Daniel J. B. Smith

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EDUCATION

University of Chicago *May 2019 – November 2022*
Ph.D. in *Evolutionary Biology*
Thesis: *Density-Dependent Interactions in Spatially Structured Communities*
Academic advisor: Dr. J. Timothy Wootton

University of Chicago *September 2017– May 2019*
Master of Science in *Evolutionary Biology*

University of Washington *September 2016 – June 2017*
Non-matriculated student
Studied advanced mathematics and statistics

University of California, Los Angeles *September 2012 – June 2016*
Bachelor of Science in *Ecology, Behavior, and Evolution*
Highest departmental honors
Senior Thesis: *Toward a Mechanistic Understanding of Thermal Niches*

PROFESSIONAL ACADEMIC APPOINTMENTS

The University of Texas at Austin *September 2024 – Present*
Peter O'Donnell Jr. Postdoctoral Fellow
Academic advisor: Dr. Annette Ostling
Focus: using data and theory to understand the effects of pathogens in tropical forest communities

The University of Arizona *November 2022 – September 2024*
Postdoctoral researcher
Academic advisor: Dr. Joanna Masel
Focus: building mathematical models in ecology and population genetics

PUBLICATIONS

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REFEREED JOURNAL ARTICLES

LaManna, Joseph…, **Smith, Daniel JB**…, Delavaux, C. "Consequences of local conspecific density effects for plant diversity and community dynamics." *Ecology Letters 27.6 Accepted.*

Magee, Lukas J., Joseph A. LaManna, Amy T. Wolf, Robert W. Howe, Yuanming Lu, Denis Valle, **Daniel JB Smith**, Robert Bagchi, David Bauman, and Daniel J. Johnson. "The unexpected influence of legacy conspecific density dependence." *Ecology Letters 27.6 (2024): e14449.* https://doi.org/10.1111/ele.14449.

Smith, Daniel JB "The functional form of specialised predation affects whether Janzen–Connell effects can prevent competitive exclusion." *Ecology Letters 25.6 (2022): 1458-1470.* https://doi.org/10.1111/ele.14014.

Smith, Daniel JB and Amarasekare, Priyanga. “Toward a mechanistic understanding of thermal niche partitioning.” *The American Naturalist 191.3 (2018): E57-E75.* https://doi.org/10.1086/695805.

ARTICLES IN REVIEW (PREPRINTS AVAILABLE)

Smith, Daniel JB, et al. “Why there are so many definitions of fitness in models.” *EcoEvoRxiv (2024).* https://doi.org/10.32942/X2V61T.

Smith, Daniel JB and Masel, Joanna. “The Interaction Between Exploitative and Interference Competition: Limits to R* Theory.” *bioRxiv (2023): 2023-09.* https://doi.org/10.1101/2023.09.27.559600.

Smith, Daniel JB. “On the interaction between Janzen-Connell effects and habitat partitioning in spatially structured environments.” *bioRxiv (2022).* https://doi.org/10.1101/2022.04.11.487940.

ARTICLES IN PREP

Smith, Daniel JB “The effect of demographic traits and environmental conditions on conspecific negative density dependence.” *In prep*.

Smith, Daniel JB “The interaction of predator satiation and specialized predation in masting plant populations.” *In prep*.

Magee, Lukas**, Smith, Daniel JB**, et al., “Echoes of trees past: persistent Janzen-Connell effects enhance species coexistence. *In prep*.

ACADEMIC TALKS

INVITED TALKS

Smith, Daniel JB, “A Unified Framework for Interference and Exploitative Competition: Synthesizing Classic Ecological and Evolutionary Game Theory Models.” Wolfram Summer Ecology Colloquium, August 2024. Link to recording.

Smith, Daniel JB, “A Unified Framework for Interference and Exploitative Competition: Synthesizing Classic Ecological and Evolutionary Game Theory Models.” Inaugural meeting of the Society for Modeling and Theory in Population Biology, Banff International Research Station, Alberta, Canada, May 2024. Link to recording.

Smith, Daniel JB, and Masel, Joanna. “The Interaction Between Exploitative and Interference Competition: Limits to R* Theory.” John Templeton Foundation Early Careers Conference, Atlanta, Georgia, January 2024.

Smith, Daniel JB, “The Functional Form of Specialized Predation Affects Whether Janzen-Connell Effects Can Prevent Competitive Exclusion.” Invited speaker for the Smithsonian Tropical Research Institute virtual science seminar, June 2024. Link to recording.

CONTRIBUTED TALKS

Smith, Daniel JB, et al. “Why there are so many definitions of fitness in models.” Evolution 2024, Montreal, Canada, 2024.

Smith, Daniel JB. “Janzen-Connell effects and habitat-induced aggregation synergistically promote species coexistence.” Barro Colorado Island 100 Years Symposium, Gamboa, Panama, June 2024.

Smith, Daniel JB, and Masel, Joanna. “The Interaction Between Exploitative and Interference Competition: Limits to R* Theory.” Evolution 2023, Albuquerque, New Mexico, 2023.

Smith, Daniel JB, “The Functional Form of Specialized Predation Affects Whether Janzen-Connell Effects Can Prevent Competitive Exclusion.” Ecological Society of America Annual Meeting, 2021 (virtual).

Smith, Daniel JB, Singha, S., Banerjee, I. “Multimodel Climate Emulation of the CMIP-6 Archive.” UChicago Geoscience PhD ‘Expo’ (virtual), 2020.

Smith, Daniel JB and Amarasekare, Priyanga. “Optimizations in a Variable World: On Latitudinal Trends of the Temperature Response of Fecundity.” Ecological Society of America Annual Meeting, New Orleans, LA, USA, 2018.

