

## Bryan P. Brown

Postdoctoral Fellow, Center for Global Infectious Disease Research, Seattle Children's  
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330.933.2112

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## EDUCATION

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- 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 AND FELLOWSHIPS

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### Research experience

- 2017 - Present    **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)
- 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

### Fellowships

- 2013 - 2017    **Graduate Research Fellow, National Science Foundation**  
Duke University, Durham, NC
- 2015 - 2016    **Research and Innovation Fellow, United States Agency for International Development**  
Duke University, Durham, NC, and University of Cape Town, Cape Town, South Africa

## AWARDS AND HONORS

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- 2019      New Investigator Scholarship, 2020 Conference on Retroviruses and Opportunistic Infections (CROI), International Antiviral Society-USA
- 2019 - Present    Loan Repayment Program, Pediatric Research, 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, 4<sup>th</sup> 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
- 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
- 2007 - 2008    Presidential Scholarship, The University of Akron

## RESEARCH SUPPORT

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### Completed Research Support

#### **DUNSOE0789**

1/1/2016 – 5/1/2017

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.

#### **DUSOM1075**

2/1/2016 – 2/1/2017

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

#### **NSF1106401**

8/1/2015 – 5/1/2016

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

## PUBLICATIONS

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### Articles in Peer-Reviewed Journals

1. **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
2. **Brown BP**, Wernegreen JJ. Genomic erosion and extensive horizontal gene transfer in gut-associated *Acetobacteraceae*. *BMC genomics*. 2019 Dec;20(1):472. PMID31182035.
3. 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.**
4. 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.
5. 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.
6. **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.
7. **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.
8. 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.

9. **Brown BP**, Brown SR and Senko JM. Microbial communities associated with wet flue gas desulfurization systems. *Front Microbiol* 2012 3:412. PMID23226147. PMC3510643.

#### Preprints

1. **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.

## **ACADEMIC PRESENTATIONS**

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#### Conference presentations

1. **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.
2. 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.
3. **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.
4. **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.

#### Conference posters

1. **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.
2. **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.
3. **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.
4. **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.
5. **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.
6. **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**

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#### 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
- 7 Undergraduate students

## **SERVICE AND OUTREACH**

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### Reviewing activities

#### **Journals:**

PLOS ONE

Clinical and Translational Medicine

### Outreach

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

## **SOFTWARE**

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### R packages

**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>