Bryan P. Brown

Postdoctoral Fellow, 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 AND FELLOWSHIPS

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

2009 **Visiting Researcher, Australian Museum**
Sydney, Australia

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

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, 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

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

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

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, Edlefson 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

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

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

Reviewing activities

Journals:
PLOS ONE
Clinical and Translational Medicine

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

SOFTWARE

R packages

pico: enables robust statistical analysis and modeling of compositional microbiome datasets by coupling 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. https://github.com/itsmisterbrown/microfiltR