

Bryan P. Brown

Research Scientist III, Center for Global Infectious Disease Research, Seattle Children's
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EDUCATION

- 2017 Doctor of Philosophy, Duke University, Durham, NC
Center for Genomic and Computational Biology; Nicholas School of the Environment
Dissertation: *Ecological and Evolutionary Factors Shaping Animal-Bacterial Symbioses: Insights from Insects & Gut Symbionts*
Advisor: Jennifer J. Wernegreen, PhD
- 2011 Bachelor of Science, The University of Akron, Akron, OH
Majors: Biochemistry, Biology; Minor: Spanish
Advisors: Stephen C. Weeks, PhD and John M. Senko, PhD

RESEARCH EXPERIENCE

- 2017 - Present **Research Scientist III/ Postdoctoral Fellow, Seattle Children's**
Seattle Children's Research Institute, Center for Global Infectious Disease Research, Seattle, WA
(PIs: Heather Jaspan, MD, PhD; Michael Gale Jr., PhD, and Rhea Coler, MSc, PhD)
- 2012 - 2017 **Predoctoral Fellow, Duke University**
Nicholas School of the Environment, Durham, NC (PI: Jennifer Wernegreen, PhD)
- 2009 – 2011 **Research Assistant, The University of Akron**
Department of Biology, Akron, OH
- 2010 – 2011 **Research Assistant, The University of Akron**
Department of Geosciences, Akron, OH

AWARDS AND HONORS

- 2021 – 2026 Pathway to Independence Award, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health, Department of Health and Human Services
- 2021 – 2022 Loan Repayment Program Renewal Award, Pediatric Research, National Institute of Allergy and Infectious Disease, National Institutes of Health, Department of Health and Human Services
- 2020 Research Scholarship, 4th HIV Research for Prevention Conference (HIVR4P), International AIDS Society
- 2020 - 2021 Ruth L. Kirschstein National Research Service Award Individual Postdoctoral Fellowship, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health, Department of Health and Human Services
- 2019 New Investigator Scholarship, 2020 Conference on Retroviruses and Opportunistic Infections (CROI), International Antiviral Society-USA
- 2019 - 2021 Loan Repayment Program, Pediatric Research, National Institute of Allergy and Infectious Disease, National Institutes of Health, Department of Health and Human Services
- 2019 International Scholarship, 10th International AIDS Society Conference on HIV Science, International AIDS Society
- 2018 Travel award, 4th International Workshop on Microbiome in HIV, National Institutes of Allergy and Infectious Diseases, National Institutes of Health
- 2015 - 2016 Graduate Research Opportunities Worldwide Travel Award, National Science Foundation
- 2013 - 2016 Graduate Research Fellowship, National Science Foundation
- 2011 Undergraduate Researcher of the Year, The University of Akron
- 2011 Outstanding Undergraduate Research Award, The University of Akron
- 2011 Dr. Paul Acquarone Award in Plant Sciences, The University of Akron
- 2010 Placed 1st overall, Conference on Integrated Bioscience, The University of Akron
- 2007 - 2008 Honors Recognition Scholarship, The University of Akron

RESEARCH FUNDING

Pending funding

R00HD106861 9/1/2023 – 8/31/2026
Eunice Kennedy Shriver National Institute of Child Health and Human Development
National Institutes of Health
PI: Brown
NIH Pathway to Independence Award
Title: Identifying inter-kingdom microbial determinants of altered immunity in HIV exposed infants
Description: The project utilizes integrative multiomic techniques and gnotobiotic mouse models to characterize the effects of the expanded gut virome of HIV-exposed infants on their bacterial microbiota and responses to vaccination. Role: Principal Investigator

Active funding

K99HD106861 9/1/2021 – 8/31/2023
Eunice Kennedy Shriver National Institute of Child Health and Human Development
National Institutes of Health
PI: Brown
NIH Pathway to Independence Award
Title: Identifying inter-kingdom microbial determinants of altered immunity in HIV exposed infants
Description: The project utilizes integrative multiomic techniques and gnotobiotic mouse models to characterize the effects of the expanded gut virome of HIV-exposed infants on their bacterial microbiota and responses to vaccination. Role: Principal Investigator

