

# Marta S. Shocket

## Quantitative Disease Ecology

Affiliated Researcher  
University of Florida, Dept. of Geography  
Quantitative Disease Ecology & Conservation Lab

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## Education & Training

Postdoctoral Training – Dept. of Ecology & Evolutionary Biology University of California Los Angeles (Los Angeles, CA) <i>Advisor:</i> Van Savage (thermal biology, biophysics, mathematical biology)	2019–2021
Postdoctoral Training – Dept. of Biology Stanford University (Stanford, CA) <i>Advisor:</i> Erin Mordecai (disease ecology, mosquito-borne disease)	2016–2019
Postdoctoral Teaching Certificate Stanford University (Stanford, CA)	2019
Ph.D. in Ecology, Evolution & Behavior Indiana University (Bloomington, IN) Specialization in Ecology/Population Biology; Minor in Genetics <i>Advisor:</i> Spencer Hall (disease ecology, aquatic ecology)	2016
B.A. in Biology and Latin American Studies Bard College (Annandale-on-Hudson, NY) <i>Advisor:</i> Felicia Keesing (community ecology, tick-borne disease)	2009

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## Appointments

Affiliated Researcher, QDEC Lab, University of Florida	2021–present
Curriculum Developer, Citizen Science, Bard College	2021–present
Adjunct Faculty, Citizen Science, Bard College	2020–present

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## Fellowships & Awards

<b>The American Naturalist Student Paper Award</b> (Shocket et al. 2018 <i>Am Nat</i> )	<b>2018</b>
Brackenridge Fellowship (\$2,000 for field work), Indiana University	2014
Sears Crowell Scholarship (\$2,000 for study at a field station), Indiana University	2011, 2012
<b>NSF Graduate Research Fellowship Program (GRFP) 3-year Fellowship</b>	<b>2011</b>
Indiana University Biology Department Recruitment Fellowship	2010
Seth Goldfine Memorial Scholarship for academic & athletic leadership, Bard College	2009
Michos Award for commitment to science & community participation, Bard College	2008
John Bard Award, Division of Mathematics & Natural Sciences, Bard College	2007
Distinguished Science Scholar, 4-year full-tuition scholarship, Bard College	2005

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## Journal Articles (\*undergraduate student mentee, \*\*graduate student mentee)

