Kevin M. Bakker

Curriculum Vitae

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SCHOOL OF PUBLIC HEALTH
EPIDEMIOLOGY
UNIVERSITY OF MICHIGAN

infectious diseases, environmental drivers, spatiotemporal population dynamics, statistical inference, mathematical modeling, seasonality, and immunization

Education and Appointments

2020–present **Assistant Research Scientist**, University of Michigan, Ann Arbor, MI, Department of Epidemiology.

2018–2020 **NIH F32 Research Fellow**, University of Michigan, Ann Arbor, MI, Department of Statistics.

2017–2018 **Postdoctoral Researcher**, University of Glasgow, Glasgow, Scotland, Institute of Biodiversity, Animal Health and Comparative Medicine.

2013–2017 **Ph.D.**, University of Michigan, Ecology and Evolutionary Biology, Michigan Institute for Computational Discovery & Engineering Certificate.

2012–2014 **Master of Science**, University of Michigan, Ecology and Evolutionary Biology.

2005–2006 **Bachelor of Science**, Michigan State University, Zoology.

2000–2004 **Bachelor of Science**, Michigan State University, Human Biology.

Publications *In Prep* or *Submitted*

[9] **Kevin M Bakker**. ''Comparing VZV transmission and reactivation dynamics under multiple vaccination regimes" (available upon request)

[8] **Kevin M Bakker**, Marisa E Eisenberg, Robert Woods, and Micaela E Martinez. "Seasonal transmission and viral reactivation: a case study of chickenpox & shingles". (available upon request)

[7] ^Abigail Collingwood and **Kevin M Bakker**. ''Spatiotemporal dynamics of scrub typhus in Thailand from 2003-2018" (available upon request, ^Bakker lab member)

Refereed Publications

[6] M Brock Fenton, Daniel G Streicker, Paul A Racey, Merlin D Tuttle, Rodrigo A Medellin, Mark J Daley, Sergio Recuenco, and **Kevin M Bakker**. "Knowledge gaps about rabies transmission from vampire bats to humans". In: *Nature Ecology & Evolution* (2020), pp. 1–2.

[5] **Kevin M Bakker**, Tonie E Rocke, Jorge E Osorio, Rachel C Abbott, Carlos Tello, Jorge E Carrera, William Valderrama, Carlos Shiva, Nestor Falcon, and Daniel G Streicker. "Fluorescent biomarkers demonstrate prospects for spreadable vaccines to control disease transmission in wild bats". In: *Nature Ecology & Evolution* (2019), pp. 1–8.

[4] **Kevin M Bakker**, Micaela Elvira Martinez-Bakker, Barbara Helm, and Tyler J Stevenson. "Digital epidemiology reveals global childhood disease seasonality and the effects of immunization". In: *Proceedings of the National Academy of Sciences* 113.24 (2016), pp. 6689–6694.

[3] *Micaela Martinez-Bakker, ***Kevin M Bakker**, Aaron A King, and Pejman Rohani. "Human Birth Seasonality: Latitudinal Gradient and Interplay with Childhood Disease Dynamics". In: *Proceedings of the Royal Society B: Biological Sciences* 281.1783 (2014), *Co–first authors.

[2] Laura Alonso-Sáez, Alison S Waller, Daniel R Mende, **Kevin Bakker**, Hanna Farnelid, Patricia L Yager, Connie Lovejoy, Jean-Éric Tremblay, Marianne Potvin, Friederike Heinrich, et al. "Role for urea in nitrification by polar marine Archaea". In: *Proceedings of the National Academy of Sciences* 109.44 (2012), pp. 17989–17994.

[1] Jean-François Ghiglione, Pierre E Galand, Thomas Pommier, Carlos Pedrós-Alió, Elizabeth W Maas, **Kevin Bakker**, Stefan Bertilson, David L Kirchman, Connie Lovejoy, Patricia L Yager, et al. "Pole-to-pole biogeography of surface and deep marine bacterial communities". In: *Proceedings of the National Academy of Sciences* 109.43 (2012), pp. 17633–17638.

Unrefereed Publications

2018 **'Tis the Season for Conception**, *The Conversation*, Micaela Martinez and **Kevin M Bakker**.

2013 **The Chukchi Sea**, *Biomes and Ecosystems: An Encyclopedia*, Salem Press, ed: Robert Warren Howarth.

