Texas Genetic Society Meeting. Texas A&M – P† (co-author Andrew Anderson)
- *Tempo and Mode of Microsatellite Evolution in Insects*; Genetics Recruiting Seminar. Texas A&M – P† (co-author Michelle Jonika)
- *micRocounter: and R package for microsat analysis*; Student Research Week. Texas A&M – P† (co-author Johnathan Lo)
- *Operational Sex Ratio Bias and the fate of sexually antagonistic variation*; Student Research Week. Texas A&M – P† (co-author Amy Shum and David Gafford-Gabey)
- *Chromosome evolution in Polyneoptera*; Student Research Week. Texas A&M – P† (co-author Terrence Sylvester)
- *Incorporating environmental and sex effects in line-cross analysis*; Student Research Week. Texas A&M – P†

(co-author Andrew Armstrong)

- *How much water is in the fountain of youth*; Student Research Week. Texas A&M – P<sup>†</sup> (co-author Andrew Anderson)
- *Microsatellite content in hexapods*; Student Research Week. Texas A&M – P<sup>†</sup> (co-author Michelle Jonika)
- *Amphibian chromosome number evolution*; Student Research Week. Texas A&M – P<sup>†</sup> (co-author Riddhi Perkins)

#### 2018

- *Detection of temporal correlations in trait evolution*; Texas Genetics Society. Texas A&M – P<sup>†</sup> (co-author Nathan Anderson)
- *Promises and perils of environmental variation - Software for the Analysis of Genetic Architecture*; Texas Genetics Society. Texas A&M – P<sup>†</sup> (co-author Andrew Armstrong) - Best undergraduate poster

#### 2017

- *Inference of outlier loci in population genomic studies*; Society for the Study of Evolution. Oregon – T<sup>†</sup> (co-author Richard A. Adams)
- *The evolution of transfer RNA genes in *Tigriopus californicus**; Society for the Study of Evolution. Oregon – P<sup>†</sup> (co-author Eric Watson)
- *Life history predict evolutionary patterns in P53 network*; Society for the Study of Evolution. Oregon – P<sup>†</sup> (co-author Erin Gilbertson)
- *Gene loss in reptile lineages*; Society for the Study of Evolution. Oregon – P<sup>†</sup> (co-author Courtney Passow)
- *Short-term resolution of sexual antagonism leads to long-term Y chromosome instability*; Society for the Study of Evolution. Oregon – P

#### 2016

- *Chromosome number evolution in beetles*; Society for the Study of Evolution. Texas. – P
- *Software for the Analysis of Genetic Architecture: SAGA*; Society for the Study of Evolution. Texas. – P

#### 2015

- *Fragile Y chromosomes may be common across the tree of life*; University of Minnesota Postdoctoral Symposium. – P
- *A three locus 2 allele model of chromosome aneuploidy*; University of Minnesota theory group – T
- *The causes and consequences of karyotype evolution in invertebrates*; University of Texas at Arlington, Exit Seminar – T
- *Transitions in life history lead to higher rates of chromosome evolution*; University of Texas at Arlington, Genome Biology Group. – T

#### 2014

- *SilicoPainter an R package to perform in-silico chromosome painting*; Arthropod Genomics Conference, Notre Dame, Indiana. – P
- *Y chromosome loss is driven by meiotic mechanisms*; University of Texas at Arlington, Genome Biology Group. – T

#### 2012

- *Evolution of sex chromosome systems in Coleoptera*; Society for the Study of Evolution. Canada. – P

#### 2011

- *Chromosome number variation across 1000 Beetles*; Society for the Study of Evolution. Oklahoma. – P

#### AWARDS AND MINOR GRANTS

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2016	Outstanding presentation University of Minnesota postdoctoral seminar Finalist James F. Crow early career researcher award
2010-2015	Carrizo Oil and Gas Doctoral Student Fellowship – \$10,000 STEM Fellowship – \$104,000
2014	Learning Community Grant - University of Texas at Arlington – \$500 Writing Fellowship - University of Texas at Arlington – \$6,726 Eck Institute for Global Health Travel Grant – \$600

2013	Excellence in Teaching Award - \$500
2012	NESCent Working Group Travel Funds – \$2,300 Department Travel Grant – \$1,125
2010	The Utley Graduate Fellowship - \$2,000

#### OTHER PUBLICATIONS

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2018	Scientific Consultant <i>The Evolution of Insects</i> by Christine Evans, Abdo Publishing
2010 – present	Coleopterists Corner - blog. 100+ posts. 1,000+ views/month
2014	Blackmon, H. Coleoptera Karyotypes: The evolution of sex chromosomes and chromosome number. <i>Newsletter of the Ontario Entomological Society</i> 19:2 19–21

#### ADDITIONAL TRAINING

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2016	Software Carpentry Instructor Training
2015	CIRTL Associate level certification in STEM teaching
2014	Bark Beetle Academy; University of Florida
2012	Bodega Phylogenetics Workshop; University of California Davis
2011	Geometric Morphometrics Workshop; University of Manchester

#### TEACHING EXPERIENCE

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U – undergraduate G – graduate Average student evaluation 4.5/5

Developed curricula and primary instructor

2019	R for Bioinformatics	G 12 students
2019	Foundation of evolutionary biology	G 10 students
2019	Experimental design	G 23; U 2 students
2019	EEB: Phylogenetics module	G 15 students
2018	Experimental design	G 13 students
2018	Evolutionary theory reading group	G 11 students
2018	EEB: Phylogenetics module	G 7 students
2013	Introduction to R for Biologists	G 12 students
2011	Entomology Laboratory	U 60 students

