

Sarah B. Carey

Curriculum vitae

Postdoctoral Associate
Auburn University, Department of Crop, Soil, and Environmental Sciences
HudsonAlpha Institute for Biotechnology
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Education

May 2020 **University of Florida, Gainesville, Florida**
Ph.D., Botany

2014 **University of Florida, Gainesville, Florida**
B.S., Biology, *Summa cum laude*

2012 **Saint Johns River State College, St. Augustine, Florida**
A.A., *Summa cum laude*

Research Experience

2020-present **Postdoctoral Associate, Auburn University and HudsonAlpha Institute for Biotechnology**
Advisor: Alex Harkess

2014-2020 **Doctoral Research, University of Florida**
Advisor: Stuart McDaniel
Dissertation topic: *Sex-biased evolutionary processes in mosses*

- Evolutionary genetics, genomics, transcriptomics, phylogenomics

2016-2019 **Research Assistant, University of Florida**
Genealogy of Flagellate Plants Project
Advisors: J. Gordon Burleigh, Emily Sessa, Stuart McDaniel, and E. Christine Davis

- Molecular lab work, phylogenomics

2013-2014 **Undergraduate Research Assistant, University of Florida**
Advisor: Stuart McDaniel

- Sterile-tissue culture, molecular lab work

2011-2012 **Chemistry Lab Assistant, Saint Johns River State College**
Advisor: Nell Freeman

- Maintain lab inventory, prep chemicals

Publications

Carey S.B., J. Jenkins, J.T. Lovell, F. Maumus, A. Sreedasyam, A.C. Payton, S. Shu, G.P. Tiley, N. Fernandez-Pozo, K. Barry, C. Chen, M. Wang, A. Lipzen, C. Daum, C.A. Saski, J.C. McBreen*, R.E. Conrad*, L.M. Kollar, S. Olsson, S. Huttunen, J.B. Landis, J.G. Burleigh, N.J. Wickett, M.G. Johnson, S.A. Rensing, J. Grimwood, J. Schmutz, S.F. McDaniel. Gene-rich UV sex chromosomes harbor conserved regulators of sexual development. *Science Advances* 7.27 (2021) doi:/10.1126/sciadv.abh2488

Carey, S., Q. Yu, A. Harkess. The diversity of plant sex chromosomes highlighted through advances in genome sequencing. *Genes* 12.3 (2021): 381 doi:/10.3390/genes12030381

Carey S.B., L.M. Kollar, S.F. McDaniel. Does degeneration or genetic conflict shape gene content on UV sex chromosomes?. *Bryophyte Diversity and Evolution* 43.1 (2021): 133-149 doi:/10.11646/bde.43.1.11

Shortlidge E.E., **S.B. Carey**, A.C. Payton, S.F. McDaniel, T.N. Rosenstiel, S.M Eppley. Microarthropod contributions to fitness variation in the common moss *Ceratodon purpureus*. *Proceedings of the Royal Society B* (2021): 20210119 doi:/10.1098/rspb.2021.0119

Breinholt, J.W., **S.B. Carey**, G.P. Tiley, E.C. Davis, L. Endara, ... J.G. Burleigh. A target enrichment probe set for resolving the flagellate plant tree of life. *Applications in plant sciences*. 9(1), e11406 (2021) doi/10.1002/aps3.11406

Burtscher, W.P.*+, M.A List*+., A.C. Payton, S.F. McDaniel, **S.B. Carey**. Area from image analyses accurately estimates dry-weight biomass of juvenile moss tissue. *Applications in Plant Sciences* 9(4), e11418 (2021) doi:/10.1002/aps3.11418

Luo, F., N. Valle, E. Sessa, G. Burleigh, L. Endara, S. McDaniel, **S. Carey**, and E. C. Davis. Collaborative Design Reasoning in a Large Interdisciplinary Learning Tool Design Project. *International Journal of Designs for Learning* 11, no. 1 (2020): 85-97.

Pereira, M.R., P.E.A.S. Câmara, B.S. Amorim, S.F. McDaniel, A.C. Payton, **S.B. Carey**, A.M. Sierra, and C.E. Zartman. Advances in Calymperaceae (Dicranidae, Bryophyta): Phylogeny, divergence times and pantropical promiscuity. *The Bryologist* 122, (2), 183-196. 2019 doi:/10.1639/0007-2745-122.2.183

Lewis, L.R., E.M. Biersma, **S.B. Carey**, K. Holsinger, S.F. McDaniel, R. Rozzi, and B. Goffinet. Resolving the northern hemisphere source region for the long-distance dispersal event that gave rise to the South American endemic dung moss *Tetraplodon fuegianus*. *American Journal of Botany* 104 (11), 1651-1659. 2017 doi:/10.3732/ajb.1700144

