

MOLLIE E. BROOKS

Research Scientist

National Institute of Aquatic Resources, Danish Technical University

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EDUCATION

Ph.D. Biology, Dissertation: *Four permutations of growth, reproduction, and survival* 2006-2012
University of Florida, Advisors: Benjamin M. Bolker (Biology) and Mary Christman (Statistics)

B.S. Mathematics with related studies in Computer Science 2001-2004
University of Pittsburgh, Advisor: William J. Layton

PUBLISHED MANUSCRIPTS

M. E. Brooks, K. Kristensen, M. R. Darrigo, P. Rubim, M. Uriarte, E. Bruna, B. M. Bolker. (In Press)
Statistical modeling of patterns in annual reproductive rates. *Ecology*

M. E. Brooks, K. Kristensen, K. J. van Benthem, A. Magnusson, C. W. Berg, A. Nielsen, H. J. Skaug,
M. Mächler, and B. M. Bolker. (2017) glmmTMB balances speed and flexibility among packages for
zeroinflated generalized linear mixed modeling. *The R Journal* 9 (2): 378-400.

M. E. Brooks, C. Clements, J. Pemberton, A. Ozgul (2017) Estimation of individual growth trajectories
when repeated measures are missing. *The American Naturalist* 190 (3): 377-388.

M. E. Brooks, M. Mugabo, G. M. Rodgers, T. G. Benton, and A. Ozgul (2015) How well can body
size represent effects of the environment on demographic rates? Disentangling correlated explanatory
variables. *Journal of Animal Ecology* 85: 318-328.

J. R. Mayor, S. J. Wright, E. Schuur, M. E. Brooks, and B. L. Turner (2014). Stable nitrogen isotope
patterns of trees and soils altered by long-term nitrogen and phosphorus addition to a lowland tropical
rainforest. *Biogeochemistry* 119: 293-306.

M. Brooks, M. McCoy, B. Bolker (2013) A Method for Detecting Positive Growth Autocorrelation
without Marking Individuals. *PLoS ONE* 8: e76389.

B. Bolker, B. Gardner, M. N. Maunder, C. W. Berg, M. Brooks, L. S. Comita, E. E. Crone, S. Cubaynes,
T. Davies, P. de Valpine, J. Ford, O. Gimenez, M. Kéry, E. Kim, C. Lennert-Cody, A. Magnusson,
S. J. Martell, M. Minami, J. C. Nash, A. Nielsen, J. Regetz, J. A. Royle, H. J. Skaug, and E. Zipkin
(2013) Strategies for fitting nonlinear ecological models in R, AD Model Builder, and BUGS. *Methods
in Ecology and Evolution* 4: 501-512.

S. Alvarez, M. Mack, M. Brooks (2013) A direct test of nitrogen and phosphorus limitation to net
primary productivity in a lowland tropical wet forest. *Ecology* 94: 1540-1551.

M. L. Wayne, G. M. Blohm, M. E. Brooks, K. L. Regan, B. Y. Brown, M. Barfield, R. D. Holt, and B.
M. Bolker (2011) The prevalence and persistence of sigma virus, a biparentally transmitted parasite
of *Drosophila melanogaster*. *Evolutionary Ecology Research* 13: 323-345.

M. Brooks, and Y. Iwasa (2010) Size-dependent sex change can be the ESS without any size advantage
of reproduction when mortality is size-dependent. *Theoretical Population Biology* 78: 183-191.

B. M. Bolker, M. E. Brooks, C. J. Clark, S. W. Geange, J. R. Paulsen, M. H. H. Stevens, and J. S.
White (2009) Generalized linear mixed models: a practical guide for ecology and evolution. *Trends
in Ecology and Evolution* 24: 127-135.

FELLOWSHIPS, GRANTS AND AWARDS

Models and Statistical Tools for Management Strategy Evaluation, European Maritime and Fisheries
Fund (1,974,157 DKK) Dec 2018

Developing open source software to fit zero-inflated generalized linear mixed models to ecological data,
International Exploratory Workshop Grant, Swiss SNF (9800 CHF) Aug 2015

Fitting Flexible State-Space and Hierarchical Models Using TMB Workshop, Graduate Research Cam-
pus Grant, University of Zurich (6190 CHF) Aug 2014

US NSF Integrative Graduate Education and Research Traineeship Fellowship in Quantitative Spatial Ecology, Evolution, & Environment, University of Florida 2009 - 2011

US NSF Summer Fellowship in the East Asia and Pacific Summer Institute with the Japanese Society for the Promotion of Science 2009

Grinter Fellowship, University of Florida 2006 - 2010

Grants funded by the Quantitative Spatial Ecology, Evolution, & Environment training program

- Travel to Thailand to teach Generalized Linear Mixed Models (1400 USD) 2011
- Reserve 8 cores, University of Florida High Performance Computing Center (1000 USD) 2010
- Travel to Thailand to teach Population Modeling (1400 USD) 2010

