

HEATH BLACKMON

Department of Biology
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ACADEMIC POSITIONS

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

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

2019 \$14,768 Eppley Foundation – *The genomics of pine beetle outbreaks* Co-PI with Claudio Cassola
\$18,000 EcoLab Grant – Evolution of sex chromosome [s](#) 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

Blackmon lab members: ¹Undergraduate ²Graduate ³Postdoc

2019

24 Hjelman³, 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** Lo¹, J., M.M. Jonika², and **H. Blackmon**. micRocounter: Microsatellite Characterization in Genome Assemblies. *G3* 9:10 3101-3104 DOI: 10.1534/g3.119.400335
- 22** Perkins¹, R.D., J.R. Gamboa², M.M. Jonika², J. Lo¹, A. Shum¹, 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.¹, N. Anderson¹, **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, Goldberg, E.E., 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
- 2018**
- 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. Vamosi. 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

R Packages

1. chromePlus: Probabilistic models of chromosome evolution <https://github.com/coleoguy/chromePlus/>
2. SAGA: Software for the Analysis of Genetic Architecture. <https://github.com/coleoguy/SAGA>
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. Amphibian Karyotype Database. <https://karyotype.org>
3. Tree of Sex Database – responsible for invertebrates <https://treeofsex.org>

Pedagogy

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

INVITED SEMINARS

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)

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* – 1st 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[†] (co-author Andrew Anderson)
- *Microsatellite content in hexapods*; Student Research Week. Texas A&M – P[†] (co-author Michelle Jonika)

- *Amphibian chromosome number evolution*; Student Research Week. Texas A&M – P[†] (co-author Riddhi Perkins)

2018

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

2017

- *Inference of outlier loci in population genomic studies*; Society for the Study of Evolution. Oregon – T[†] (co-author Richard A. Adams)
- *The evolution of transfer RNA genes in *Tigriopus californicus**; Society for the Study of Evolution. Oregon – P[†] (co-author Eric Watson)
- *Life history predict evolutionary patterns in P53 network*; Society for the Study of Evolution. Oregon – P[†] (co-author Erin Gilbertson)
- *Gene loss in reptile lineages*; Society for the Study of Evolution. Oregon – P[†] (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

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

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

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

(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	Guest Lecture: effective population size	U 60 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

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

Postdoc

Carl Hjelman

Current Graduate Students in Blackmon Lab

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

Current Graduate Students Mentored

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)

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)

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

PROFESSIONAL MEMBERSHIPS

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

2019	Biology department faculty search committee
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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	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 EvoITwin 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

Emma Goldberg
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