Teaching assistant

2016	Biostatistics	U 60 students
2014	Bioinformatics	G 21 students

Laboratory instructor

2014-2015	Anatomy and Physiology I	U 96 students
2014	Anatomy and Physiology II	U 72 students
2013-2015	Research Methods	U 76 students
2012	Zoology	U 46 students
2010	Introductory Biology (majors)	U 72 students

Guest lectures

2019	Guest Lectures: phylogenetics	U 42 students
2019	Guest Lecture: effective population size	U 60 students
2016	Measurement error in PCMs	G 6 students
2015	Reproducible research in R	G 15 students
2014	Phyloinformatics	G 21 students
2012	Graphing in R	G 21 students
2011	Ancestral State Reconstruction	G 14 students
2011	Evolution and Ecology of Insects	U 191 students

#### MENTORING

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## Postdoc

Carl Hjelman

## Current Graduate Students in Blackmon Lab

Terrence Sylvester	Chair	TAMU-Biology	Ph.D.
Michelle Jonika	Chair	TAMU-Genetics	Ph.D.
Sarah Ruckman	Chair	TAMU-EEB	Masters

## Current Graduate Students Mentored

Jenna Hulke	Member	TAMU-Biology
Kasuni Daundasekara	Member	TAMU-Biology
Kevin Bredemeyer	Member	TAMU-Genetics
Sarah O'Leary	Member	TAMU-Genetics
Mateo Garcia	Member	TAMU-EEB
Constance Lin	Member	TAMU-Entomology
Stephen Bovio	Member	TAMU-EEB
Xue Fan	Member	TAMU-Statistics
Nicholas Farmer	Member	TAMU-Plant pathology
Breann Richey	Member	TAMU-EEB

## Former Graduate Students

Andrew Anderson	Co-Chair	TAMU-Biology
Andrew Sakla	Member	TAMU-Biology
Roberto Garcia	Intern Sponsor	University of Sonora-Entomology
Luke Bower	Member	TAMU-Wildlife and Fisheries
Alexis Earl	Statistical consultation	TAMU-WFSC

## UNDERGRADUATES MENTORED (\* Published peer reviewed manuscripts while in lab)

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Nathan Anderson*	Paulina Serra Rossi	Amy Shum*
Andrew Armstrong*	Tiffany Brown	Johnathan Lo*
Shawn Hingo	Mayra Gonzalez	Madyson Wynn
Athena Myer	Eleanor Simpson	Julia Plocica
Riddhi Perkins*	David Gafford-Gabbey	Kayla Wilhoit

## PEER REVIEW (NUMBER OF REVIEWS)

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ABDO Publishing (1)	Genomics (1)
Annals of the New York Academy of Sciences (1)	Heredity (3)
Applications in Plant Science (2)	Intl Jrnl of Gynecology and Obstetrics Research (1)
Axios (1)	Journal of Heredity (2)
BMC Genomics (1)	Molecular Biology and Evolution (3)
Cambridge University Press (1)	Myrmecological News (1)
Cells (1)	National Science Foundation – panelist
European Journal of Entomology (1)	National Science Foundation – ad hoc reviewer
Evolution (3)	Nature Scientific Reports (4)
G3: Genes Genomes Genetics (1)	New Phytologist (1)
Genes (6)	PeerJ (2)
Genetics (3)	PLOS One (1)
Genome Biology and Evolution (6)	Proceedings of the Royal Society B (1)
Genomes (1)	Systematic Biology (1)

**PROFESSIONAL MEMBERSHIPS**

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Genetics Society of America	American Genetics Association	Texas Genetics Society
Society for the Study of Evolution	Coleopterists Society	American Society of Naturalists

**UNIVERSITY AND PROFESSIONAL SERVICE**

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2019 Biology department faculty search committee  
2019-present Aggie Vets who Code organizer and director  
2019-present TAMU Coffee Club faculty advisor  
2018-present Biology department student and postdoc research conference committee  
2018-present Texas Genetics Society board member  
2018-present Genetics IDP outreach committee  
2017-present Biology Department Graduate Recruitment & Admissions Committee  
2019 November Organized and led R Hackday (40 graduate, 2 undergraduate, 2 faculty)  
2019 June Midwest Phylogenetics Workshop (1 Week workshop)  
2019 April Organized and taught Intro to R for biologists at Texas Genetics Society meeting  
2019 March Organized and led R Hackday (38 graduate, 3 undergraduate, 3 faculty)  
2018 Research presentation for TAMU Science Leadership Scholars Program  
2017–2018 Founder and instructor for the Vets who Code program at Texas A&M  
2016–2018 Genetics Society of America Board of directors – postdoctoral representative  
Grant review for Phi Sigma Biological Sciences Honor Society;  
2016 The Allied Genetics Conference GSA poster judge  
software Carpentry Instructor: Reproducible research in R - 4 hour module  
2010–2015 Elementary and Middle School Hands on Science Programs:  
Scientific Inference - Fossils and Skeletons: 213 students  
Insects Adaptation: 69 students  
2015 Organize and facilitate the EvoLTwin group (evolution group in the Twin Cities)  
2015 Software Carpentry Class at University of Texas at Arlington; assistant  
Organized and led reading group – Primary literature in undergraduate biology  
2014 Formed and moderated foundations of evolutionary biology graduate study group  
2012 Session Moderator for ACES conference  
Faculty search committee — graduate student representative  
2011 Judge for Undergraduate Research Posters at LSAM Conference

**REFERENCES**

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Emma Goldberg Research Scientist Los Alamos National Laboratories 612-625-5713 eeg@umn.edu	Jeffery Demuth Associate Professor University of Texas at Arlington 817-272-2653 jpdemuth@uta.edu
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