L40AI147257 7/1/2019 – 6/30/2022
National Institute of Allergy and Infectious Diseases
National Institutes of Health
PI: Brown
Extramural Loan Repayment Program for Pediatric Research
Title: Influence of gut virome on bacterial microbiota and vaccine responsiveness in HIV-exposed infants
Description: The project aims to characterize the effects of maternal HIV infection on infant endogenous microbial communities and their responses to vaccination. Role: Principal Investigator

Completed research funding

F32HD102290 4/1/2020 – 3/31/2023
Eunice Kennedy Shriver National Institute of Child Health and Human Development
National Institutes of Health
PI: Brown
Ruth L. Kirschstein National Research Service Award Individual Postdoctoral Fellowship
Title: Influence of gut virome on bacterial microbiota and vaccine responsiveness in HIV-exposed infants
Description: The project aims to characterize the effects of maternal HIV infection on infant endogenous microbial communities and their responses to vaccination. Role: Principal Investigator

NSF1106401 9/1/2013 – 8/31/2016
National Science Foundation
PI: Brown
NSF Graduate Research Fellowship
Title: Ecological and evolutionary forces shaping animal-bacterial interactions
Description: The goal of this study is to identify shifts in vaginal bacterial microbiota that are associated with elevated HIV susceptibility in adolescent South African women. Role: Principal Investigator

NSF1106401

8/1/2015 – 4/30/2016

National Science Foundation, United States Agency for International Development

PI: Brown

NSF Graduate Research Opportunities Worldwide, and USAID Research and Innovation Fellowship

Title: Structural and functional dynamics of vaginal microbiota associated with altered HIV susceptibility

Description: The goal of this study is to identify shifts in vaginal bacterial microbiota that are associated with elevated HIV susceptibility in adolescent South African women. Role: Principal Investigator

DUSOM1075

2/1/2016 – 1/31/2017

Duke University

PI: Wernegreen

Research Grant, Duke University School of Medicine

Title: A world within: Diversity and dynamics of bacterial communities inhabiting ants

Description: The purpose of this study is to identify mechanisms and dynamics of bacterial transmission between interacting hosts and across developmental stages. Role: Co-Investigator

DUNSOE0789

1/1/2016 – 4/30/2017

Duke University

PI: Wernegreen

SEED grant, Duke University Nicholas School of the Environment

Title: Evolutionary dynamics across the genomes of persistent gut bacterial associates

Description: This project aims to characterize the genomes of persistent gut bacteria and to identify selective pressures acting on these associates via adaptation to the gastrointestinal tract. Role: Co-Investigator.

BIBLIOGRAPHYJournal articles

- **Brown BP**, Feng, C, Tanko RF, Jaumdally SZ, Bunjun R, Dabee S, Happel A, Onono M, Nair G, Palanee-Phillips T, Scoville CW, Heller K, Nyangahu DD, Baeten JM, Bosinger SE, Burgener A, Passmore JS, Heffron R, Jaspan HB. Copper intrauterine device induces depletion of *Lactobacillus crispatus* in the female genital tract microbiota in a randomized trial. *Under revision*.
- Nyangahu DD, Courtney P, **Brown BP**, Feng C, Havyarimana E, Cohen S, Urdahl K, Jaspan HB. Shifts in gestational gut bacterial communities impact antigen-specific cellular immunity in offspring in a maternal antibody-dependent manner. *In revision at iScience*.
- Dabee S, Tanko RF, **Brown BP**, Bunjun R, Balle C, Feng, C, Konstantinus I, Jaumdally SZ, Onono M, Nair G, Palanee-Phillips T, Gill K, Baeten JM, Bekker LG, Passmore JS, Heffron R, Jaspan HB, Happel A. Female genital tract cytokine signatures and vaginal microbiota of African women using intramuscular DMPA versus NET-EN hormonal contraceptives: a prospective cohort analysis. *Frontiers in immunology*. 2021: 5296. PMID34956191
- Larsen S, Berube B, Pecor T, Cross E, **Brown BP**, Williams B, Johnson E, Qu P, Baldwin SL, Coler RN. Qualification of ELISA and neutralization methodologies to measure SARS-CoV-2 humoral immunity in human clinical samples. *Journal of immunological methods* 2021 Dec 1;499:113160. PMID34599915
- **Brown BP**, Wendoh J, Chopera D, Havyarimana E, Jaumdally S, Nyangahu DD, Gray CM, Martin DP, Varsani A, Jaspan HB. crAssphage genomes identified in fecal samples of an adult and infants with evidence of positive genomic selective pressure within tail protein genes. *Virus Res*. 2020 Oct 30;198219. PMID33137401
- Nyangahu DD, Darby M, Havyarimana E, **Brown BP**, Horsnell W, Jaspan HB. Preconception helminth infection alters offspring microbiota and immune subsets in a mouse model. *Parasite Immunology*. 2020 Apr 11:e12721. PMID32277499
- **Brown BP**, Jaspan HB. Compositional analyses reveal correlations between taxon-level gut bacterial abundance and peripheral T cell marker expression in African infants. *Gut microbes*. 2019 Jul 28:1-8. PMID31347944
- **Brown BP**, Wernegreen JJ. Genomic erosion and extensive horizontal gene transfer in gut-associated *Acetobacteraceae*. *BMC genomics*. 2019 Dec;20(1):472. PMID31182035.
- Wood LF*, **Brown BP***, Lennard K, Karaoz U, Passmore JS, Hesseling AC, Edlefsen PT, Mulder N, Brodie EL, Sodora DL, Jaspan HB. Feeding related gut microbial composition associates with peripheral T cell