Smith, Daniel JB and Amarasekare, Priyanga. “On the Temperature Response of Ectotherm Fecundity.” Society of Naturalists Meeting, Pacific Grove, CA, USA, 2018.

Smith, Daniel JB and Amarasekare, Priyanga. “Towards a Mechanistic Basis of the Thermal Plasticity of Ectotherm Fecundity.” Ecological Society of America Annual Meeting, Portland, OR, USA, 2017.

Smith, Daniel JB and Amarasekare, Priyanga. “A Mechanistic Framework for Temperature Mediated Niche Partitioning in Ectotherms.” UCLA Science Poster Day, June 2015.

Smith, Daniel JB and Amarasekare, Priyanga. “A Mechanistic Framework for Temperature Mediated Niche Partitioning in Ectotherms.” UCLA Ecology and Evolutionary Biology Symposium, June 2015.

TEACHING EXPERIENCE

Population genetics reading group leader – The University of Arizona *Autumn 2023*
- Taught graduate students basic theoretical population genetics
- Gave weekly lecture and lead weekly discussions

Introduction to Modeling in Biology – The University of Arizona *Autumn 2023*
- Preceptor and lecturer (graduate level course)
- Worked directly with students on computational projects performed in Mathematica
- Lecturer on Stochastic Processes (emphasis on Markov chain models)
- Lecturer on the neutral theory of ecology

Animal behavior (Teaching assistant) – University of Chicago *Winter 2022*
- Teaching assistant (undergraduate level course)
- Closely worked with students on specialized observational behavior projects
- Guest lecturer on evolutionary game theory and dynamic systems

WORKSHOPS AND WORKING GROUPS

Theoretical working group at Barro Colorado Island 100 *Summer 2024*
Invited to collaborate with tropical forest researchers in NSF-funded working group.

Society for Modeling and Theory in Population Biology Working Group *Spring 2024*
Invited to collaborate with mathematical biologists (students and faculty) to plan improvements in quantitative training for undergraduate students in the life sciences.

Conspecific Negative Density Dependence (CNDD) Working Group Part II *Spring 2023*

Invited to collaborate with researchers in NSF-funded working group. Contributed to the development one published article and two articles *in prep.*

Conspecific Negative Density Dependence (CNDD) Working Group Part I *Spring 2022*
Invited to collaborate with researchers in NSF-funded working group. Contributed to the development and writing of two academic articles.

AWARDS

Peter O'Donnell Jr. Postdoc Fellowship– $74,000
Each year the Institute seeks outstanding researchers trained at the interfaces of computer science, mathematics, statistics, high performance computing, and applications across science, engineering, and medicine for the prestigious Peter O'Donnell, Jr., Postdoctoral Fellowship.

Data Science for Energy and Environmental Research (DSEER) Fellowship 2019-2021 – $64,000
NFS funded data science program. Included the teaching of and participation in classes on various subjects related to data science, climate science, and agricultural science. Participated in the development of a coding and statistics bootcamp. Conducted a research project developing a climate model emulator.

2017 NSF Graduate Research Fellowship, Honorable Mention

2016 EEB Undergraduate Research Award
Chosen from a pool of applicants of life science majors senior honors research students. Awarded for academic merits and senior thesis: "Toward a Mechanistic Understanding of Thermal Niches".

Whitcome Summer Undergraduate Research Fellowship – $3,000
Recommended for the fellowship by research adviser Priyanga Amarasekare and selected out of a pool of applicants consisting of life science majors. During the fellowship, formulated and analyzed the effects of temperature on ectotherm populations dynamics with a theoretical model

MENTORSHIP

Tanner Muscarella *December 2023 – July 2024*
- The University of Arizona post-baccalaureate researcher
- Advised Tanner in applied mathematics
- Results *In prep* for publication

Osho Sharma *May 2023 – July 2024*
- The University of Arizona undergraduate researcher
- Advised Osho in the development of an ecological model
- Results *In prep* for publication

OUTREACH

YouTube Content Creator September 2021 – Present
Creating videos on theoretical concepts in ecology and evolutionary biology. I write, animate, film, and edit all my videos. (https://www.youtube.com/@LifeEquationsVideos)

Chicago Tutor September 2018 – June 2020
Providing STEM tutoring and homework help to Chicago middle school students in Hyde Park, Chicago, IL at Chicago Tutor, an organization focused on providing support for underprivileged students.

UChicago Summer Camp July 2018 – August 2018
Supervised and assisted children grade 1 – 6 in gardening projects while introducing them to grade appropriate biological concepts.

Restoration Ministries July 2018
Lectured on evolutionary biology and game theory to 5^{th} – 8^{th} grade students.

ADDITIONAL WORK

Tutor at Say Hello College *June 2024 – Present*
Providing high school students tutoring on standardized tests, calculus (for the AP calculus exam), and biology (for the AP biology exam).

Freelance Academic Editor at TopEdit English Editing LLC *October 2020 – September 2021*
Edited academic papers of non-native English speakers, providing serval services, including line editing and substantial editing.

Conservation Volunteer at ACE (American Conservation Experience) *June 2014 – September 2014*
Cleaned, fixed, and built trails, built debris wrecks, assisted in surveys, and removed invasive species from national parks and national forests in Utah. Lived in camping conditions for extended periods of time. Assisted in navigation and in some planning of trail-work. ACE is directly linked to AmeriCorps.

COMPUTER SKILLS

Strong proficiency in R – Statistical analysis, ODE simulation, stochastic programming ● Proficiency in Julia – stochastic programming / simulations ● Proficiency in Mathematica – ODE simulation, graphical analysis ● Proficiency in Matlab ● Proficiency in Python ● Proficiency in LaTex