- Walsman, J., A. Strauss, J. Hite, **M. Shocket**, and S. Hall. (2022) A paradox of parasite resistance: disease-driven trophic cascades increase the cost of resistance, selecting for lower resistance with parasites than without them. *Evolutionary Ecology*. *In press*.
- A. Keyel, M. Gorris, I. Rochlin, J. Uelmen, L. Chaves, G. Hamer, I. Moise, **M. Shocket**, A. Kilpatrick, N. DeFelice, J. Davis, E. Little, P. Irwin, A. Tyre, K. Helm-Smith, C. Fredregill, O. Timm, K. Holcomb, M. Wimberly, M. Ward, C. Barker, and R. Smith. (2021) A proposed framework for the development and qualitative evaluation of West Nile virus models and their application to local public health decision-making. *PLOS Neglected Tropical Diseases*. 15(9): e0009653.
- L. Couper, J. Farner, J. Caldwell, M. Childs, M. Harris, D. Kirk, N. Nova, **M. Shocket**, E. Skinner, L. Uricchio, M. Exposito-Alonso, and E. Mordecai. (2021) How will mosquitoes adapt to climate warming? *eLife*. 10: e69630.
- R. Penczykowski, S. Hall, **M. Shocket**, J. Ochs, B. Lemanski, H. Sundar, and M. Duffy. (2021) Virulent disease epidemics can increase host density by depressing foraging of hosts. *American Naturalist*. 199(1): 75-90.
- Athni, T.\*, **M. Shocket**, L. Couper, N. Nova, I. Caldwell, J. Caldwell, J. Childress, M. Childs, G. De Leo, D. Kirk, A. MacDonald, K. Olivarius, D. Pickel, S. Roberts, O. Winkour, H. Young, J. Cheng, E. Grant, P. Kurzner, S. Kyaw, B. Lin, R. López, D. Massihpour, E. Olsen, M. Roache, A. Ruiz, E. Schultz, M. Shafat, R. Spencer, N. Bharti, and E. Mordecai. (2021) The influence of vector-borne disease on human history: socio-ecological mechanisms. *Ecology Letters*. 24(4): 829-846.
- Nova, N., E. Deyle, **M. Shocket**, A. MacDonald, M. Childs, M. Rypdal, G. Sugihara, and E. Mordecai. (2020) Susceptible host availability modulates climate effects on dengue dynamics. *Ecology Letters*. 24(3): 415-425.
- Shocket, M.**, A. Verwillow\*, M. Numazu\*, H. Slamani, J. Cohen, F. El Moustaid, J. Rohr, L. Johnson, and E. Mordecai. (2020) Transmission of West Nile and five other temperate mosquito-borne viruses peaks at temperatures between 23°C and 26°C. *eLife*. 9: e58511.
- Miazgowiec, K., **M. Shocket**, S. Ryan, O. Villena, R. Hall, H. Owen, T. Adanlawo, K. Balaji, L. Johnson, E. Mordecai, and C. Murdock. (2020) Age influences the thermal suitability of *Plasmodium falciparum* transmission in the Asian malaria vector *Anopheles stephensi*. *Proc. R. Soc. B*. 287(1931): 20201093.
- Strauss, A., J. Hite, D. Civitello, **M. Shocket**, C. Cáceres, and S. Hall. (2019) Genotypic variation in parasite avoidance behaviour and other mechanistic, nonlinear components of transmission. *Proc. R. Soc. B*. 286(1915): 20192164.
- Shocket, M.**, A. Magnante\*, M. Duffy, C. Cáceres, and S. Hall. (2019) Can hot temperatures limit disease transmission? A test of mechanisms in a zooplankton-fungus system. *Functional Ecology*. 33(10): 2017-2029.
- Mordecai, E., J. Caldwell, M. Grossman, C. Lippi, L. Johnson, M. Niera, J. Rohr, S. Ryan, V. Savage, **M. Shocket**, R. Sippi, A. Stewart Ibarra, M. Thomas, and O. Villena. (2019) Thermal biology of mosquito-borne disease. (Cover article) *Ecology Letters*. 22(10): 1690-1708.

- Altassan, K.\*\*\*, C. Morin, **M. Shocket**, K. Ebi, and J. Hess (2019). Dengue fever in Saudi Arabia: A review of environmental and population factors impacting emergence and spread. *Travel Med Infect Dis.* 30: 46-53.
- Shocket, M.**, S. Ryan, and E. Mordecai. (2018) Temperature explains broad patterns of Ross River virus transmission. *eLife.* 7: e37762.
- Shocket, M.**, D. Vergara, A. Sickbert\*, J. Walsman, A. Strauss, J. Hite, M. Duffy, C. Cáceres, and S. Hall. (2018) Parasite rearing and infection temperatures jointly influence disease transmission and shape seasonality of epidemics. *Ecology.* 99(9): 1975-87.
- Shocket, M.**, A. Strauss, J. Hite, M. Šljivar, D. Civitello, M. Duffy, C. Cáceres, and S. Hall. (2018) Temperature drives epidemics in a zooplankton-fungus disease system: a trait-driven approach points to transmission via host foraging. *American Naturalist.* 191(4): 435-451. **Winner of The American Naturalist 2018 Student Paper Award.**
- Mordecai, E., J. Cohen, M. Evans, P. Gudapati, L. Johnson, K. Miazgowiec, C. Murdock, J. Rohr, S. Ryan, V. Savage, **M. Shocket**, A. Stewart-Ibarra, M. Thomas, and D. Weikel. (2017) Detecting the impact of temperature on transmission of Zika, dengue and chikungunya using mechanistic models. *PLOS Neglected Tropical Diseases.* 11(4): e0005568.
- Strauss, A., J. Hite, **M. Shocket**, C. Cáceres, M. Duffy, and S. Hall. (2017) Rapid evolution rescues hosts from competition and disease and—despite a dilution effect—increases the density of infected hosts. *Proc. R. Soc. B.* 284(1868): 20171970.
- Hite, J., R. Penczykowski, **M. Shocket**, K. Griebel, A. Strauss, M. Duffy, C. Cáceres, and S. Hall. (2017) Allocation, not male resistance, increases male frequency during epidemics: a case study in facultatively sexual hosts. *Ecology.* 98(11): 2773-2783.
- Strauss, A., **M. Shocket**, J. Hite, R. Penczykowski, M. Duffy, C. Cáceres, and S. Hall. (2016) Habitat, predators, and hosts regulate disease in *Daphnia* through direct and indirect pathways. *Ecological Monographs.* 86(4): 393-411.
- Hite, J., R. Penczykowski, **M. Shocket**, A. Strauss, P. Orlando, M. Duffy, C. Cáceres, and S. Hall. (2016) Parasites destabilize host populations by shifting stage-structured interactions. *Ecology.* 97(2): 439-449.
- Civitello, D., R. Penczykowski, A. Smith, **M. Shocket**, M. Duffy, and S. Hall. (2015) Resources, key traits, and the size of fungal epidemics in *Daphnia* populations. *Journal of Animal Ecology.* 84(4): 1010-1017.

