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 Synanthropizatic 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

Awards and Fellowships

2017-2020 Miller Postdoctoral Fellowship, UC Berkeley
2013-2017 National Science Foundation, Graduate Research Fellowship
2013 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)*

In Revision

1. **Brook CE.** In Revision. A batty concept goes viral. *Nature Ecology & Evolution.*
2. **Brook CE,** Ng M, Boots M, Dobson A, Graham A, Grenfell B, Chandran KC, van Leeuwen A. In Revision. Within-host dynamics of virulent viruses in bat reservoirs for emerging zoonotic disease. *eLife.* doi (preprint): 10.1101/696195.

2019

3. Guth S, Visher E, Boots M, and **Brook CE**. 2019. Host phylogenetic distance drives trends in virus virulence and transmissibility across the animal-human interface. *Philosophical Transactions of the Royal Society* 374(1782): 20190296. doi: 10.1098/rstb.2019.0296.
4. **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.*
5. **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.
6. 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

7. **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* 33(1): 99-111. doi: 10.1111/cobi.13151.

2017

8. **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

9. Wesolowski A*, Mensah K*, **Brook CE***, Andrianjafimasy M, Winter A, Buckee CO, Razafindratsimendresy R, Tatem AJ, Heraud 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

10. **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(1): 542. doi: 10.1186/s13071-015-1124-7.
11. Rist CL, Ngonghala CN, Garchitorena A, **Brook CE**, Ramananjato, Miller AC, Randrianarivelojosia 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.
12. **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.
13. **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.
14. 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.
15. 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(2): 348–60. doi:10.1890/14-0995.1.

2013

16. **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 (oral)

2019 *Association for Tropical Biology & Conservation Annual Meeting,* Antananarivo, Madagascar.
2018 *Fall Biology Seminar Series,* University of San Francisco, CA. ***invited talk**
2018 *Ecology and Evolution of Infectious Diseases*, University of Glasgow, Scotland.
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.
2015 *North American Society Bat Research, Annual Meeting.* Monterey, CA. ***session organizer**
2015 *Ecological Society of America – Annual Meeting.* Baltimore, Maryland.

Research Grants

2019-present **Bill & Melinda Gates Foundation Grand Challenges Explorations.** *PI.* $100,000. "Metagenomics and the Etiology of Zoonotic Disease: Deciphering Bat-to-Human Viral Transmission in Madagascar."

2018-present **DARPA PREdicting Emerging Pathogenic Threats (PREEMPT).** *co-PI with RK Plowright (lead), 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"**.**

2018-2019 **Center for Emerging and Neglected Tropical Diseases, Thomas C. Alber Science and Engineering Fellowship.** *PI.* $10,000.
"A transcriptomic window into zoonotic bat virus seasonality in Madagascar."

2017-present **National Institutes of Health, International 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). $625,000.
"Investigating seasonal drivers of viral zoonoses from Madagascar fruit bats."

2016-2017 **Princeton Environmental Institute, Walbridge Graduate Award.** *PI.* $10,000.
"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. $13,000.
"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.* $15,000.
"Investigating spillover of viral hemorrhagic fevers from fruit bats in Madagascar."

2015-2016 **National Geographic Society: Waitt Grant.** *PI.* $15,000.
"Investigating risks for Ebola virus spillover from Madagascar fruit bats."

2013-2014 **Lubee Bat Conservancy. Bacardi Conservation & Research Fund.** *PI.* $5,000.
"Bushmeat harvesting impacts on risk for henipavirus spillover among fruit bats in Madagascar."

2013-2014 **Bat Conservation International. Student Research Scholarship.***PI.* $3,200.
"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.* $2,250.
"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.* $5,000.
"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.* $1,500.
"Mammalian Biodiversity, Metapopulation Connectivity, & Potential for Zoonosis."

2013 **National Geographic Society: Young Explorer Grant.** *PI.* $5,000.
"Habitat Modification and the Ecology of Plague Emergence in Madagascar."

2013 **Princeton University: Health Grand Challenges Grant.** *PI.* $1,200.
"Habitat Modification and Plague Emergence in Madagascar."

Teaching Experience

2016-present **E^2M^2: Ecological and Epidemiological Modeling in Madagascar.**
Founder, Instructor: **E2M2.org**
- Design and deliver lectures and exercises for introductory programming (R) workshop for Malagasy students in biology, medicine, public health

2015-2016 **International Clinics on Infectious Disease, Dynamics, and Data.**
Workshop Faculty: ici3d.org
- Designed and delivered 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 University. *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 mentor)**:**
- Sarah Guth (Ph.D., 2018-*current*).
  Seasonal movement and spatial infection dynamics in Madagascar fruit bats
- Mattina Allonge (Ph.D., 2018-*current*).
  Seasonal resource allocation to growth, reproduction, and immunity in Madagascar fruit bats

University of Antananarivo Advisees:
- Santino Andry (Ph.D., 2019-*current*).
  Quantifying cross-species contact networks in Madagascar fruit bats
- Fifi Ravelomanantsoa (Ph.D., 2019-*current*).
  Seasonal dynamics of microbiome diversity in the context of nutrition for Madagascar fruit bats
- Angelo Andrianiaina (Ph.D., 2018-*current*).
  Population dynamics of fruit bat ectoparasites in Madagascar
- Christian Ranaivoson (Ph.D., 2013-*current*).
  Seasonality of Babesia spp. infection in Madagascar fruit bats

Post-Baccalaureate Advisees:
- Anecia Gentles (Field Project Manager, 2019-*current*)
  Isotopic tracking of seasonal cross-species contact rates in Madagascar fruit bats
- Samantha Kreling (Field Project Manager, 2019-*current*)
  Tracking fruit bat contact networks by UV dust
- Katheryn Fitzgerald (Field Project Manager, 2019-*current*)
  Quantifying seed dispersal services of Pteropus rufus, *the Madagascan Flying Fox*
- Kimberly Rivera (Field Project Manager, 2019)

Princeton University 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

Skills

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 Blog: https://openexplorer.nationalgeographic.com/expedition/ekipafanihy/
- 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/