Carey, S.B., A.C. Payton, and S.F. McDaniel. A method for eliminating bacterial contamination from in vitro moss cultures. *Applications in Plant Sciences* 3(1):1400086. 2015 doi:/10.3732/apps.1400086

Publications in Progress

Valle, N., P. Anonenko, L. Endara, E.C. Davis, G. Somarriba, E. Sessa, F. Luo, **S. Carey**, S. Dogan, G. Burleigh, M. von Konrat and S. McDaniel. Community Science, Storytelling, or Inquiry-Based Learning? Evaluating Three Technology-Enhanced Pedagogical Approaches in an Online Botany Course; *Accepted*

Carey, S.B., J.H. Peniston, A.C. Payton, M. Kim, A. Lipzen, D. Bauer, K. Lail, C. Daum, K. Barry, J. Jenkins, J. Grimwood, J. Schmutz, S.F. McDaniel. Novel insights into joint estimations of demography, mutation rate, and selection using UV sex chromosomes. *bioRxiv* (2021) doi:/10.1101/2021.03.30.437085

*Undergraduate mentee

+Contributed equally

Grants Awarded

2021	The Joint Genome Institute, New Investigator (PI; no direct)
2020	The Joint Genome Institute, Community Science Program (co-PI; no direct)
2018	Botanical Society of America Genetics Section Student Award (\$1000)
2016	Sigma Xi Grant-In-Aid of Research (\$1000)
2015	Society for the Study of Evolution Rosemary Grant Award (\$2500)
2015	microMORPH Cross-Disciplinary Training Grant (\$3254)
2015	Mildred Mason Griffith Botany Grant, UF (\$1000)

Honors and Awards

2018	Best talk iMoss Meeting, St. Petersburg, FL
2016	NSF GRFP Honorable Mention
2015	Runner-up best graduate student talk, SEPEEG, Eaton, GA
2014	Runner-up best talk, UF URAP, Gainesville, FL
2012	Saint Johns River State College Hall of Fame
2012	Organic Chemistry Award, Saint Johns River State College
2012	Composition I and II Award, Saint Johns River State College
2012	Dr. Gary B. Lott Memorial Scholarship (\$750)

Travel Funding

2018	Wellcome Genome Campus 30 Year Anniversary Award (\$300)
2017	International Botanical Congress Outstanding Student Award (\$300)
2017	Botanical Society of America IBC Travel Award (\$2400)
2016	UF Graduate Student Council Travel Grant (\$350)
2016, 2020	UF College of Liberal Arts and Sciences Travel Award (\$475)

Invited Conference Presentations

2020	<i>Remarkable genome stability in autosomes contrasts with dynamic sex chromosomes in mosses.</i> Plant and Animal Genome Conference. San Diego, CA
2020	<i>Implications of whole-genome duplications on sex chromosomes in mosses.</i> Plant and Animal Genome Conference. San Diego, CA
2019	<i>Phylogenomic analyses uncover ancient but highly dynamic moss sex chromosomes.</i> Plant and Animal Genome Conference. San Diego, CA
2017	<i>An ancient UV sex chromosome system in mosses.</i> International Botanical Congress. Shenzhen, China

Meeting Oral Presentations

2021	<i>Comparative genome analyses to infer the diversification of sex chromosomes in the genus Asparagus.</i> Virtual Plant Sex Chromosome Meeting
2020	Cryptic evolutionary strata in an ancient sex chromosome system. Botany Conference.
2019	<i>An ancient, dynamic sex chromosome system in plants.</i> UF HiPerGator Symposium
2019	<i>Genomic consequences of UV sex chromosomes.</i> Botany Conference. Tucson, AZ
2019	<i>Genomic consequences of UV sex chromosomes.</i> Evolution Meeting. Providence, RI

- 2018 *Genome analysis in a polymorphic moss with large, ancient sex chromosomes.* Genome Informatics. Hinxton, UK
- 2018 *Ancient sex chromosomes in plants.* Botany Conference. Rochester, MN
- 2018 *Ancient sex chromosomes in bryophytes.* iMoss Meeting, St. Petersburg, FL
- 2017 *An ancient UV sex chromosome system in mosses.* Evolution Meeting. Portland, OR
- 2016 *Sex-biased gene expression in 6 day old *Ceratodon purpureus*.* South Eastern Population Ecology and Evolutionary Genetics Meeting. Madison, FL
- 2016 *Using a SNP-corrected genome-guided approach to infer transcriptional dimorphism in *Ceratodon purpureus*.* Evolution Meeting. Austin, TX
- 2016 *Transcriptional dimorphism in juvenile tissue of the moss *Ceratodon purpureus*.* UF Plant Molecular and Cellular Biology Meeting. Daytona, FL
- 2015 *The genetic basis of spore production in the moss *Ceratodon purpureus*.* South Eastern Population Ecology and Evolutionary Genetics Meeting. Eaton, GA
- 2014 *A method for eliminating bacterial contamination from in vitro moss cultures.* UF URAP. Gainesville, FL

