

## Jeff J. Shi, Ph.D.

Scientific Computing Consultant, Minnesota Supercomputing Institute  
Lecturer, Department of Ecology, Evolution, and Behavior  
University of Minnesota | Minneapolis, MN  
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## Education

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**University of Michigan**, Ann Arbor, MI September 2012 – May 2018  
Ph.D. (2018) and M.Sc. (2014), Ecology and Evolutionary Biology  
Ph.D. Dissertation: Diversity & Diversification Across the Global Radiation of Extant Bats  
([https://z.umn.edu/bat\\_diversity](https://z.umn.edu/bat_diversity))  
Michigan Institute for Computational Discovery & Engineering (Certificate & Fellow)  
Certificate in Graduate Teaching, Center for Research on Learning and Teaching  
National Science Foundation Graduate Research Fellow

**Duke University**, Durham, NC August 2007 – May 2011  
B.Sc., Biology (Concentration: Evolutionary Biology), *magna cum laude*  
Organization for Tropical Studies, South Africa (August – December 2009)

## Professional and Research Skills

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- Strong scripting and programming experience and training in R, Python, and the Unix shell. Experience in using Git and Github for version control. Strong experience in scientific graphic design for manuscripts and presentations (R, GIMP, and Illustrator). Familiarity with the Globus platform, HPC clusters, and SQL.
- Strong experience in mining and using large biological datasets, including genetic sequence data for inferring phylogenies, high-dimensional trait data, and geospatial data. Strong background in using these data to develop bioinformatics workflows, phylogenetic comparative methods, and novel statistical models.
- Experience and formal training in research consulting. Currently works with faculty and administrators across various disciplines on developing research, from the conception phase and study design to data collection, execution, and analysis.
- Extensive experience and interest in popular science communication, presentation, and writing, as well as developing outreach programs for scientific researchers and educators.

## Professional Experience

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### **Scientific Computing Consultant**, *Minnesota Supercomputing Institute*

University of Minnesota | April 2020 – Present

Consults with faculty, researchers, and other clients within the university system and local organizations on high-performance research computing and in solving cyberinfrastructure problems. Leads internal projects and development, engages in dedicated research support with clients, and provides advanced user training for researchers. Works broadly across academic and scientific disciplines using a variety of programming and scripting languages.

### **Lecturer**, *College of Biological Sciences*

University of Minnesota | December 2019 – Present

Teaches the core Evolution course (EEB 3409) in the Department of Ecology, Evolution, and

Behavior. Develops and prepares lectures, problem sets, computational and wet lab assignments, and both formative and summative assessments. Focuses on integrating active and innovative research into the curriculum, with an emphasis on bringing in a diverse set of researchers, questions, and solutions into the class. Develops course content on the history of evolutionary theory, phylogenetics, adaptation, population genetics, and macroevolution (speciation/extinction).

**Education Program Specialist**, *Center for Educational Innovation*

University of Minnesota | August 2018 – April 2020

Broadly consulted with faculty, staff, and students on research and implementation of effective, equitable, and inclusive teaching strategies in higher education. Consulted with faculty and other instructors on researching the scholarship of teaching and learning, and diversity, equity, and inclusion in STEM education. Coordinated efforts to promote inclusive teaching, diversity, and inclusion at the Center and across the university system. Liaison to the College of Biological Sciences and the Institute on the Environment.

- Completed the Equity and Diversity certificate program with the Office for Equity and Diversity.
- Served on the University of Minnesota Graduate School's Graduate Student Advisory board during the 2019 – 2020 academic year.

**Graduate Student Instructional Consultant**, *Center for Research on Learning and Teaching*

University of Michigan | August 2016 – July 2018

As a consultant, helped to develop and promote effective strategies for graduate teaching across the university. Also a member of the Instructional Technology subgroup of consultants, which planned workshops and seminars around thoughtful and effective integration of technology with pedagogy.

**R Scripting and Programming Instructor**, *Department of Ecology and Evolutionary Biology*

University of Michigan | Summers 2013 – 2016

Taught basics of scripting and programming in R to incoming graduate students in the department. Broadly incorporated examples from across ecology and evolutionary biology, and served as a point of contact and reference as new students began to develop their independent research agendas.

**Research Assistant**, *Department of Ecology and Evolutionary Biology (PI: Dan Rabosky)*

University of Michigan | September 2012 – May 2018

Researcher and doctoral student in a computational macroevolution lab, focused on (but not limited to) the biodiversity of extant vertebrates. Developed phylogenetic comparative methods and statistical models for analyzing how rates of diversification and trait evolution vary across phylogenies and biogeography, typically in R or Python. Worked in a team lab setting and utilized the university high-performance computing cluster to data-mine and analyze large genetic sequence, spatial, and high-dimensional morphological datasets. Helped to develop, test, debug, and maintain novel software (BAMM: Bayesian Analysis of Macroevolutionary Mixtures) and an associated R package (BAMMtools) for macroevolutionary analyses of diversification on phylogenies.