Active Grants

2020 **$202,645** Michigan Department of Environment, Great Lakes, and Energy

2020–2025 **$6,000** University of Michigan Data Acquisition for Data Science

2020–2022 **$85,000** University of Michigan Post Translational Scholars Program

2016–2019 **$4,500** University of Michigan, Undergraduate Research Opportunity Grant (3 awards)

Previous Grants & Fellowships Awarded

2019–2020 **$3,009** XSEDE Supercomputer Startup Funding (2 awards)

2018–2020 **$184,818** NIH National Research Service Award F32AI134016

2016–2017 **$47,400** University of Michigan Rackham Predoctoral Fellowship

2014–2017 **$10,775** University of Michigan Ecology and Evolutionary Biology Grants (7 awards)

2013-2017 **$9,250** University of Michigan Rackham Grants (6 awards)

2015 **$4,000** University of Michigan, Michigan Institute for Computational Discovery and Engineering Fellowship

2015 **$1,350** University of Washington Summer Institute in Statistics and Modeling in Infectious Diseases Summer Institute Grant

Media (hyperlinks)

- Fox News
- Slate Magazine
- LiveScience – Birth Seas
- LiveScience – Digital Epi
- Business Insider
- MedPageToday
- UMich – Biogeography
- Science
- The Pharmaceutical Journal
- AAAS Radio
- ResearchGate News
- ABC News
- Medical Economics
- UMich – Birth Seasonality
- Discovery News
- Boston Globe
- New Scientist
- Michigan Radio
- The Express
- UMich – Digital Epi
- UMich – Vampire Bats
- Digtial Trends
- Medical Daily
- Daily Mail
- NBC News
- The Scotsman
- Photonics
- Freethink

National and International Conference Presentations

2020 **Bakker, K.M.** and D. Streicker. Ecology and Evolution of Infectious Diseases. Montpellier, France *Cancelled - COVID-19*

2019 **Bakker, K.M.** and D. Streicker. Ecological Society of America. Louisville, KY

2017 **Bakker, K.M.** and M. Martinez. Jacques Monod: Open Questions in Disease Ecology and Evolution: From Basic Research to Evolutionary Medicine. Roscoff, France

2017 **Bakker, K.M.** and D. Streicker. Ecological Society of America. Portland, OR

2017 **Bakker, K.M.** and M. Martinez. Ecology and Evolution of Infectious Diseases. Santa Barbara, CA

2016 **Bakker, K.M.**, M. Martinez-Bakker, B. Helm, and T.J. Stephenson. Ecology and Evolution of Infectious Diseases. Ithaca, NY

2015 **Bakker, K.M.**, M. Martinez-Bakker, B. Helm, and T.J. Stephenson. British Ecological Society. Edinburgh, Scotland

2015 **Bakker, K.M.** and M. Pascual. Ecological Society of America. Baltimore, MD

2014 **Bakker, K.M.** and P. Rohani. Ecological Society of America. Sacramento, CA

2014 **Bakker, K.M.** and P. Rohani. Ecology and Evolution of Infectious Diseases. Fort Collins, CO

2013 **Bakker, K.M.**, Martinez-Bakker, M., King, A.A., and P. Rohani. Ecology and Evolution of Infectious Diseases. State College, PA

Invited Talks

2020 *(upcoming)* Max Planck Institute for Infection Biology. Berlin, Germany

2020 Epidemiology department, School of Public Health. Ann Arbor, MI

2019 MAC-EPID Workshop meeting, School of Public Health. Ann Arbor, MI

2019 School of Mathematics and Statistics. Glasgow, Scotland

2018 Complex Systems networks group. Ann Arbor, MI

2017 Disease ecology and wild immunology. Glasgow, Scotland

2017 Department of Ecology and Evolutionary Biology seminar speaker. Ann Arbor, MI

2016 Odum School of Ecology. Athens, GA

2015 Institute for Disease Modeling. Seattle, WA

Local and Other Presentations

2016 **Bakker, K.M.** *pomp* in R, a tutorial. Ann Arbor, MI

2016 **Bakker, K.M.**, M. Martinez-Bakker, B. Helm, and T.J. Stevenson. Michigan Institute of Computational Discovery and Engineering. Ann Arbor, MI

2016 **Bakker, K.M.** Modeling Infectious Diseases Across Scales. Ann Arbor, MI

2015 **Bakker, K.M.** and M. Pascual. Computational discovery in complex systems biology. Ann Arbor, MI

2015 **Bakker, K.M.**, E. Ionides, M. Eisenberg, and M. Pascual. Early career scientist symposium. Ann Arbor, MI