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## Manuscripts in Progress

*In prep.* **Shocket, M.**, E. Mordecai, and V. Savage. Using metabolic theory of ecology to inform temperature-dependent models for transmission of mosquito-borne disease.

*In prep.* **Shocket, M.**,<sup>‡</sup> K. Miazgowiec<sup>‡</sup>, J. Bernhardt, A. Orakzai, V. Savage, R. Hall, and C. Murdock. Rate summation fails to predict the thermal suitability of human malaria transmission under field relevant diurnally fluctuating conditions. (<sup>‡</sup>equal authorship contributions)

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## Book Chapters

*In review.* **Shocket, M.** and A. Keyel. Chapter 12: Modeling the effects of climate on vector-borne disease. *Planetary Health*. Ed: J. Conn.

Kirk, D.<sup>‡</sup>, E. Skinner<sup>‡</sup>, **M. Shocket**, L. Couper, N. Nova, T. Athni, J. Pourtois, J. Farner, M. Childs, M. Harris, S. Nyathi, and E. Mordecai. (2022) Chapter 4: Climate change and infectious Disease. *Ecology of Infectious Disease*. Ed: G. Suzán, A. Aguirre, and J. Mills. Oxford University Press. *In press*. (<sup>‡</sup>equal authorship contributions)

**Shocket, M.**, C. Anderson, J. Caldwell, M. Childs, L. Couper, S. Han, M. Harris, M. Howard, M. Kain, A. McDonald, N. Nova, and E. Mordecai. (2021) Chapter 6: Environmental drivers of vector-borne diseases. *Population Biology of Vector-borne Diseases*. Ed: J. Drake. Oxford University Press.

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## Selected Conference Presentations

31<sup>st</sup> Annual European Congress of Clinical Microbiology and Infectious Diseases. 2021. Online.  
Invited Talk in Organized Session: “More tropical diseases due to climate change?”: “Climate change, variability, and spatial-temporal distribution of arboviruses”

Ecological Society of America 105<sup>th</sup> (Virtual) Annual Meeting. 2020. Online.  
Talk: “Informing temperature-dependent models of mosquito-borne disease with the metabolic theory of ecology”

UTMB–Nature Conference: “Vector-borne Infectious Diseases”. 2020. Galveston, TX.  
Invited Talk: “Thermal biology of mosquito-borne disease.” CANCELLED FOR COVID-19.

Entomological Society of America Annual Meeting. 2019. St. Louis, MO.  
Invited Talk in Organized Symposium “Space, time, and disease: vectors at multiple spatial and temporal scales”: “Temperature drives patterns of mosquito-borne disease: transmission models and empirical evidence across 16 systems.”

Ecological Society of America 104<sup>th</sup> Annual Meeting. 2019. Louisville, KY.  
Invited Talk in Organized Oral Session “Ecological Levers for Health”: “Temperature drives broad patterns of mosquito-borne pathogen transmission.”

