

Cara E. Brook

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Education

- 2012-2017 **Ph.D. Ecology and Evolutionary Biology, Princeton University**
Elucidating mechanisms of viral hosting in bat reservoirs for emerging zoonotic disease. Advised by: Dr. Andrew P. Dobson
- 2012-2014 **M.Sc. Ecology and Evolutionary Biology, Princeton University**
Deciphering the role of bats as reservoirs in emerging disease.
Advised by: Dr. Andrew P. Dobson
- 2006-2010 **B.S. Earth Systems, Stanford University**
*The Synanthropic Raven: Anthropogenic resource use and the invasion of *Corvus corax* in Yosemite National Park.* Advised by: Dr. Elizabeth Hadly

Appointments

- 2017-present **Miller Postdoctoral Fellow**, UC Berkeley, CA
- 2012-2017 **PhD student**, Princeton University, NJ
- 2012 **Field Technician**, US Geological Survey, Superior National Forest, MN
- 2011 **GIS Technician**, Peninsula Open Space Trust, Palo Alto, CA
- 2011 **Project Manager**, Smithsonian Inst., Mpala Research Centre, Kenya
- 2010 **Conservation Intern**, World Wildlife Fund, Vondrozo, Madagascar

Awards and Fellowships

- 2017-2020 Miller Postdoctoral Fellowship, UC Berkeley.
- 2013-2017 National Science Foundation, Graduate Research Fellowship.
- 2013 US DOD: National Defense, Science, and Engineering Graduate Fellowship.
(Declined in favor of NSF)
- 2010 Firestone Medal, Undergrad Research Excellence, Stanford University
- 2010 Earth Systems Award, Senior Thesis Excellence, Stanford University

Peer-Reviewed Publications *(in reverse chronological order)*

2019

1. **Brook CE**, Ng M, Boots M, Dobson A, Graham A, Grenfell B, Chandran KC, van Leeuwen A. In Prep. Within-host mechanisms of viral persistence in bat reservoirs for emerging zoonotic disease. (Anticipated submission to: *PNAS*, May 2019).
2. Guth S, Visher E, Boots M*, and **Brook CE***. *In Revision*. Phylogenetic distance underpins a virulence-transmission tradeoff across the human-animal interface. *Philosophical Transactions of the Royal Society*. *=equal senior contributions.
3. **Brook CE**, Ranaivoson HC, Broder CC, Cunningham AA, Héraud J-M, Peel AJ, Gibson L, Wood JLN, Metcalf CJE*, and Dobson AP*. 2019. Disentangling serology to elucidate henipa- and filovirus transmission in Madagascar fruit bats. *Journal of Animal Ecology*. doi: 10.1111/1365-2656.12985. *=equal senior contributions.
4. **Brook CE**, Ranaivoson HC, Andriafidison D, Ralisata M, Razafimanahaka J, Héraud JM, Dobson AP, and Metcalf CJE. 2019. Population trends for two Malagasy fruit bats. *Biological Conservation*. 234:165-171. doi: 10.1016/j.biocon.2019.03.032.

5. Ranaivoson HC, Héraud JM, Goethert HK, Telford SR, Rabetafika L* and **Brook CE***. 2019. Babesial infection in the Madagascan flying fox, *Pteropus rufus* É. Geoffroy, 1803. *Parasites & Vectors*. 12(51): 1307101933. doi: 10.1186/s13071-019-3300-7.
*=equal senior contributions.

2018

6. **Brook CE**, Herrera JP, Borgerson C, Fuller E, Andriamahazoarivosoa P, Rasolofoniaina BJR, Randrianasolo JLRR, Rakotondrafarasata ZRE, Randriamady HJ, Dobson AP, Golden CD. 2018. Population viability and harvest sustainability for Madagascar lemurs. *Conservation Biology* doi: 10.1111/cobi.13151.

2017

7. **Brook CE**, Bai Y, Yu EO, Ranaivoson HC, Shin H, Dobson AP, Metcalf CJE*, Kosoy MY* and Dittmar K*. 2017. Elucidating transmission dynamics and host-parasite-vector relationships for rodent-borne *Bartonella* spp. in Madagascar. *Epidemics* 20:56-66. doi:10.1016/j.epidem.2017.03.004. *= equal senior contributions.

2016

8. Wesolowski A*, Mensah K*, **Brook CE***, Andrianjafimasy M, Winter A, Buckee CO, Razafindratsimendresy R, Tatem AJ, Héraud J-M♦, and Metcalf CJE♦. 2016. Introduction of Rubella-Containing-Vaccine to Madagascar: Implications for roll-out and local elimination across low-income countries. *Journal of the Royal Society Interface*. 13(177): 20151101. doi:10.1098/rsif.2015.110. *= equal lead contributions; ♦ = equal senior contributions.

