Dr. July Pilowsky

Curriculum Vitae

@ecomodeling
pilowskyj@caryinstitute.org
https://github.com/japilo

DOCTORAL RESEARCH

"Revealing ecological processes of range dynamics through space and time"

In ecology, process-explicit models represent the dynamics of ecological systems as explicit functions of the mechanisms and drivers that produced them. Process-explicit models are therefore able to link observed ecological patterns, such as species spatial abundance patterns, directly to their causes, such as climate and environmental change. In my doctoral research, I showed how process-explicit models can be used to establish determinants of range collapses and extinction by unpacking complex interactions between ecological lifestyles, biological traits, climate change, and human-driven threats. By providing a more complete understanding of the ecological mechanisms that regulate species' responses to climate and environmental change, my research provides information needed to better predict vulnerability to future climate and environmental change.

EDUCATION

2019 – 2023 **Doctor of Philosophy**
Biology
University of Adelaide, Australia
University of Copenhagen, Denmark

2013 – 2017 **Master of Science**
Biology
Tufts University, Boston, USA

2008 – 2012 **Bachelor of Arts**
Environmental Biology
Columbia University, New York, USA

WORK EXPERIENCE

2023– (FT)

Cary Institute for Ecosystem Studies
Postdoctoral Associate

Working with Dr. Barbara Han to model transmission of disease between wildlife and humans.

2017 – 2018 (FT)

Max Planck Institute of Demographic Research
Pre-Doctoral Fellow

Worked with Prof. Johan Dahlgren to develop the colorednoise package for simulating populations with temporal autocorrelation.

2016 (PT)

Tufts University
Research Technician

I worked with Prof. Avery Cohn to collect, explore, and visualize data on coffee production in Central and South America in relation to changing climate.

PUBLICATIONS

J. A. Pilowsky, A. Manica, S. Brown, C. Rahbek, and D. A. Fordham. Simulations of human migration into North America are more sensitive to demography than choice of palaeoclimate model. *Ecological Modelling*, 473(2022):110115, 2022.

J. A. Pilowsky, S. Haythorne, S. C. Brown, M. Krapp, E. Armstrong, B. W. Brook, C. Rahbek, and D. A. Fordham. Range and extinction dynamics of the steppe bison in Siberia: A pattern-oriented modelling approach. *Global Ecology and Biogeography*, 31(12):2483–2497, 2022.

J. A. Pilowsky, R. K. Colwell, C. Rahbek, and D. A. Fordham. Process-explicit models reveal the structure and dynamics of biodiversity patterns. *Science Advances*, 8(31):eabj2271, 2022.

D. A. Fordham, S. C. Brown, H. R. Akçakaya, B. W. Brook, S. Haythorne, A. Manica, K. T. Shoemaker, J. J. Austin, B. Blonder, J. A. Pilowsky, C. Rahbek, and D. Nogues-Bravo. Process-explicit models reveal pathway to extinction for woolly mammoth using pattern-oriented validation. *Ecology Letters*, 25(1):125–137, 2022.

D. A. Fordham, S. T. Jackson, S. C. Brown, B. Huntley, B. W. Brook, D. Dahl-Jensen, M. T. P. Gilbert, B. L. Otto-Bliesner, A. Svensson, S. Theodoridis, J. M. Wilmshurst, J. C. Buettel, E. Canteri, M. McDowell, L. Orlando, J. A. Pilowsky, C. Rahbek, and D. Nogues-Bravo. Using paleo-archives to safeguard biodiversity under climate change. *Science*, 369(6507):eabc5654, 2020.

J. A. Pilowsky and J. P. Dahlgren. Incorporating the temporal autocorrelation of demographic rates into structured population models. *Oikos*, 129(2):238–248, 2019.

J. A. Pilowsky and P. T. Starks. Displacement and replacement in real time: Polistes dominula's impact on P. fuscatus in the northeastern U.S. *Biological Invasions*, 20(5):1161–1169, 2018.

S. Keen, C. D. Meliza, J. Pilowsky, and D. R. Rubenstein. Song in a social and sexual context: vocalizations signal identity and rank in both sexes of a cooperative breeder. *Frontiers in Ecology and Evolution*, 4:46, 2016.

N. Wilson-Rich, J. A. Pilowsky, B. Foo, T. Tien, F. Hester, and P. T. Starks. A test of the haploid susceptibility hypothesis using a species with naturally occurring variation in ploidy. *Insectes sociaux*, 61(2):163–169, 2014.

J. A. Pilowsky and D. R. Rubenstein. Social context and the lack of sexual dimorphism in song in an avian cooperative breeder. *Animal behaviour*, 85(4):709–714, 2013.

TEACHING EXPERIENCE

2014–2016

Osher Institute, Tufts University
Study Group Leader

Created curricula with lectures, discussion, and activities for two classes on evolution for senior citizens. Taught curricula as month long courses for 30 senior students each year.

2014–2015

Department of Biology, Tufts University
Graduate Instructor

Developed a new lab curriculum to complement a lecture course on biostatistics. Taught the lab course I developed for a class of 25 graduate and undergraduate students.

PRESENTATIONS

2021 Ecological Society of Australia
"Simulating species range dynamics over long time scales."

2017 Ecological Society of America
"The ecology of cooperation in *Polistes* wasps."

COMPUTER SKILLS

LANGUAGES Developed two R / C++ packages on CRAN
colorednoise has 33k downloads
paleopop has 7k downloads

GIS In my PhD I used 6TB of spatiotemporal data in raster and vector formats.

WEB I code my own academic website with Ruby and CSS.

AWARDS

2021 **Ingenuity Communications Award, Runner-Up**
University of Adelaide

2014 **Graduate Research Competition Winner**
Tufts University

2013 **Graduate Research Fellowship**
National Science Foundation

LANGUAGES

CONVERSATIONAL Danish

PROFICIENT French

FLUENT English, Spanish