Society for Mathematical Biology Annual Meeting. 2019. Montreal, QC, Canada.  
Talk: “Comparing temperature-dependent transmission models for 16 mosquito-borne diseases.”

Bay Area Ecology and Evolution of Infectious Disease 1<sup>st</sup> Annual Meeting. 2019. Stanford, CA.  
Talk: “Temperature explains broad patterns of transmission of mosquito-borne disease.”

Mosquito Control Association of Australia. 2018. Tweed Heads, Queensland, Australia.  
Talk: “Temperature explains broad patterns of Ross River virus transmission.”  
Talk: “Your data wanted! Two public databases of global vector abundances.”

Ecology and Evolution of Infectious Diseases 16<sup>th</sup> Annual Meeting. 2018. Glasgow, Scotland  
Poster: “Comparing temperature-based  $R_0$  models across vector-borne diseases and a new model for Ross River virus.”

Ecology and Evolution of Infectious Disease 15<sup>th</sup> Annual Meeting. 2017. UC Santa Barbara, CA  
Talk: “Temperature drives transmission in a *Daphnia*-fungus system via host foraging and parasite infectivity.”

Impact of Environmental Changes on Infectious Diseases 2017. International Center for Theoretical Physics, Trieste, Italy

Poster: “Comparing temperature-based  $R_0$  models across vector-borne diseases and a new model for Ross River virus.”

American Mosquito Control Association 83<sup>rd</sup> Annual Meeting. 2017. San Diego, CA

Talk: “Connecting vector abundance with vector ecology: VectorBiTE”

Unifying Biological Principles across Disciplines (Am. Society of Naturalists). 2016. Asilomar, CA

Talk: “Past and current temperature regulate transmission in a zooplankton-fungus disease system.”

Ecological Society of America, 100<sup>th</sup> Annual Meeting. 2015. Baltimore, MD

Talk: “Temperature & resource quality regulate seasonal epidemics in a *Daphnia*-fungal disease system.”

21<sup>st</sup> Century Naturalists (American Society of Naturalists). 2014. Asilomar, CA

Midwest Ecology and Evolution Conference. 2014. University of Dayton, OH.

Talk: “Temperature & resource quality regulate seasonal epidemics in a *Daphnia*-fungal disease system.”

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## Invited Seminars

University of Wisconsin, WI, Parasitology & Vector Biology Training Program, 2021

Bard College, NY, Biology Department, 2021

University of Massachusetts Boston, MA, Biology Department, 2021

Imperial College London (Silwood Park), UK, Ecology and Evolution Seminar, 2020

University of California Berkeley, CA, EEID Seminar, 2020

University of Georgia, GA. Department of Ecology, 2020

San Francisco State University, CA, Department of Biology, 2019

Santa Clara University, CA, Biology Department, 2018

University of Melbourne, Vic, Australia, School of BioSciences, 2018

University of Tasmania, Tas, Australia, Department of Biology, 2018

Griffith University, Qld, Australia, School of Environment, 2018

University of San Francisco, CA, Department of Biology, 2017

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## Working Groups

VectorBiTE Research Coordination Network: Working Group on Temperature Variation & Rate Summation (2016–2019), Working Group on Ecoinformatic Databases (2017–2019)

MRC Centre for Global Infectious Disease Analysis, Imperial College of London: Working Group on Climate Seasonality and Transmission of Arboviruses (2019)

## Pedagogy Training, Teaching, & Mentoring

### Pedagogy Training

Postdoctoral Teaching Certificate (70 hours of training), Stanford University, 2017–2019

Graduate Course: Z620 Mentored Teaching, (1.5 credit hours) Indiana University, Spring 2013

### Teaching Positions

*Citizen Science Program*, Bard College, faculty (2-week intensive winter intercession course on science literacy, required for all first-year students): 2020, 2021, 2022, and 2023

*Citizen Science*, Bard Microcollege Brooklyn/Harlem, faculty (2-week intensive summer course on science literacy, students are from excluded communities): 2022

