

Cara E. Brook

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Appointments

2021-present **Assistant Professor**, Dept of Ecology and Evolution, University of Chicago, Chicago, IL
2020-present **Branco Weiss Society in Science Fellow**, ETH-Zurich, Zurich, Switzerland

Education and Training

2017-2020 **Miller Postdoctoral Fellow**, Department of Integrative Biology, UC Berkeley, CA. Advisor: Mike Boots.
2012-2017 **Ph.D. Ecology and Evolutionary Biology, Princeton University**. Advisor: Andrew Dobson.
Elucidating mechanisms of viral hosting in bat reservoirs for emerging zoonotic disease.
2012-2014 **M.Sc. Ecology and Evolutionary Biology, Princeton University**
2006-2010 **B.S. Earth Systems, Stanford University**

Awards and Fellowships

2020-present L'Oréal USA For Women in Science Fellowship
2020-present Branco Weiss 'Society in Science' Fellowship, ETH-Zurich
2017-2020 Miller Postdoctoral Fellowship, UC Berkeley
2013-2017 National Science Foundation, Graduate Research Fellowship
2010 Firestone Medal, Undergraduate Research Excellence, Stanford University
2010 Earth Systems Award, Senior Thesis Excellence, Stanford University

Publications (in reverse chronological order; *equal lead/‡equal senior contributions)

In Review (pre-prints)

1. **Brook CE**, Rozins C, Guth S, and Boots M. Reservoir host immunology and life history shape virulence evolution in zoonotic viruses. In Review. doi (pre-print): 10.1101/ 2021.10.06.46337

Accepted, In Press

2. Andrianiana A*, Andry S*, Gentles A, Guth S, Héraud JM, Ranaivoson HC, Ravelomanantsoa NAF, Treuer T, and **Brook CE**. Reproduction, seasonal morphology, and juvenile growth in three Malagasy fruit bats. In Press. *Journal of Mammalogy*. doi: 10.1101/2021.10.28.466299.

Published

3. Guth S, Mollentze N, Renault K, Streicker DG, Visher E, Boots M‡, and **Brook CE**‡. Bats host the most virulent—but not the most dangerous—zoonotic viruses. 2022. *PNAS* 119(14): e2113628119. doi: 10.1073/pnas.2113628119.
4. Kettenburg G, Kistler A, Ranaivoson HC, Ah Yong V, Andrianiana A, Andry S, DeRisi JL, Gentles A, Raharinosy V, Randriambolamanantsoa TH, Ravelomanantsoa NAF, Tato CM, Dussart P, Héraud JM, and **Brook CE**. Full genome *Nobecovirus* sequences from Malagasy fruit bats define a unique evolutionary history for this coronavirus clade. 2022. *Frontiers in Public Health* 10:786060. doi: 10.3389/fpubh.2022.786060.
5. Jones DN, Ravelomanantsoa NAF, Yeoman CJ, Plowright RK‡, and **Brook CE**‡. Do unique gastrointestinal microbiomes facilitate bats' roles as major viral reservoirs? 2022. *Trends in Microbiology*. doi: 10.1016/j.tim.2021.12.009.
6. Andriamandimby SF*, **Brook CE***, Razanajatovo N, Randriambolamanantsoa TH, Rakotondramanga J-M, Rasambainarivo F, Raharimanga V, Razanajatovo IM, Mangahasimbola R, Razafindratsimandresy R, Randrianarisoa S, Bernardson B, Rabarison JH, Randrianarisoa M, Nasolo FS, Rabetombosoa RM, Ratsimbazafy A-M, Raharinosy V, Rabemananjara AY, Ranaivoson HC, Razafimanjato H, Randremanana R‡, Héraud J-M‡, and Dussart P‡. Cross-sectional cycle threshold values reflect epidemic dynamics of COVID-19 in Madagascar. 2021. *Epidemics*. doi: 10.1016/j.epidem.2021.100533.
7. **Brook CE**, Northrup GR, Ehrenberg AJ, the IGI SARS-CoV-2 Testing Consortium, Doudna JA, and Boots M. Optimizing COVID-19 control with asymptomatic surveillance testing in a university environment. 2021. *Epidemics*. doi: 10.1016/j.epidem.2021.100527.
8. Albery GF, Becker DJ, Brierley L, **Brook CE**, Christofferson RC, Cohen LE, Dallas TA, Eskew EA, Fagre A, Farrell M, Glennon E, Guth S, Joseph MB, Mollentze N, Neely BA, Poisot T, Rasmussen AL, Ryan SJ, Sjödin AR, Seifert S, Sorrell EM, Carlson CJ. 2021. The science of the host-virus network. *Nature Microbiology*. doi: 10.1038/s41579-021-00652-2.
9. Ruiz-Aravena M, McKee C, Gamble A, Hudson P, Parrish CR, Bharti N, Faust C, Schountz T, Restif O, Morris A, Jax E, Dee L, Lunn T, Peel A, Munster VJ, Yinda CK, Port JR, **Brook CE**, Aguilar HC, Yeo YY, Buchholz DW, Lloyd-Smith JO, Snedden C, Gurley ES, Jones D, Kessler M, Falvo C, Crowley D, Botto G, Rynda-Applé A,