2014 **Bakker, K.M.** Student evaluation seminar talk. Ann Arbor, MI

2014 **Bakker, K.M.** 5 minute speed talk — recruitment weekend. Ann Arbor, MI

2014 **Bakker, K.M.** 5 minute speed talk — departmental seminar. Ann Arbor, MI

2014 **Bakker, K.M.** Theory group seminar talk. Ann Arbor, MI

Students Mentored

2018-2021 Clare Dougherty,Lab manager, independent study, UROP

2020-2021 Lior Latimer, UROP

2020-2021 Reiden Magdaleno, UROP

2020-2021 Samantha Schrodel, UROP

2020-2021 Ella McKenzie, UROP

2020-2021 Jillian Terrell, UROP

2020-2021 Xiazi Yuan, UROP

2019-2020 Abigail Collingwood, Masters Capstone

2019-2020 Juliette Kaplan, UROP

2019-2020 Cerys Rogers, UROP

2019-2020 Mahir Piyarali, UROP

2019 Erica Fossee, UROP

2018-2019 Victoria Minka, UROP, Independent study

2016-2019 Alyah Chmiel, Independent study, Lab manager

2016,2019 Lauren Rollins, Independent study

2018 Ariana Mitchum, MRADS

2016-2018 Logan Austin, Independent study

2016-2017 Nathan Warriner, UROP & Independent study

2016-2017 Madeleine Schmitter, UROP

2016-2017 Molly Stachurski, UROP

2016 Aidan O'Connor, Independent study

2015 Emilia Iglesias, Independent study

2014 Tabea Schatz, Volunteer

Research Experience

09/2020–present **University of Michigan**, SARS-CoV-2 wastewater monitoring, COVID-19 immune response.

05/2018–08/2020 **University of Michigan**, Semi-transmissible vaccines, *panelPomp*, *spatPomp*, optical character recognition software.

09/2017–04/2018 **University of Glasgow**, Wildlife disease modeling, transferable vaccines, model validation with serological data.

12/2010–08/2017 **University of Michigan**, Disease modeling, statistical methods, and *pomp* (Partially observed Markov Process) model fitting with extensive coding experience with R, C++, and LaTeX.

08/2007–10/2010 **University of Georgia**, Set up and ran CARD-MAR-FISH and DNA sequencing labs, 650+ hours on Fluorescent microscope, trained in PCR, qPCR, DNA extraction, and other microbial and molecular lab techniques.

07/2008 **Uppsala University, Sweden**, Learned MAR-FISH technique to identify bacterial activity and community structure.

05/2008–06/2008 **Interdisciplinary sea ice research course (MSL 695) in Barrow, Alaska**, Intensive course on data analysis and collection involving fieldwork, volunteered for an additional week to collect genetic samples of Ringed Seals.

11/2007–01/2008 & 11/2008–01/2009 **Antarctic research cruises aboard the Swedish Icebreaker Oden**, Research focus on the Southern Oceans bacterial community structure, collected organic matter through for DOM/POM analysis, DNA samples filtered for later extraction and 454 sequencing, respiration bottles filled for CO2 analysis, MAR-CARD-FISH samples produced from separate filtration process.

05/2006 **Bahamas summer study**, Marine fish, coral, and invertebrate identification/physiology, studied the behavior, reproduction, competition and feeding of marine organisms, sea urchin research project on the inverse relationship between test size and population density.

05/2005 **Ecology Lab–Kellogg Biological Station**, Research orientated course revolving around planning and implementing field experiments and conducting data analyses.

12/2005–01/2006 **Antarctic research cruise aboard the Russian Icebreaker M/S Orlova**, Southern Ocean circulation, chemistry, food webs, and organism interactions, research project on human interactions and their impact on the environment.

05/2003–06/2003 **Belize summer study**, Tropical and marine ecology, research project outlining human impact on the coastal ecosystem.

Service, Outreach, & Workshops

08/2015–12/2015 **University of Michigan**, Graduate Student Mentor: Mentored six new graduate student instructors.

08/2015 **Ecological Society of America**, Served as ESA student mentor for disease ecology.

07/2015 **University of Washington**, Summer Institute in Statistics and Modeling Infectious Disease (SISMID): Simulation based inference for epidemiological dynamics and spatial statistics.

07/2015 **Chumakov Institute of Poliomyelitis (Moscow, Russia)**, Visit, data collection, and developing collaborations with Russian polio researchers.

03/2015 **Dewitt Middle School (Dewitt, MI)**, Science outreach for 240 students via interactive learning on the scientific method, global demography, and disease ecology.

08/2014–07/2015 **University of Michigan**, President - Graduate students in Ecology & Evolutionary Biology (GREEBS). Activities included: organization of coffee-match, advanced R workshop, grad hacks workshop, and Professional development workshops with Robert Woods, Elizabeth Pringle, and Chelsea Wood.

04/2014 - 08/2014 **University of Michigan**, Coded all models from *Modeling Infectious Diseases* (ISBN: 9780691116174) in *R* programming language.

05/2014 **University of Michigan**, Qualifying exams preparation meeting, lead organizer, and speaker.

01/2012–06/2012 **University of Michigan**, Event Leader, 10th annual Ecology and Evolution of Infectious Disease conference and workshop.

Professional Societies

2015–present **British Ecological Society**.

2010–present **Ecological Society of America**.

2009–present **American Geophysical Union**.