activation and mucosal gene expression in African infants. Clin Infect Dis 2018 Sep 28;67(8):1237-1246. PMID29659737. ***co-first authors.**

- Nyangahu D, Lennard KS, **Brown BP**, Darby MG, Wendoh JM, Havyarimana H, Smith P, Butcher J, Stintzi A, Mulder N, Horsnell W, Jaspan HB. Disruption of maternal gut microbiota during gestation alters offspring immunity. Microbiome 2018 Jul 7;6(1):124. PMID29981583. PMC6035804.
- Ho NT, Li F, Lee-Sarwar KA, Tun HM, **Brown BP**, Pannaraj PS, Bender JM, Azad MB, Thompson AL, Weiss ST, Azcarate-Peril MA, Litonjua AA, Kozyrskyj AL, Jaspan HB, Aldrovandi GM, Kuhn L. Meta-analysis of effects of exclusive breastfeeding on infant gut microbiota across populations. Nat Commun 2018 Oct 9;9(1):4169. PMID30301893. PMC6177445.
- **Brown BP** and Wernegreen JJ. Deep divergence and rapid evolutionary rates in gut-associated Acetobacteraceae of ants. BMC Microbiol 2016 Jul 11;16(1):140. PMID27400652. PMC4939635.
- **Brown BP**, Astrop TI, Weeks SC. Post-larval developmental dynamics of the Spinicaudatan (Branchiopoda: Diplostraca) carapace. Journal of Crustacean Biology 2014 34 (5), 611-617.
- Astrop, TI, Park, LE, **Brown, BP**, and Weeks, SC. Sexual discrimination at work: Spinicaudatan 'Clam Shrimp' (Crustacea: Branchiopoda) as a model organism for the study of sexual system evolution. Palaeontologia Electronica 2012 Vol. 15, Issue 2;20A,15p.
- 1. **Brown BP**, Brown SR and Senko JM. Microbial communities associated with wet flue gas desulfurization systems. Front Microbiol 2012 3:412. PMID23226147. PMC3510643.

Cited preprints

- **Brown BP**, Wendoh J, Chopera D, Havyarimana E, Jaumdally SZ, Nyangahu DD, Gray C, Martin DP, Varsani A, Jaspan HB. crAssphage abundance and genomic selective pressure correlate with altered bacterial abundance in the fecal microbiota of South African mother-infant dyads. bioRxiv. 2019 Jan 1:582015.

Platform presentations

- **Brown BP**, Maust BM, Happel AU, Havyarimana E, Jaumdally SZ, Varsani A, Jaspan HB. (2022, March). Inter-kingdom microbial determinants alter immunity and vaccine responsiveness in HIV exposed infants. Pacific Northwest Research Institute Seminar Series, Seattle, WA, USA.
- **Brown BP**, Wendoh J, Chopera D, Havyarimana E, Jaumdally SZ, Martin DP, Varsani A, Jaspan HB. (2019, July). Maternal HIV infection alters the community composition and dynamics of the enteric microbiome of associated infants. 10th International AIDS Society Conference on HIV Science, Mexico City, Mexico.
- Balle C, Lennard K, Konstantinus I, Jaumdally S, Esra R, Gasper M, **Brown BP**, Karaoz U, Gill K, Myer L. (2018, October). Hormonal Contraception Induced Changes to the Female Genital Microbiota in South African Adolescents: A Randomized, Crossover Trial. HIV Research for Prevention. Madrid, Spain.
- **Brown BP**, Jaspan HB, Study Team I. (2018, October). A compositional transform reveals HIV exposure induced shifts in the fecal microbiota and vaccine responsiveness of Nigerian infants. 4th International Workshop on Microbiome in HIV Pathogenesis, Prevention and Treatment. Washington, DC, USA.
- **Brown BP**, Jaspan HB. (2018, September). A penalized compositional transform reveals shifts in the fecal microbiota of HIV exposed Nigerian infants. Fred Hutchinson Microbiome Research Initiative Biennial Symposium. Seattle, WA, USA.

