

Kevin M. Bakker

Curriculum Vitae

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*infectious diseases, molecular biology (ddPCR), 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.

Refereed Publications

- [7] **Bakker, Kevin M**, Marisa C Eisenberg, Robert Woods, and Micaela E Martinez. “Exploring the seasonal drivers of varicella zoster transmission and reactivation”. In: *American Journal of Epidemiology* (2021).
- [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.

Pending Grants

- 2021–2023 **\$2,800,000** Michigan Department of Health and Human Services SEWER project for SARS-CoV-2 environmental surveillance. Role Co-PI
2021–2021 **\$93,000** University of Michigan, Neighborhood SARS-CoV-2 wastewater monitoring. Role Co-PI

Active Grants

- 2021–2022 **\$138,899** University of Michigan Skunkworks Initiative. Role Co-PI
2020–2022 **\$85,000** University of Michigan Post Translational Scholars Program. Role PI
2020–2024 **\$6,000** University of Michigan Data Acquisition for Data Science. Role PI
2016–2021 **\$4,500** University of Michigan, Undergraduate Research Opportunity Grant (3 awards). Role PI

Previous Grants & Fellowships

- 2020 **\$474,844** (\$282,645 grant plus \$192,199 in equipment.) Coronavirus Aid, Relief, and Economic Security Act (CARES) & Michigan Department of Environment, Great Lakes, and Energy (EGLE). Role Co-PI
2019–2020 **\$3,009** XSEDE Supercomputer Startup Funding (2 awards). Role PI
2018–2020 **\$184,818** NIH National Research Service Award F32AI134016. Role PI
2016–2017 **\$47,400** University of Michigan Rackham Predoctoral Fellowship. Role PI
2014–2017 **\$10,775** University of Michigan Ecology and Evolutionary Biology Grants (7 awards). Role PI
2013–2017 **\$9,250** University of Michigan Rackham Grants (6 awards). Role PI
2015 **\$4,000** University of Michigan, Michigan Institute for Computational Discovery and Engineering Fellowship. Role PI
2015 **\$1,350** University of Washington Summer Institute in Statistics and Modeling in Infectious Diseases Summer Institute Grant. Role PI

Teaching

- 2020–2021 Nominated, UROP Mentor of the year (to be awarded April 2021)
Fall 2012, University of Michigan, Introduction to Ecology and Evolutionary Biology, Graduate student
Fall 2015, instructor
Winter 2016
Winter 2013 University of Michigan, Ecology and Evolution of Infectious diseases, Graduate student instructor

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
- Digital Trends
- Medical Daily
- Daily Mail
- NBC News
- The Scotsman
- Photonics
- Freethink

National and International Conference Presentations

- Jun 2021 **Bakker, K.M.**, M. Eisenberg, R. Woods, and M. Martinez. Ecology and Evolution of Infectious Diseases. Montpellier, France: *virtual*
- Apr 2021 **Bakker, K.M.** and K. Wigginton. Association for Clinical and Translational Science. Washington, DC: *virtual*
- Jun 2020 **Bakker, K.M.** and D. Streicker. Ecology and Evolution of Infectious Diseases. Montpellier, France: *Cancelled - COVID-19*
- Aug 2019 **Bakker, K.M.** and D. Streicker. Ecological Society of America. Louisville, KY
- Nov 2017 **Bakker, K.M.** and M. Martinez. Jacques Monod: Open Questions in Disease Ecology and Evolution: From Basic Research to Evolutionary Medicine. Roscoff, France
- Aug 2017 **Bakker, K.M.** and D. Streicker. Ecological Society of America. Portland, OR
- Jun 2017 **Bakker, K.M.** and M. Martinez. Ecology and Evolution of Infectious Diseases. Santa Barbara, CA
- Jun 2016 **Bakker, K.M.**, M. Martinez-Bakker, B. Helm, and T.J. Stephenson. Ecology and Evolution of Infectious Diseases. Ithaca, NY
- Dec 2015 **Bakker, K.M.**, M. Martinez-Bakker, B. Helm, and T.J. Stephenson. British Ecological Society. Edinburgh, Scotland
- Aug 2015 **Bakker, K.M.** and M. Pascual. Ecological Society of America. Baltimore, MD
- Aug 2014 **Bakker, K.M.** and P. Rohani. Ecological Society of America. Sacramento, CA
- Jun 2014 **Bakker, K.M.** and P. Rohani. Ecology and Evolution of Infectious Diseases. Fort Collins, CO
- Jun 2013 **Bakker, K.M.**, Martinez-Bakker, M., King, A.A., and P. Rohani. Ecology and Evolution of Infectious Diseases. State College, PA

Invited Talks

- Oct 2020 Max Planck Institute for Infection Biology. Berlin, Germany
- Jul 2020 Epidemiology department, School of Public Health. Ann Arbor, MI
- Oct 2019 MAC-EPID workshop meeting, School of Public Health. Ann Arbor, MI
- Jun 2019 School of Mathematics and Statistics. Glasgow, Scotland
- Jan 2018 Complex Systems networks group. Ann Arbor, MI
- Oct 2017 Disease ecology and wild immunology. Glasgow, Scotland
- Sept 2017 Department of Ecology and Evolutionary Biology seminar speaker. Ann Arbor, MI
- Sept 2016 Odum School of Ecology. Athens, GA
- Jul 2015 Institute for Disease Modeling. Seattle, WA