*Writing Knowledge Program*, Bard College, faculty (2-week intensive summer course on college writing and science literacy, required for all transfer students): 2022

*VectorBiTE Statistics Training Workshop*, teaching assistant: 2018 and 2019

*Climate Change and Vector-borne Disease* (Bio 2N), Stanford University (with faculty Prof. Erin Mordecai), course co-designer: Spring 2017; teaching assistant: Spring 2017 and 2019

*Introductory Biology Lab* (L113), Indiana University; lead associate instructor (each week I designed & delivered a 50 min lecture and ran the 3-hour lab for my 25-student section): Spring 2011, Fall 2011, and Spring 2015

### Guest Lectures

*Disease Ecology*, “Climate change and mosquito-borne diseases,” Tulane University, invited by Dr. Hannah Frank, Spring 2022

*Globally Emerging Zoonotic Diseases*, “Climate change and vector-borne diseases,” Stanford University, invited by Dr. Stephen Felt, Spring 2020

*Global Change & Health Seminar* (for Masters of Public Health students), “Temperature and mosquito-borne disease,” School of public Health, University of California Berkeley, invited by Dr. Justin Remais, Winter 2019

*Introductory Ecology*, “Disease Ecology,” Stanford University, invited by Dr. Erin Mordecai, Fall 2016

### Mentoring

- **10 undergraduate students, 3 graduate students (9 women, 7 from underrepresented backgrounds)**

- **4 undergraduate mentees, 1 graduate mentee published as co-authors**

PhD Rotation Project, UCLA – *Mentee*: Christine Craib (Winter–Spring 2021)

Undergraduate Individual Study Credit, UCLA – *Mentees*: Cymfenee Dean-Phifer (Summer 2020–Spring 2021), Samantha Chung (Fall 2020–Spring 2021)

Manuscript writing and revision, Stanford University – *Mentee*: Tejas Athni (2019–2020)

PhD Rotation Project, Stanford University – *Mentee*: Sindiso Nyathi (Winter–Spring 2019)

Manuscript writing and revision, University of Washington – *Mentee*: Kholood Altassan (2018)

Biology Summer Undergraduate Research Program, Stanford University – *Mentees*: Sophia Stefan (Summer 2018) and Anna Verwillow (Summer 2017)

Undergraduate Individual Study Credit, Stanford University – *Mentees*: Sophia Stefan (Fall 2018), Anna Verwillow (Fall 2017–Spring 2018), Mailo Numazu (Fall 2017–Spring 2018), and David Mariano (Winter 2017)

Undergraduate Individual Study Credit, Indiana University – *Mentees*: Alexandra Magnante (Fall 2015–Spring 2016), Andrew Sickbert (Fall 2015), and Marisa Paredo (Summer 2013)

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## Press Releases, Interviews, & Popular Press Publications

Why Climate Change May Bring More West Nile Virus To The U.S. *Science Friday*, NPR (National Public Radio), March 25, 2002.

<https://www.sciencefriday.com/segments/climate-change-west-nile-virus/> (Interview)

West Nile Virus and Climate Change: It's Complicated. *The Scientist*. Sept. 28, 2021.

<https://www.the-scientist.com/news-opinion/west-nile-virus-and-climate-change-it-s-complicated-69246> (Interview/consultation)

Stanford course explores how diseases have shaped human history. *Stanford News*. Jan. 27, 2021.

<https://news.stanford.edu/2021/01/27/diseases-history-intertwined/> (Press release)

Viral Weather: How COVID-19 modelling relates to climate change. The Weather Network (Canadian TV Network). May 9, 2020.

<https://www.theweathernetwork.com/ca/news/article/viral-weather-future-modelling-and-having-a-climate-change-plan>; [YouTube Link](#) (Video interview for television broadcast, YouTube channel, and podcast)

SciLine Interview with American Association for the Advancement of Science (AAAS) on COVID seasonality. (Prepared Q&A for journalists, used for quotes in articles):

- What we know about seasonality and future waves of coronavirus by Chia-Yi Hou. [The Hill](#). April 24, 2020.
- 3 potential futures for COVID-19: Recurring small outbreaks, a monster wave, or a persistent crisis by Sharon Begley. [STAT](#). May 1, 2020. Republished on [Boston.com](#) on May 5, 2020. Referenced in a Croatian language article on [24sata.hr](#) on May 7, 2020.