TEACHING EXPERIENCE

Template Model Builder Workshop 29 June 2018
International Statistical Ecology Conference, St. Andrews, Scotland, *pro bono*

State-Space Modeling using TMB Workshop 1-3 Sept 2014
Dept. of Evolutionary Biology and Environmental Studies, University of Zurich, *pro bono*

AD Model Builder Workshop 29-30 June 2014
International Statistical Ecology Conference, Sete, France, *pro bono*

Generalized Linear Mixed Models in R for Conservation Biologists Workshop 23-27 May 2011
King Mongkut's University of Technology Thonburi, Thailand, *pro bono*

AD Model Builder Workshop, University of Florida 16-19 May 2011

Using R and C++ on a High Performance Computing Cluster 29-30 Nov 2010 & 24 Oct 2012
Dept. of Biology, University of Florida, *pro bono*

Population Modeling and Viability Analysis in R Workshop 19-25 May 2010
King Mongkut's University of Technology Thonburi, Thailand, *pro bono*

Seminar Leader: Recent Population Models Spring 2010
Dept. of Biology, University of Florida, *pro bono*

Teaching Assistant: Biological Sciences, University of Florida 2006 - 2008
Biology 1 Discussion, Biology 1 Lab, Non-majors' Biology Lab

Teaching Assistant: Dept. of Mathematics, University of Pittsburgh 2004 - 2005
Business Calculus Recitations, Calculus 3 Recitations and Maple Computer Labs

PRESENTATIONS

Invited

Dept. of Evolutionary Biology and Environmental Studies, University of Zurich 25 Nov 2014
"How well does body size represent the effects of past and current environments on demography?"

Quantitative Spatial Ecology, Evolution, and Environment Symp., University of Florida 24 April 2014
"Evolutionary Demography in a Model Lab System"

Statistical Society of Canada annual meeting, Edmonton, Alberta, Canada 27 May 2013
"Predicting Temporally Autocorrelated Pond Depths with Irregular Time Series Data Using ADMB"

Dept. of Integrative Biology, University of South Florida, Tampa, Florida 20 Sept 2012
"Revisiting the effects of forest fragmentation on plant demography in the Amazon"

Mathematical Biology Laboratory, Dept. of Biology, Kyushu University, Fukuoka, Japan 7 June 2011
"Size-dependent sex change can be the ESS when mortality is size-dependent, without any size advantage of reproduction"

Contributed

- International Statistical Ecology Conference, St. Andrews, Scotland *July 2018*
 “GLMMs of reproduction with generalized Poisson and Conway-Maxwell-Poisson distributions fit with glmmTMB”
- International Statistical Ecology Conference, Seattle, USA *June 2016*
 “A state-space autoregressive model to quantify patterns of growth”
- Ecological Society of America annual meeting, Baltimore, Maryland *14 Aug 2015*
 “How well does body size represent the effects of past and current environments on demography?”
- British Ecological Society Symp.: Demography Beyond the Population, Sheffield, UK *24 March 2015*
 “Decomposed variance and covariance of demographic rates using mixed models”
- International Statistical Ecology Conference, Montpellier, France *1 July 2014*
 “Comparing vital rate estimates from unmarked population- and individual-level data”
- Ecological Society of America annual meeting, Portland, Oregon *Aug 2012*
 “Variability in demographic rates on multiple scales: *Heliconia acuminata* in fragments of the Amazon”
- Ecological Society of America annual meeting, Austin, Texas *Aug 2011*
 “A method for detecting among-individual differences in growth rate without marking individuals”
- Ecological Society of America annual meeting, Pittsburgh, Pennsylvania *Aug 2010*
 “Size-dependent sex change can be the ESS when mortality is size-dependent, without any size advantage of reproduction”
- International Statistical Ecology Conference, Canterbury, England *June 2010*
 “A method for detecting growth that is autocorrelated within individuals through time”

SOFTWARE DEVELOPMENT

Maintainer

glmmTMB: An R package for fitting generalized linear mixed models (GLMMs) and extensions

selfisher: An R package for modeling the selectivity of fisheries gear

growmod: An R package for fitting state-space models to individual growth trajectories

Contributor

TMB: An R package for fast and flexible maximum-likelihood estimation

SAM: An R package for fitting state-space stock assessment models

PROFESSIONAL SERVICE

Danish Alumni Japan Society for Promotion of Science Board Member *2019-Present*

ADMB Foundation Secretary *2016-Present*

ADMB Foundation Member *2011-Present*

Postdoctoral researcher representative, University of Zurich *2015-2016*

Middle School Science Fair Judge *2005-2013*

MS reviewer for *Ecology*, *Animal Behaviour*, *Journal of Theoretical Biology*, *Evolution*, *Journal of Animal Ecology*

Frequent contributor of advice on *R-sig-mixed-models@r-project.org* mailing list