

## Cara E. Brook

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### Education

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- 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

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- 2017-present      **Miller Postdoctoral Fellow**, Department of Integrative Biology, UC Berkeley, CA  
2016-present      **Affiliate Researcher**, Virology Unit, Institut Pasteur of Madagascar, Antananarivo, Madagascar

### Awards and Fellowships

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- 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)*

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#### *In Revision*

1. **Brook CE.** In Revision. A batty concept goes viral. *Nature Ecology & Evolution*.
2. **Brook CE**, Boots M, Chandran KC, Dobson AP, Drosten C, Graham AL, Grenfell BT, Müller MA, Ng M, Wang L-F, and 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 and 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<sup>±</sup>, and Metcalf CJE<sup>±</sup>. 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; <sup>±</sup> = 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, Randrianarivelosia 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)

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- 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

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- 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

	<i>Lloyd-Smith, H McCallum, L McGuire, V Munster, CR Parrish, AJ Peel, O Restif, T Schountz.</i> \$10,000,000.
2018-2019	“Preventing emergence and spillover of bat viruses in high-risk global hotspots”. <b>Center for Emerging and Neglected Tropical Diseases, Thomas C. Alber Science and Engineering Fellowship.</b> <i>PI.</i> \$10,000.
2017-present	“A transcriptomic window into zoonotic bat virus seasonality in Madagascar.” <b>National Institutes of Health, International Research in Infectious Diseases (R01).</b> <i>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).</i> \$625,000.
2016-2017	“Investigating seasonal drivers of viral zoonoses from Madagascar fruit bats.” <b>Princeton Environmental Institute, Walbridge Graduate Award.</b> <i>PI.</i> \$10,000.
2016-2017	“Climate Change, Resource Scarcity, & Emerging Fruit Bat Zoonoses in Madagascar.” <b>National Science Foundation, Doctoral Dissertation Improvement Grant.</b> <i>co-PI with AP Dobson and AL Graham.</i> \$13,000.
2015-2016	“Within-host seasonal drivers of pathogen dynamics in a fruit bat reservoir.” <b>PIVOT Research Award.</b> <i>co-PI with AP Dobson and J-M Héraud.</i> \$15,000.
2015-2016	“Investigating spillover of viral hemorrhagic fevers from fruit bats in Madagascar.” <b>National Geographic Society: Waitt Grant.</b> <i>PI.</i> \$15,000.
2013-2014	“Investigating risks for Ebola virus spillover from Madagascar fruit bats.” <b>Lubee Bat Conservancy. Bacardi Conservation &amp; Research Fund.</b> <i>PI.</i> \$5,000.
2013-2014	“Bushmeat harvesting impacts on risk for henipavirus spillover among fruit bats in Madagascar.” <b>Bat Conservation International. Student Research Scholarship.</b> <i>PI.</i> \$3,200.
2013-2014	“Bushmeat harvesting impacts on population dynamics and corresponding risk for henipavirus spillover in Malagasy fruit bats.” <b>The Explorer’s Club. Exploration Fund.</b> <i>PI.</i> \$2,250.
2013-2014	“Mechanisms for viral persistence among mixed species fruit bat populations in Madagascar.” <b>Bill and Melinda Gates Foundation: Grand Challenges in Global Health Explorations.</b> <i>co-PI with MH Bonds, PC Wright, and TR Gillespie.</i> \$100,000.
2013-2014	“Quantifying the economic burden of disease in Ranomafana NP, Madagascar.” <b>Princeton University: Health Grand Challenges Grant.</b> <i>PI.</i> \$5,000.
2013	“Biodiversity and human livelihood: Quantifying vector-control impact of insectivorous bats on human malaria burden in Ranomafana, Madagascar.” <b>American Society of Mammalogist: Grants-in-Aid.</b> <i>PI.</i> \$1,500.
2013	“Mammalian Biodiversity, Metapopulation Connectivity, & Potential for Zoonosis.” <b>National Geographic Society: Young Explorer Grant.</b> <i>PI.</i> \$5,000.
2013	“Habitat Modification and the Ecology of Plague Emergence in Madagascar.” <b>Princeton University: Health Grand Challenges Grant.</b> <i>PI.</i> \$1,200.
	“Habitat Modification and Plague Emergence in Madagascar.”

## Teaching Experience

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2016-present	<b>E<sup>2</sup>M<sup>2</sup>: Ecological and Epidemiological Modeling in Madagascar.</b> <i>Founder, Instructor: E2M2.org</i> - Design and deliver lectures and exercises for introductory programming (R) workshop for Malagasy students in biology, medicine, public health
2015-2016	<b>International Clinics on Infectious Disease, Dynamics, and Data.</b> <i>Workshop Faculty: ici3d.org</i> - Designed and delivered lectures and exercises for introductory programming (R) workshop for African/N. American students in biology, medicine, public health
2014	<b>Evolution &amp; Behavior of Sexes.</b> EEB 301. Princeton University. <i>Assistant-in-Instruction.</i> - 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 for the primary introductory course in the ES major

## **Advising**

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### **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:**

- Voloniaina Raharinosy (postdoc, 2018-current)  
*Coronavirus diversity in Madagascar fruit bats*
- 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 Andrianiana (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**

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**Language:** French (highly proficient written and spoken). Malagasy (highly proficient spoken).

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

## **Outreach and Writing**

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- National Geographic Society Open Explorer Blog (2019-current):  
<https://openexplorer.nationalgeographic.com/expedition/ekipafanihy/>
- Women's March Madagascar, Ranomafana, Madagascar – *Co-Founder, Co-Organizer* (2019)
- National Geographic Society Voices (2013-2018): <http://voices.nationalgeographic.com/author/carabrook/>
- Women-In-Science Partnership, Princeton University – *Organizer* (2015-2017)