

Spencer Carran

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EDUCATION

2018	Doctor of Philosophy <i>Quantitative Ecology</i> Focus: Disease Dynamics & Health Policy Dissertation: Equity in Disease Management	PENN STATE UNIVERSITY State College, PA Advised by Dr. Matthew FERRARI
2012	Bachelor of Science <i>Applied Mathematics and Biology</i>	UNIVERSITY OF MIAMI Coral Gables, FL

RESEARCH EXPERIENCE

PRESENT	Senior Computational Research Scientist	UNIVERSITY OF CHICAGO
2020	<i>Cobey Lab, Dept of Ecology & Evolution</i> Developing models of influenza vaccine effectiveness and evaluating sources of bias in existing estimates. Analyzing data from universal flu vaccine trials.	Chicago, IL
2019	Postdoctoral Scholar	UNIVERSITY OF CHICAGO
2018	<i>Dwyer Lab, Dept of Ecology & Evolution</i> Developed mathematical models of a coupled insect-pathogen system with implications for forest management. Guided management and surveillance efforts with analysis of the limits of detectability for low-prevalence disease. Developed MCMC fitting routines in C. Interfaced with the USDA Forestry Service to guide pest management policy. Supervised and directed undergraduate researchers in independent projects, leading to multiple manuscripts in prep. Analyzed mark-recapture data to develop a model of two-species habitat partitioning in partially restored river basins.	Chicago, IL
2017	Graduate Research Assistant	PENN STATE UNIVERSITY
2012	<i>Ecology IGDP</i> Studied the implications of demographic transitions and fine-scale local variation for vaccination policy and measles outbreak response. Interfaced with policymakers to identify at-risk subpopulations to prioritize in public health interventions. Analyzed multi-year individual-based health and census records to reconstruct true population state. Supervised undergraduate researchers in collaborative projects, leading to one published manuscript and one in prep.	State College, PA
2016	Graduate Research Assistant	PENN STATE UNIVERSITY
2015	<i>Mathematics Department</i> Contributed to mathematical modeling of infectious disease dynamics, including Zika. Performed simulation studies on identifiability of unobserved dynamic processes in producing observed patterns of disease transmission. Used age-structured SIR, lattice epidemic models, and long-term population projections.	State College, PA
2012	Research Assistant	UNIVERSITY OF MIAMI
2010	<i>Physics Department</i> Collaborated in a multi-disciplinary team studying emergent phenomena in insurgent warfare and financial markets.	Coral Gables, FL

RESEARCH PUBLICATIONS

Spencer Carran, Carlos Polivka, Joseph Mihaljevic, Greg Dwyer 2019.

Detection of Low Levels of Baculovirus for Outbreak-Terminating Epizootics in Defoliating Insects Research Note. PNW-RN-580. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Avery Kundrick, Zhuojie Huang, **Spencer Carran**, Matthew Kagoli, Rebecca Freeman Grais, Northan Hurtado and Matthew Ferrari 2018.

Sub-national variation in measles vaccination coverage and outbreak risk: a case study from a 2010 outbreak in Malawi BMC Public Health DOI:10.1186/s12889-018-5628-x

Spencer Carran, Matthew Ferrari, Timothy Reluga 2018.

Unintended Consequences and the Paradox of Control: Management of Emerging Pathogens with Age-Specific Virulence PLoS Neglected Tropical Diseases 12(4): e0005997. DOI:10.1371/journal.pntd.0005997.

Christopher J. Fonnesbeck, Katriona Shea, **Spencer Carran**, Jose Cassio de Moraes, Christopher Gregory, James L. Goodson, Matthew J. Ferrari 2018.

Measles outbreak response decision-making under uncertainty: a retrospective analysis J. R. Soc. Interface 2018 15 20170575. DOI: 10.1098/rsif.2017.0575.

Neil Johnson, Guannan Zhao, Eric Hunsader, Jing Meng, Amith Ravindar, **Spencer Carran**, Brian Tivnan 2012.

Financial Black Swans Driven by Ultrafast machine Ecology arXiv preprint arXiv:1202.1448

Neil Johnson, **Spencer Carran**, Joel Botner, Kyle Fontaine, Nathan Laxague, Philip Nuetzel, Jessica Turnley, Brian Tivnan 2011.