Poster presentations

- **Brown BP**, et al. (2021, January). HIV exposure alters the fecal microbiome in Nigerian infants. 4th HIV Research for Prevention Conference (HIVR4P). Virtual.
- **Brown BP**, et al. (2020, March). Contraceptive use induces durable shifts in the female genital-tract microbiota. 2020 Conference on Retroviruses and Opportunistic Infections (CROI). Boston, MA, USA.
- **Brown BP**, Jaspan HB. (2018, October). A compositional transform reveals HIV exposure induced shifts in the fecal microbiota and vaccine responsiveness in Nigerian infants. HIV Research for Prevention. Madrid, Spain.
- **Brown BP**, Varsani A, Jaspan HB. (2018, October). Altered composition and elevated diversity in the enteric virome of HIV exposed uninfected South African infants. HIV Research for Prevention. Madrid, Spain.
- **Brown BP**, Jaspan HB, Study Team I. (2018, April). HIV exposure alters the fecal microbiome and efficacy of oral polio vaccine in Nigerian infants. 25th International HIV Dynamics & Evolution. Leavenworth, WA, USA.

- **Brown BP**, Senko J. (2012, June). Microbial Communities Associated With Flue Gas Desulfurization Systems. American Society for Microbiology: 112th General Meeting. San Francisco, CA, USA.
- **Brown BP**, Weeks S. (2011, June). Morphometrics and Ontogenetics: Evolutionary Dynamics of the Spinicaudatan 'Clam Shrimp'. The Evolution Conference. Norman, OK, USA.

TEACHING AND MENTORING

Courses taught

One Health: Philosophy to Practical Integration of Human, Animal, and Environmental Health

Duke University, Global Health Institute

Role: Teaching Assistant, Co-Instructor

Description: This graduate-level, interdisciplinary course will introduce the concept of One Health as an increasingly important approach to a holistic understanding of the promotion and maintenance of human, animal, and environmental health.

Applied Data Analysis for Environmental Sciences

Duke University, Nicholas School of the Environment

Role: Teaching Assistant, Laboratory Instructor

Description: This graduate-level course provides an introduction to statistical analysis and modeling for applied problems in the environmental sciences. All labs are instructed using the R statistical framework.

Molecular Ecology

Duke University, Department of Biology

Role: Teaching Assistant, Co-Instructor

Description: This graduate-level course explores key questions in molecular ecology, a field that employs molecular tools to investigate ecological processes within natural populations and communities. While genetic techniques are central to this discipline, the course is not a methods class per se. Rather, emphasis is placed on fundamental principles and predictions from ecological and evolutionary theory, as well as historical approaches and precedents.

Genetics and Evolution

Duke University, Department of Biology

Role: Teaching Assistant, Laboratory Instructor

Description: This undergraduate-level course provides an introduction to principles of genetics and evolution. Includes Mendelian and non-Mendelian inheritance, quantitative genetics, genetic mapping, evidence for evolution, natural selection, genetic drift, kin selection, speciation, molecular evolution, and phylogenetic analysis.

Mentoring

Advising: Research

- 1 Master's student
- 8 Undergraduate students

OTHER

Reviewing activities

Journals:

PLOS ONE

Clinical and Translational Medicine

Symbiosis

Gut Microbes

Outreach

2012 Environmental Science Instructor, Lakewood Elementary School, Durham, NC

R packages developed

pico: a suite of compositional data analysis functions targeted for marker gene (16S/18S) microbiome datasets, including a novel transformation that couples an L1 penalized matrix decomposition to the isometric log ratio transformation.

microfiltR: identifies and corrects for multiple sources of contamination (exogenous and cross) in compositional marker gene surveys. Available at <https://github.com/itsmisterbrown/microfiltR>