- Plowright RK. 2021. Coronaviruses in bats: Ecology, evolution, and zoonotic spillover. *Nature Reviews Microbiology*. doi: 10.1038/s41579-021-00652-2.
10. Wilkinson E, Giovanetti M, Tegally T, San JE, Lessels R, Cuadros D, Martin DP, Zekri A-RN...**Brook CE**, ... de Oliveira T. A year of genomic surveillance reveals how the SARS-CoV-2 pandemic unfolded in Africa. 2021. *Science*. doi: 10.1126/science.abj4336.
 11. Annapragada A, **Brook CE**, Luskin MS, Rahariniaina RP, Helin M, Razafinarivo O, Ralaarison AR, Randriamady HJ, Olson LE, Goodman SM, Golden CD. 2021. Evaluation of tenrec population viability and potential sustainable management under hunting pressure in northeastern Madagascar. *Animal Conservation*. doi: 10.1111/acv.12714.
 12. Ehrenberg AJ, Moehle EA, **Brook CE**, Doudna Cate AH, Witkowski LB, Sachdeva R, Hirsch A, Barry K, Hamilton JR, Lin-Shiao E, McDevitt S, Valentin-Alvarado L, Letourneau KN, Hunter L, Pestal K, Frankino PA, Murley A, Nandakumar D, Stahl EC, Tsuchida CA, Gildea H, Murdock A, Hochstrasser ML, Bardet L, Sherry C, the IGI SARS-CoV-2 consortium, Harte A, Nicolette G, Petersen M, Giannikopoulos P, Hockemeyer D, Urnov FD, Ringeisen BR, Boots M, Doudna JA. 2021. Launching a saliva-based SARS-CoV-2 surveillance testing program on a university campus. *PLoS One*: 2021. 16(5): e0251296. doi: 10.1371/journal.pone.0251296
 13. Randremamana R, Andriamandimby SF, Rakotondramanga J-M, Razanajatovo N, Mangahasimbola R, Randriambolamanantsoa T, Ranaivoson HC, Rabemananjara H, Razanajatovo I, Razafindratsimandresy R, Rabarison J, **Brook CE**, Rakotomanana F, Rabetombosoa R, Razafimanjato H, Ahyong V, Raharinosy V, Raharimanga V, Raharinantoanina S, Randrianarisoa M, Bernardson B, Randrianasolo L, Randriamampionona L, Tato CM, DeRisi JR, Dussart P, Vololoniaina M, Randriatsarafara F, Randriamanantany Z, Heraud J-M. The COVID-19 Epidemic in Madagascar: clinical description and laboratory results of the first wave, March-September 2020. *Influenza and Other Respiratory Viruses*. 2021. 00:1-12. doi: 10.22541/au.161088504.46456502/v1.
 14. Ravelomanantsoa NAF, Guth S, Andrianiaina A, Andry S, Gentles A, Ranaivoson HC, **Brook CE**. 2020. The zoonotic potential of bat-borne coronaviruses. *Emerging Topics in Life Sciences*. 4 (4): 365-381. doi: 10.1042/ETLS20200097.
 15. Gentles A, Guth S, Rozins C, **Brook CE**. 2020. A review of mechanistic models of viral dynamics in bat reservoirs for zoonotic disease. *Pathogens and Global Health*. doi: 10.1080/20477724.2020. 1833161.
 16. Rocha R, Aziz SA, **Brook CE**, Carvalho WD, Cooper-Bohannon R, Frick WF, Huang JCC, Kingston T, Lopez-Baucells A, Maas B, Mathews F, Medellin RA, Olival KJ, Peel AJ, Plowright RK, Razgour O, Rebelo H, Rodrigues L, Rossiter SJ, Russo D, Straka TM, Teeling EC, Treuer T, Voigt CC, and Webala PW. Bat conservation and zoonotic disease risk: A research agenda to prevent misguided persecution in the aftermath of COVID-19. 2020. *Animal Conservation*. doi: 10.1111/acv.12636.
 17. Olival KJ*, Cryan PM*, Amman BR, Baric RS, Blehert DS, **Brook CE**, Calisher CH, Castle KT, Coleman JTH, Daszak P, Epstein JH, Field H, Frick WF, Gilbert AT, Hayman DTS, Ip HS, Karesh WB, Johnson CK, Kading RK, Kingston T, Lorch JM, Mendendall IH, Peel AJ, Phelps KL, Plowright RK, Reeder DM, Reichard JD, Sleeman JM, Streicker DG, Towner JS, and Wang L-F. 2020. Possibility for reverse zoonotic transmission of SARS-CoV-2 to free-ranging wildlife: a case study of bats. *PLoS Pathogens*. 16(9): e1008758. doi: 10.1371/journal.ppat.1008758.
 18. Amen AM, Barry KW, Boyle JM, **Brook CE**, Choo S, Cornmesser LT, Dilworth DJ, Doudna JA[‡], Ehrenberg AJ, Fedrigo I, Friedline SE, Graham TGW, Green R, Hamilton JR, Hirsh A, Hochstrasser ML, Hockemeyer D[‡], Krishnappa N, Lari A, Li H, Lin-Shiao E, Lu T, Lyons EF, Mark KG, Martell LA, Martins ARO, McDevitt SL, Mitchell PS, Moehle EA, Naca CL, Nandakumar D, O'Brien E, Pappas DJ, Pestal K, Quach DL, Rubin BE, Sachdeva R, Stahl EC, Syed AM, Tan I-L, Tollner AL, Tsuchida CA, Tsui CK, Turkalo TK, Urnov F[‡], Warf MB, Whitney ON, Witkowski LB. 2020. Blueprint for a Pop-up SARS-CoV-2 Testing Lab. *Nature Biotechnology*. doi: 10.1038/s41587-020-0583-3
 19. **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. 2020. Accelerated viral dynamics in bat cell lines, with implications for zoonotic emergence. *eLife*. 9:e48401. doi: 10.7554/eLife.48401.
 20. **Brook CE**. 2019. A batty concept goes viral. *Nature Ecology & Evol*. doi:10.1038/s41559-019-1045-5.
 21. 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.
 22. **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.