Pattern in Escalations in Insurgent and Terrorist Activity Science 333 no. 6038. DOI: 10.1126/science.1205068

Spencer Carran, Amith Ravindar, S.Y. Lau, John Bohannon 2011.

Afghanistan Casualty Timeline (2008-2011) Science 331 no. 1256. DOI: 10.1126/science.331.6022.1256

PRESENTATIONS

Ecological Society of America, 2019 Annual Meeting, Louisville, Contributed Talk: To spray or not to spray: Model-based predictions of when microbial control of defoliating insects is necessary

Invited Talk, Northwestern University Center for Global Health, 2019. Equitable Vaccination Policy on a Heterogeneous Landscape

Environmental Data Science Lunch Seminar, 2019, University of Chicago Center for Spatial Data Science. Talk: Developing Spatially Explicit Public Health Policy

Ecological Society of America, 2017 Annual Meeting, Portland, Contributed Talk: Equity, not Equality: Developing Efficient Locally-Tailored Outbreak Response Strategy.

Ecology and Evolution of Infectious Disease, 2017, UC Santa Barbara, Poster Presentation: Unintended Consequences and the Paradox of Control: Management of Emerging Pathogens with Age-Specific Virulence

Life Science Symposium, 2017, Pennsylvania State University, Poster Presentation.

Ecology and Evolution of Infectious Disease, 2016, Cornell University. Poster Presentation: Equity, not Equality: Efficient Sub-National Outbreak Response for Measles in Malawi.

Living With Our Viromes, 2016, Pennsylvania State University. Poster Presentation.

Ecology and Evolution of Infectious Disease, 2015, University of Georgia. Poster presentation: A Phenomenological Approach to Estimating Measles Incidence and Outbreak Risk.

TECHNICAL SKILLS & EXPERTISE

Dynamical Systems, Nonlinear Dynamics	Stochastic Differential Equations
R for time series and geospatial analysis	PlyR, Rmarkdown, Shiny, Maptools
Hierarchical Bayesian modeling	JAGS, Stan, Emcee
Python, Pandas, numpy, scipy, matplotlib	LaTeX, Git, Linux, Bash

WORKSHOPS AND TEACHING EXPERIENCE

Course Assistant, Introduction to Geospatial Raster Data in R Workshop, Spring 2019, University of Chicago.

Workshop Presented: Introduction to R for Statistics, PSU Summer Applied Math REU, 2015-2016
Assisted a cross-disciplinary group of students in developing programming skills.

Teaching Assistant, BIOL220W, Spring 2015, Spring 2017 Led lab sections for majors population/community biology.

Teaching Assistant, Epidemics - the Dynamics of Infectious Disease (MOOC through Coursera).
Moderated and directed online discussions among students from a wide range of backgrounds.

Workshop Leader, BIL150/160 2011-2012. Supplemented instruction in a small group setting for introductory biology courses.

UNDERGRADUATE RESEARCH PROJECTS MENTORED

Avery Kundrick (PSU), outbreak-derived estimates of vaccine coverage, manuscript published.

Simon Bezirgianian (PSU), development of novel catalytic model for measles susceptibility, manuscript in prep.

Bruno do Rosario Petrucci (UofC), evolutionarily informed pest management strategies, manuscript in prep.

Amy Huang (UofC), comparison of sex-specific and untargeted HPV vaccination programs, work in progress.

Catalina Raggi (UofC), implications of healthcare access disparities for herd immunity in connected populations, manuscript in prep.

Olivia Shao (UofC Quantitative Biology Summer Fellowship), optimal timing of influenza vaccine in light of waning immunity, work in progress.

AWARDS AND HONORS

UofC Biological Sciences Division Career Advancement for Postdocs travel award (\$500)

NSF Travel Grant and Conference Support for AARMS workshop and summer school, 2014 (\$1600)

NSF GRFP Honorable Mention, 2013

Graham Award, Pennsylvania State University, 2012-2014 (\$8,000)

Braddock Fellowship, Pennsylvania State University, 2012 (\$8,000)

Beyond the Book Summer Research Award, University of Miami, 2011 (\$2,500)

Robert C Byrd Scholar, 2008-2011 (\$4,500)

Foote Fellow, University of Miami, 2008-2012

Isaac Bashevis Singer Scholar, University of Miami, 2008-2012 (\$150,000)