**Graduate Student Instructor**, *Program in Biology*

University of Michigan | September 2012 – December 2017

- Evolution (EEB 390), Fall 2017
- Intro Biology Lab (Biology 173), Winter 2016
- Grader: Writing in Biology (EEB 397), Fall 2015
- Guest Lecturer: Animal Diversity (Biology 108), Fall 2015 – 2017
- Vertebrate Diversity and Evolution (Biology 252), Fall 2015

- Intro Biology Lab (Biology 173), Winter 2013
- Introduction to Global Change: Physical Processes (Biology 110), Fall 2012

**Research Assistant**, *Department of Biology / Lemur Center (PI: Anne Yoder)*

Duke University | January 2010 – July 2012

Maintained and managed lab equipment and safety while pursuing independent research and training undergraduate researchers. Focused on population genetics of small mammals (primarily rodents and bats) endemic to Madagascar. Wet lab experience in PCR, molecular cloning, electrophoresis, and DNA sequencing.

**Field Research Assistant**, *Organization for Tropical Studies*

South African National Parks (SANParks) | August 2009 – December 2009

Student research assistant for SANParks and scientists in Kruger National Park, Mapungubwe National Park, and the De Hoop Nature Preserve in South Africa. Surveyed small and large mammals and analyzed their interactions for long-term studies and research.

**Research Assistant**, *Department of Biology (PI: John Willis)*

Duke University | November 2008 – May 2009

Research assistant for the lab's study on copper tolerance in the plant genus *Mimulus*. Prepared chemical solutions and cared for and maintained large experimental plots of flowering plants.

## Funding and Awards

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University of Michigan, Edwin H. Edwards Scholarship in Biology, 2017

Michigan Institute for Computational Discovery and Engineering, Graduate Fellowship, 2015

University of Michigan Museum of Zoology, Hinsdale & Walker Scholarship, 2015

National Science Foundation, Doctoral Dissertation Improvement Grant, 2015

National Science Foundation, Graduate Research Fellowship, 2012 – 2017

Duke University, Phi Beta Kappa, 2011

Duke University, High Distinction in Biology, 2011

Duke University, James B. Rast Memorial Award in Comparative Organismal Biology, 2011

## Academic Publications

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**Shi, J.J.**, E.P. Westeen\*, & D.L. Rabosky. *In review*. A test for rate-coupling in the dynamics of trophic and cranial evolution in New World bats.

**Shi, J.J.**, E.P. Westeen\*, & D.L. Rabosky. 2018. Digitizing extant bat diversity: an open-access repository of 3D  $\mu$ CT-scanned skulls for research and education<sup>†</sup>. *PLOS ONE* 13(9): e0203022.

**Shi, J.J.**, E.P. Westeen\*, N.T. Katlein\*, E.R. Dumont, & D.L. Rabosky. 2018. Ecomorphological and phylogenetic constraints on sympatry across extant bats. *Journal of Biogeography* 45(7): 1560-1570.

**Shi, J.J.** & D.L. Rabosky. 2015. Speciation dynamics during the global radiation of extant bats. *Evolution* 69(6): 1528-1545.

**Shi, J.J.**, L.M. Chan, A.J. Peel, R. Lai\*, A.D. Yoder, & S.M. Goodman. 2014. A deep divergence time between sister species of *Eidolon* (Family Pteropodidae), with evidence for widespread panmixia. *Acta Chiropterologica* 16(2): 279-292.

D.L. Rabosky, M.C. Grundler, C.J. Anderson, P.O. Title, **J.J. Shi**, J.W. Brown, H. Huang, & J.G. Larson. 2014. BAMMtools: an R package for the analysis of evolutionary dynamics on phylogenetic

trees. *Methods in Ecology and Evolution* 5(7): 701-707.

**Shi, J.J.**, L.M. Chan, Z. Rakotomalala, A.M. Heilman, S.M. Goodman, & A.D. Yoder. 2013. Latitude drives diversification in Madagascar's endemic dry forest rodent, *Eliurus myoxinus* (subfamily Nesomyinae). *Biological Journal of the Linnean Society* 110(3): 500-517.