2015

9. **Brook CE**, Beauclair R, Ngwenya O, Worden L, Ndeffo-Mbah M, Lietman TM, Satpathy SK, Galvani AP, and Porco TP. 2015. Spatial heterogeneity in projected leprosy trends in India. *Parasites & Vectors* 8(542): 2-11. doi: 10.1186/s13071-015-1124-7.
10. Rist CL, Ngonghala CN, Garchitorena A, **Brook CE**, Ramananjato, Miller AC, Randrianarivelojosa M, Wright PC, Gillespie TR, and Bonds MH. 2015. Modeling the burden of poultry disease on the rural poor in Madagascar. *One Health*. 1:60-65. doi: 10.1016/j.onehlt.2015.10.002.
11. **Brook CE**, Bai Y, Dobson AP, Osikowicz L, Ranaivoson HC, Zhu Q, Kosoy MY, and Dittmar K. 2015. *Bartonella* spp. in fruit bats and blood-feeding ectoparasites in Madagascar. *PLoS Neglected Tropical Diseases*. 10 (2):e0003532. doi:10.1371/journal.pntd.0003532.
12. **Brook CE** and Dobson AP. 2015. Bats as 'special' reservoirs for emerging zoonotic pathogens. *Trends in Microbiology*. 23(3):172-180. doi:10.1016/j.tim.2014.12.00.
13. Guyton J and **Brook CE**. 2015. African Bats: Conservation in the Time of Ebola. *Therya*. 6(1): 69-88. doi: 10.12933/therya-15-244.
14. Young HS, McCauley DJ, Dirzo R, Goheen JR, Agwanda B, **Brook CE**, Castillo EO, Ferguson AW, Kinyua SN, McDonough MM, Palmer TM, Pringle RM, Young TP, and Helgen KM. 2015. Context-dependent effects of large wildlife declines on small mammal communities in central Kenya. *Ecological Applications* (25):348-60. doi:10.1890/14-0995.1.

2013

15. **Brook CE**, Bernstein DP, and Hadly EA. 2013. Human food subsidies and Common Raven occurrence in Yosemite National Park, CA. *Western Birds* 44(2):127-34.

Selected Conference Presentations

- 2018 *Fall Biology Seminar Series*, University of San Francisco, CA. ***invited talk**
- 2018 *Ecology and Evolution of Infectious Diseases*, University of Glasgow, Scotland. ***invited talk**
- 2018 *Modeling Insights into Epidemiology and Ecology*, Institut Pasteur de Madagascar, Antananarivo, Madagascar. ***invited talk**
- 2017 *International Bat Infectious Diseases Conference*. Colorado State University, Fort Collins, CO.
- 2017 *Ecology and Evolution of Infectious Diseases Conference*. UC Santa Barbara, CA.
- 2015 *North American Society Bat Research, Annual Meeting*. Monterey, CA. ***session organizer**
- 2015 *Ecological Society of America – Annual Meeting*. Baltimore, Maryland.
- 2015 *African Small Mammal Symposium*. Vahatra, Mantasoa, Madagascar.
- 2014 *Ecology and Evolution of Infectious Diseases Conference*. Colorado State, Fort Collins, CO.

Research Grants

- 2018-present **DARPA PREdicting Emerging Pathogenic Threats (PREEMPT).**
Lead PI: RK Plowright. co-PI with H Arguilar-Carreno, N Bharti, P Ebby, E Gurley, B Han, PJ Hudson, JO Lloyd-Smith, H McCallum, L McGuire, V Munster, CR Parrish, AJ Peel, O Restif, T Schountz. \$10,000,000.
 “Preventing emergence and spillover of bat viruses in high-risk global hotspots”.
- 2018-present **Center for Emerging and Neglected Tropical Diseases, Thomas C. Alber Science and Engineering Fellowship.** *PI. \$10000.*
 “A transcriptomic window into zoonotic bat virus seasonality in Madagascar.”
- 2017-present **National Institutes of Health, Intl Research in Infectious Diseases (R01).**
Senior/Key Personnel with co-PIs JM Héraud, CJ Metcalf, C Golden, and LF Wang (PI status not permitted for graduate students at time of submission). \$625000.
 “Investigating seasonal drivers of viral zoonoses from Madagascar fruit bats.”
- 2016-2017 **Princeton Environmental Institute, Walbridge Graduate Award.** *PI. \$10000.*
 “Climate Change, Resource Scarcity, & Emerging Fruit Bat Zoonoses in Madagascar.”
- 2016-2017 **National Science Foundation, Doctoral Dissertation Improvement Grant.**
co-PI with AP Dobson and AL Graham. \$13000.
 “Within-host seasonal drivers of pathogen dynamics in a fruit bat reservoir.”
- 2015-2016 **PIVOT Research Award.** *co-PI with AP Dobson and J-M Héraud. \$15000.*
 “Investigating spillover of viral hemorrhagic fevers from fruit bats in Madagascar.”
- 2015-2016 **National Geographic Society: Waite Grant.** *PI. \$15000.*
 “Investigating risks for Ebola virus spillover from Madagascar fruit bats.”
- 2013-2014 **Lubee Bat Conservancy. Bacardi Conservation & Research Fund.** *PI. \$5000.*
 “Bushmeat harvesting impacts on risk for henipavirus spillover among fruit bats in Madagascar.”
- 2013-2014 **Bat Conservation International. Student Research Scholarship.** *PI. \$3200.*
 “Bushmeat harvesting impacts on population dynamics and corresponding risk for henipavirus spillover in Malagasy fruit bats.”
- 2013-2014 **The Explorer’s Club. Exploration Fund.** *PI. \$2250.*
 “Mechanisms for viral persistence among mixed species fruit bat populations in Madagascar.”
- 2013-2014 **Bill and Melinda Gates Foundation: Grand Challenges in Global Health Explorations.** *co-PI with MH Bonds, PC Wright, and TR Gillespie. \$100,000.*
 “Quantifying the economic burden of disease in Ranomafana NP, Madagascar.”
- 2013-2014 **Princeton University: Health Grand Challenges Grant.** *PI. \$5000.*
 “Biodiversity and human livelihood: Quantifying vector-control impact of insectivorous bats on human malaria burden in Ranomafana, Madagascar.”
- 2013 **American Society of Mammalogist: Grants-in-Aid.** *PI. \$1500.*