Is climate change affecting the spread of disease? *Honolulu Civil Beat*. March 23, 2020.

<https://www.civilbeat.org/2020/03/is-climate-change-affecting-the-spread-of-disease/> (Podcast interview)

Episode 51: Transmissible tumors and LSD receptors. eLife Podcast by Naked Scientists. Nov. 14, 2018.

<https://www.thenakedscientists.com/articles/interviews/climate-change-and-disease-spread> (Podcast interview)

Temperature model predicts regional and seasonal virus transmission by mosquitoes. *EurekAlert!* Aug. 28, 2018.

[https://www.eurekalert.org/pub\\_releases/2018-08/e-tmp082818.php](https://www.eurekalert.org/pub_releases/2018-08/e-tmp082818.php) (Press release)

IU study: Key factor may be missing from models that predict disease outbreaks from climate change. *News at IU Bloomington*. Aug. 16, 2018.



<https://news.iu.edu/stories/2018/08/iub/releases/16-key-factor-missing-models-predict-disease-outbreaks-climate-change.html> (Press release)

U.S. Faces a Rise in Mosquito ‘Disease Danger Days.’ *Climate Central*. Aug. 8, 2018.  
<http://www.climatecentral.org/news/us-faces-a-rise-in-mosquito-disease-danger-days-21903>  
(Interview/consultation)

West Nile Crippling El Pasoans, Rising Temperatures Play Role. *Climate Central*. Aug. 8, 2018.  
<http://www.climatecentral.org/news/west-nile-el-paso-rising-temperatures-play-role-21905>  
(Interview/consultation)

**Shocket, M.** Lending a hand: Citizens aid in scientific discoveries. *The Ryder*. July 2013.  
Bloomington, IN. (Article for local monthly arts/alternative newspaper)

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## Professional Service & Outreach

**Peer Reviews:** 52 since 2015

Journals: *American Naturalist*, *Bulletin of Entomological Research*, *Ecological Modelling*, *Ecology*, *eLife*, *Emerging Infectious Diseases*, *Environmental Research Letters*, *Frontiers in Ecology and Evolution*, *Functional Ecology*, *J. of Animal Ecology*, *J. of Applied Ecology*, *J. of Medical Entomology*, *Lancet Planetary Health*, *Nature Microbiology*, *Oecologia*, *Oikos*, *PLoS Computational Biology*, *PLoS Medicine*, *PLoS ONE*, *Proceedings of the Royal Society B*, *Royal Society Open Science*, *Trends in Parasitology*, and *Viruses*.

### Conference & University Service

Creator & Chair of Organizing Committee for 1st Bay Area Ecology & Evolution of Infectious Disease Meeting (BAEEID, 2019)

Co-chair, Organizing Committee for Midwest Ecology and Evolution Conference (MEEC, 2015)

Organizer and participant of Science Outreach Panel, Midwest Ecology & Evolution Conference (MEEC, 2015)

Chair of Transportation and Greetings Committee for Graduate Recruitment Weekend (2011)

### Public Outreach

Bugs, Birds, and Beasts Day at Imperial College London, Silwood Campus (July 26, 2022)

Stanford Prison Education Project, created and delivered lesson on ‘Evidence and Error in Science’ for Myths and Misconceptions course in Redwood City Jail (Fall 2018, Winter 2019)

Nightlife: Migratory Animals, California Academy of Sciences (November 8, 2018)

Nightlife: Women in Science, California Academy of Sciences (March 29, 2018)

Stanford STAR (Science and Teaching through Art) Program; completed 3 training sessions, created and presented poster at 2 public events for high school students (Fall 2016)

Public talk on Climate Change & Infectious Disease, Bloomington Science Café (November 2, 2016)

Co-organizer for Bloomington Science Café (2012–2016)

Public talk on Citizen Science, Bloomington Science Café (July 17, 2013)