Meeting Poster Presentations

- 2019 *Near universal sex-linked marker in mosses.* Botany Conference. Tucson, AZ
- 2019 *Transcriptional dimorphism driven by large sex chromosomes in fire moss.* Evolution Meeting. Providence, RI
- 2017 *An ancient UV sex chromosome system in mosses.* Evolution Meeting. Portland, OR
- 2014 *A method for eliminating bacterial contamination from in vitro moss cultures.* UF Undergraduate Research Symposium Poster Session
- 2013 *A method for eliminating bacterial contamination from in vitro moss cultures.* UF Chemistry Department Alumni Weekend Poster Session

Teaching Experience

Teaching Assistant

Spring semesters 2018-2020

Plant Diversity Online

- Assist with running online course

Fall semesters 2015-2019

Introductory Botany

- Taught labs and assisted in lecture
- Wrote three labs for doing semester-long growth experiments in mosses (1. Setting up experiments, 2. Image analyses using ImageJ, 3. Statistical analyses using R)
- Wrote a lab to learn mitosis and meiosis

Spring semesters 2015-2017

Plant Diversity

- Taught labs and assisted in lecture
- Edited lab manual, developed new questions

Fall 2014, Summer 2015

Principles of Biology II Lab

- Taught labs

Non-refereed Publications

F.E. Putz, E.C. Davis, and **S.B. Carey**. University of Florida Introductory Botany Laboratory Manual. 2016-2019.

G. Ionta, M. Blanco, B. Knorr, S. Allen, **S. Carey**, and S. McDaniel. University of Florida Plant Diversity Lab Manual. 2016-2018.

Guest Lectures

2021 **Comparative genomics and sex chromosome evolution in mosses**. Introductory Biology. SUNY Cortland

2019 **Orthofinder**. Bioinformatic Users Group Series. Texas Tech University. Lubbock, TX

2018 **Genetic Frontiers**. Introductory Botany. University of Florida

Mentoring

Undergraduates

2016-2020 **Wes Burtscher**. *Sexual dimorphism in juvenile tissue across mosses*

- Now lab assistant in McDaniel lab

2018-2019 **Tikahari Khanal**. *Mapping improvement in polymorphic *Ceratodon purpureus**

- REU recipient
- Now Software Engineer, Procter & Gamble

2016-2019 **Emily Lockwood**. *Species-level phylogeny of *Equisetum**

- UF University Scholars Program recipient
- Now Master's Student, UF

Summer 2018 **Joan Glenny-Pescov**. *Sex-biased gene expression in *Ceratodon purpureus**

- UF Summer Undergraduate Research Fellow visiting from Florida International University
- Now PhD student, University of Miami

Summer 2018 **Jordan McBreen**. *Tissue perturbations and RNA extractions for *Ceratodon purpureus* genome annotation*

- Now PhD student, UF

2017-2018 **Kaylee Hoffman**. *Trained on molecular lab techniques*

2017-2018 **Kristen Gaines**. *Testing a near-universal sex-linked marker in mosses*

- Now PhD student, UF

2015-2016 **Marna List**. *Evaluating methods for growth analyses in mosses*

- UF University Scholars Program recipient
- Now UF Medical Honors Student

2014-2016 **Roth Conrad**. *Transcriptomic analyses in *Ceratodon purpureus**

- UF University Scholars Program recipient
- Best undergraduate student talk, SEPEEG 2016, Madison, FL
- Now PhD Candidate, Georgia Tech

Academic Service and Outreach

2020	Organized symposium at the Botany Conference
Summer 2019	Co-organizer Population Biology Summer Seminar Series
2016	Invited scientist at <i>She's a Scientist!</i> , FL Museum of Natural History
2015-2018	UF Biology Department URAP Committee
2015-2016	Organizer of Art of Biology Art Exhibition, UF Dept. of Biology
2015-2016	UF Biology Department Awards Committee
2014, 2019	Poster judge, UF Biology Department URAP Symposium
2014-2016	Graduate Student Advisor, GROW Botany
2013, 2014	Undergraduate Researcher Panelist, UF FYI Biology
2013-2014	Vice-President & Founding Member, GROW Botany (Recipients of Champions for Change Award, Campus Organization of the Year)
2013-2014	Vice-President, Botanical Society of America UF Student Chapter

Professional Affiliations

2015-present	Society for the Study of Evolution
2013-present	Botanical Society of America