\* mentored undergraduate research assistants

† authored a companion popular press article for *The Conversation*, January 2019: "3D scans of bat skulls help natural history museums open up dark corners of their collections."  
([https://z.umn.edu/3D\\_bats](https://z.umn.edu/3D_bats))

## Conferences and Invited Presentations

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**Shi, J.J.**, E.P. Westeen, E.R. Dumont, & D.L. Rabosky. June 2017. Predictors of sympatry across the global radiation of extant bats. *Evolution Annual Meeting: paper presentation*. Portland, OR.

**Shi, J.J.** & D.L. Rabosky. June-July 2016. Ecomorphological and phylogenetic constraints on secondary sympatry in bats (Order: Chiroptera). *International Congress of Vertebrate Morphology: paper presentation*. Washington, DC.

**Shi, J.J.** & D.L. Rabosky. June 2016. Constraints on secondary sympatry in bats (Order: Chiroptera). *Evolution Annual Meeting: paper presentation*. Austin, TX.

**Shi, J.J.**. February 2016. Bats and Batman: bat truths and bat legends. *Cranbrook Institute of Science: invited guest presentation*. Bloomfield Hills, MI.

**Shi, J.J.**, N.T. Katlein, E.R. Dumont, & D.L. Rabosky. June 2015. The evolution of complex skull shape across modern bats, and its relationship with speciation. *Evolution Annual Meeting: paper presentation*. Guarujá, São Paulo.

**Shi, J.J.\***, E.R. Dumont, N.T. Katlein, & D.L. Rabosky. October 2014. Speciation and skull morphological evolution are decoupled across extant bats. *North American Society for Bat Research Annual Meeting: paper presentation*. Albany, NY.

\*recipient of Karl F. Koopman Award for a platform paper presentation

**Shi, J.J.** September 2014. From Dracula to Batman: bat myths and legends through the ages. *Great Lakes Bat Festival: invited community seminar*. Ann Arbor, MI.

**Shi, J.J.** & D.L. Rabosky. June 2014. Phenotypic evolution of bat skulls, and its relationship with speciation. *Evolution Annual Meeting: paper presentation*. Raleigh, NC.

**Shi, J.J.**, C. Badgley, & D.L. Rabosky. June 2013. Macroevolutionary dynamics of diversification across extant bats. *Evolution Annual Meeting: paper presentation*. Snowbird, UT.

## Service and Outreach

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### 826 MSP, Board of Directors

Minneapolis, MN | September 2018 – Present

Joined the board of directors (development committee) in the spring of 2019 after being a volunteer. Helps to lead a chapter of the 826 National non-profit network of organizations, with a focus on reducing the persistent achievement gap in primary and secondary education by supporting young, local students through creative writing and tutoring.

### Institute for Social Change

Ann Arbor, MI | Summer 2015, 2017

Participant and subsequent facilitator for the Rackham Graduate School's Institute for Social Change, an immersive summer workshop and seminar series designed to engage graduate students with public scholarship.

### I'm A Scientist USA

USA | May 2015

Winner of the first US competition of “I’m A Scientist,” an online event for young students to interact with, question, and vote on participants for their ability to present research and engage with a wide audience.

**Detroit Zoological Society, Fellowship in Science Communication**

Detroit, MI | March 2015 – July 2018

As part of the society’s “Portal to the Public,” developed and presented hands-on activities and workshops at the Detroit Zoo for engaging the public in scientific research.

**National Ocean Science Bowl**

Ann Arbor, MI | February 2013 – 2017

Moderator for the regional National Ocean Sciences Bowl tournament. Co-led volunteer organization for the 2015-2016 season. Co-regional coordinator for the 2016-2017 season.

**University of Michigan, Internal EEB Committees**

Ann Arbor, MI | May 2013 – May 2016

Elected representative for various departmental committees:

- Faculty Search Committee (2015-2016 Academic Year)
- Ph.D./M.Sc. Admissions Committee (2014-2016 Academic Years)
- Social Committee (2013-2014 Academic Year)

**826michigan**

Ann Arbor, MI | January 2013 – July 2018

Intern and volunteer facilitator within the Michigan branch of the 826 National network of non-profit organizations, aimed at helping young, local students with writing, both in STEM and other fields. Developed and facilitated multiple presentations and workshops, all directed at integrating creative writing skills into scientific interest and inquiry. Charged with establishing national bookstore partnerships.

**Duke Chemistry Outreach Educator**

Durham, NC | January 2010 – July 2012

Presented chemical and general scientific demonstrations, activities, and informal lectures at local schools, museums, and fairs alongside Duke faculty and other students.

## References

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Daniel Rabosky, Ph.D. (Dissertation Chair)

Associate Professor; Associate Curator of the Museum of Zoology

Ecology and Evolutionary Biology, University of Michigan

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Stephen A. Smith, Ph.D.

Associate Professor; Associate Chair for Undergraduate Studies

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