Local and Other Presentations

- Dec 2020 **Bakker, K.M.** Michigan Research (MICH) studio talk. Ann Arbor, MI

- Nov 2020 **Bakker, K.M.** Streicker group talk. Glasgow, Scotland
- May 2016 **Bakker, K.M.** *pomp* in R, a tutorial. Ann Arbor, MI
- Mar 2016 **Bakker, K.M.**, M. Martinez-Bakker, B. Helm, and T.J. Stevenson. Michigan Institute of Computational Discovery and Engineering. Ann Arbor, MI
- Feb 2016 **Bakker, K.M.** Modeling Infectious Diseases Across Scales. Ann Arbor, MI
- Mar 2015 **Bakker, K.M.** and M. Pascual. Computational discovery in complex systems biology. Ann Arbor, MI
- Mar 2015 **Bakker, K.M.**, E. Ionides, M. Eisenberg, and M. Pascual. Early career scientist symposium. Ann Arbor, MI
- May 2014 **Bakker, K.M.** Student evaluation seminar talk. Ann Arbor, MI
- Mar 2014 **Bakker, K.M.** 5 minute speed talk — recruitment weekend. Ann Arbor, MI
- Feb 2014 **Bakker, K.M.** 5 minute speed talk — departmental seminar. Ann Arbor, MI
- Jan 2014 **Bakker, K.M.** Theory group seminar talk. Ann Arbor, MI

Students Mentored

- 2021-2021 Finnegan Klein, Greenhills Advanced Research Student
- 2021-2021 Shreya Mullapudi, Independent study
- 2021-2021 Sasha Tretyakova, Volunteer
- 2018-2021 Clare Dougherty, Lab manager, independent study, UROP, presented at spring 2019 UROP Symposium
- 2020-2021 Lior Latimer, UROP
- 2020-2021 Reiden Magdaleno, MRADS
- 2020-2021 Samantha Schrodell, 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

Student Presentations

- April 2021 Lior Latimer - will present at the UROP Spring Symposium, 2021. Ann Arbor, MI.
- April 2021 Reiden Magdaleno - will present at the National Council for Undergraduate Research (NCUR) Spring Symposium, 2021. Virtual.
- April 2021 Reiden Magdaleno - will present at the MRADS Spring Symposium, 2021. Ann Arbor, MI.
- April 2021 Samantha Schrodell - will present at the UROP Spring Symposium, 2021. Ann Arbor, MI.
- April 2021 Ella McKenzie - will present at the UROP Spring Symposium, 2021. Ann Arbor, MI.
- April 2021 Jillian Terrell - will present at the UROP Spring Symposium, 2021. Ann Arbor, MI.
- April 2021 Xiazi Yuan - will present at the UROP Spring Symposium, 2021. Ann Arbor, MI.
- April 2020 Juliette Kaplan - UROP Spring Symposium, 2020. Ann Arbor, MI. Awarded Blue Ribbon.
- April 2020 Cerys Rogers - UROP Spring Symposium, 2020. Ann Arbor, MI.
- April 2019 Clare Dougherty - UROP Spring Symposium, 2019. Ann Arbor, MI.
- April 2019 Victoria Minka - UROP Spring Symposium, 2019. Ann Arbor, MI.
- April 2017 Nathan Warriner - UROP Spring Symposium, 2017. Ann Arbor, MI.
- April 2017 Madeleine Schmitter - UROP Spring Symposium, 2017. Ann Arbor, MI.
- April 2017 Molly Stachurski - UROP Spring Symposium, 2017. Ann Arbor, MI.

Research Experience

- 09/2020– present **University of Michigan**, SARS-CoV-2 wastewater monitoring, SARS-CoV-2 immune response to vaccination and exposure, OnCore certification, LabVantage training, MiChart (Epic) certification, RedCap training, ddPCR training, liquid handler training.
- 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– **Belize summer study**, Tropical and marine ecology, research project outlining human impact on
06/2003 the coastal ecosystem.

Service, Outreach, & Workshops

08/2015– **University of Michigan**, Graduate Student Mentor: Mentored six new graduate student
12/2015 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– **University of Michigan**, President - Graduate students in Ecology & Evolutionary Biology
07/2015 (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 - **University of Michigan**, Coded all models from *Modeling Infectious Diseases* (ISBN:
08/2014 9780691116174) in R programming language.

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

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

Ad hoc Reviewer

Virus Evolution, Epidemiology & Infection, American Journal of Epidemiology, PLoS Biology, International Journal of Infectious Diseases, ClinicoEconomics and Outcomes Research, BMC Public Health, PLoS One, Epidemics, Ecology, PLoS Computational Biology, Scientific Reports, Journal of Epidemiology and Global Health, BMJ Open

Professional Societies

2015–present **British Ecological Society**.

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

2009–present **American Geophysical Union**.