- 2013 “Mammalian Biodiversity, Metapopulation Connectivity, & Potential for Zoonosis.”
National Geographic Society: Young Explorer Grant. *PI.* \$5000.
- 2013 “Habitat Modification and the Ecology of Plague Emergence in Madagascar.”
Princeton University: Health Grand Challenges Grant. *PI.* \$1200.
- 2009-2010 “Habitat Modification and Plague Emergence in Madagascar.”
Stanford Vice Provost Undergraduate Education Major Grant. *PI.* \$5200.
 “Anthropogenic resources and Common Raven invasion in Yosemite National Park.”

Teaching Experience

- 2016-present **E²M²: Ecological and Epidemiological Modeling in Madagascar.**
Founder, Instructor: <https://carabrook.github.io/E2M2>
 - Design and deliver lectures and exercises for introductory programming (R) workshop for Malagasy students in biology, medicine, public health
- 2015-present **International Clinics on Infectious Disease, Dynamics, and Data.**
Workshop Faculty: ici3d.org
 - Design and deliver lectures and exercises for introductory programming (R) workshop for African/N. American students in biology, medicine, public health
- 2014 **Evolution & Behavior of Sexes.** EEB 301. Princeton Univ. *Assistant-in-Instruction.*
 - Taught weekly discussion section, designed exams and assignments for upper-division seminar in Ecology and Evolutionary Biology (EEB)
- 2012-2013 **Life on Earth.** EEB 211. Princeton University. *Assistant-in-Instruction.*
 - Taught weekly discussion section, designed exams, labs and assignments for primary introductory course in the EEB major
- 2009 **Introduction to Earth Systems.** ES10. Stanford University. *Teaching Assistant.*
 - Taught weekly classroom section, wrote and graded assignments, and designed curriculum, the primary introductory course in the ES major

Advising

UC Berkeley Graduate Students (informal committee member):

Sarah Guth (Ph.D., *Current*).

Seasonal movement and spatial infection dynamics in Madagascar fruit bats

Mattina Allonge (Ph.D., *Current*).

Seasonal resource shifts and investment in growth, reproduction, and immunity in Madagascar fruit bats

University of Antananarivo Advisees:

Angelo Andrianiana (Ph.D., *Current*).

Population dynamics of fruit bat ectoparasites in Madagascar

Christian Ranaivoson (Ph.D., *Current*).

Seasonality of Babesia spp. infection in Madagascar fruit bats

Princeton Undergraduate Advisees:

Yun-Yun Li (2016, undergraduate research exchange)

Emily Yu (2015, senior thesis)

A study on Bartonella spp. prevalence, strain diversity, & dynamics in Rattus rattus in Madagascar

Evaline Cheng (2014, senior thesis)

Modeling the impacts of biodiversity loss on malaria transmission in Madagascar

Certifications, Languages, Skills

Certifications:

Wilderness First Responder (2014). PADI Open Water SCUBA Diver (2008).

Language:

French (highly proficient written and spoken). Malagasy (highly proficient spoken).

Computer:

R, MatLab, C++, ArcGIS, Microsoft Office (Powerpoint, Word, Excel)

Journalism and Other Writing

- National Geographic Society Voices (over 30 articles related to my work in Madagascar): <http://voices.nationalgeographic.com/author/carabrook/>
- Popular science writing in Princeton Discovery Research magazine: <https://discovery.princeton.edu/2016/11/15/big-answers-from-small-creatures/>
- Popular science writing in the SACEMA quarterly: <http://sacemaquarterly.com/>