23. **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.
24. Ranaivoson HC, Héraud JM, Goethert HK, Telford SR, Rabetafika L[±] and **Brook CE**[±]. 2019. Babesial infection in the Madagascar flying fox, *Pteropus rufus* É. Geoffroy, 1803. *Parasites & Vectors* 12(51): 1307101933. doi: 10.1186/s13071-019-3300-7.
25. **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.
26. **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.
27. Wesolowski A*, Mensah K*, **Brook CE***, Andrianafimasy 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.
28. **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.
29. Rist CL, Ngonghala CN, Garchitorena A, **Brook CE**, Ramananjato, Miller AC, Randrianariveolosia 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.onehit.2015.10.002.
30. **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.
31. **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.
32. 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.
33. 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.
34. **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 Invited Talks

- 2022 Winter Seminar Series, Dept. Microbiology and Immunopathology, Uniformed Services University.
 2021 Molecular Methods in Animal Ecology Seminar Series, Universidad Federal do Paraná, Brazil.
 2020 Bugs and Drugs: Infectious Disease Seminar Series, UCSF, San Francisco, CA.
 2019 Interdisciplinary Disease Across Scales Seminar Series, University of Georgia, Athens, GA

Research Grants

- 2022-present. **National Geographic Society Education Grant.** PI. \$25,000.
 2020-present. **Branco Weiss Science in Society Fellowship.** PI. 500,000 CHF.
 2020-present. **Loréal USA For Women in Science Fellowship.** PI. \$60,000.
 2020-2021. **Innovative Genomics Institute.** PI. \$100,000.
 2019-2021. **Bill & Melinda Gates Foundation Grand Challenges Explorations.** PI. \$100,000.
 2018-2020 **DARPA PREdicting Emerging Pathogenic Threats (PREEMPT).** co-PI with RK Plowright (lead), and 14 others. \$10,000,000.
 2017-present **National Institutes of Health, International Research in Infectious Diseases (R01).** Co-PI with P Dussart. \$625,000.

Teaching and Mentoring

- E²M²: Ecological and Epidemiological Modeling in Madagascar.** Founder/Instructor. **E2M2.org** (2016-present)
University of Chicago PhD Students: Gwen Kettenberg (2021-current); Sophia Horigan (2019-current)
U-Chicago Postdocs: Emily Rhus (2021-current); Theresa Laverty (2021-current); Katie Young (2022-current)
U-Chicago Postbaccalaureate Fellows: Freddy Gonzalez (2021-current); Yimei Li (2021-current)
University of Chicago Undergraduates: Vera Soloviev (2021-current)
University of Antananarivo Mentees: Santino Andry (2019-current); Fifi Ravelomanantsoa (2019-current); Angelo Andrianiana (2018-current); Christian Ranaivoson (2013-current)