Brandon "Bubba" Brooks

University of California Berkeley
Department of Plant and Microbial Biology
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Education:

Ph.D. in Plant and Microbial Biology in progress (expected Fall 2016)
University of California Berkeley, Department of Plant and Microbial Biology, Berkeley, CA
Advisor: Dr. Jillian F. Banfield

B.S. in Microbiology and Molecular Genetics (2009)
Oklahoma State University, Department of Microbiology and Molecular Genetics
Advisor: Dr. Robert V. Miller

Research Interests:

During my thesis:
Humans spend approximately 90% of their time indoors, yet we know very little about the microbial ecosystem of the built environment. I'm interested in studying microbes thriving in the built environment and how they affect the human microbiome, or the microbes living on and in people. By leveraging high-throughput sequencing and other "omics" technologies, I aim to characterize these interactions by using infants housed in a neonatal intensive care unit as a model system. Results from my thesis will have broad applications, from developing a better understanding of how microbes thrive and are transmitted in indoor environments, to answering fundamental questions concerning human gut colonization.

Up next?:
Generally, I'd like to take the informatics tools and metagenomics perspective I've learned from the Banfield lab and apply them in a more clinical setting. This could take several forms, from studying dysbiosis in IBD or obesity, to environments outside the gut.

Major Skills:

Microbial community analysis, metagenomics (whole genome recovery from complex communities at the strain level, using multiple platforms), infant gut microbiome development, neonatal intensive care unit microbiology (nosocomial infection surveillance), quantification via ddPCR, metaproteomics, metatranscriptomics, phylogenetic analyses, 16S surveys (on multiple platforms), R code, Ruby scripting, project design and management

Selected Publications:

1. Brooks B, Firek BA, Miller CS, Sharon I, Thomas BC, Baker R, Morowitz MJ, Banfield JF: **Microbes in the neonatal intensive care unit resemble those found in the gut of premature infants**. *Microbiome* 2014, **2**:1.

2. Brooks B, Mueller RS, Young JC, Morowitz MJ, Hettich RL, Banfield JF: **Strain-resolved microbial community proteomics reveals simultaneous aerobic and anaerobic function during gastrointestinal tract colonization of a preterm infant.** *Front Microbiol* 2015, **6**(July):654.

All Publications:

1. Brooks B, Mueller RS, Young JC, Morowitz MJ, Hettich RL, Banfield JF: **Strain-resolved microbial community proteomics reveals simultaneous aerobic and anaerobic function during gastrointestinal tract colonization of a preterm infant.** *Front Microbiol* 2015, **6**(July):654.

2. Young JC, Pan C, Adams RM, Brooks B, Banfield JF, Morowitz MJ, Hettich RL: **Metaproteomics reveals functional shifts in microbial and human proteins during a preterm infant gut colonization case**. *Proteomics* 2015, **15**:3463–3473.

3. Raveh-Sadka T, Thomas BC, Singh A, Firek B, Brooks B, Castelle CJ, Sharon I, Baker R, Good M, Morowitz MJ, Banfield JF: **Gut bacteria are rarely shared by co-hospitalized premature infants, regardless of necrotizing enterocolitis development**. *Elife* 2015, **4**:1–25.

4. Brooks B, Firek BA, Miller CS, Sharon I, Thomas BC, Baker R, Morowitz MJ, Banfield JF: **Microbes in the neonatal intensive care unit resemble those found in the gut of premature infants**. *Microbiome* 2014, **2**:1.

Research Experiences:

Joined the Banfield lab, University of California Berkeley, principle investigator Dr. Jillian Banfield, Thesis (working) title: *The interaction of built environment microbes with the human microbiome* (Summer 2011-current).

Plant and Microbial Biology research rotation #3, University of California Berkeley, principle investigator Dr. Jillian Banfield, *Metagenomic Assembly of Genomes from Gut*

Colonizing Microbes in Low Birth Weight, Premature Neonates (Spring 2011).

Plant and Microbial Biology research rotation #2, Lawrence Berkeley National Labs, principal investigator Dr. Janet Jansson, *Methods Comparison for Genomic DNA Extraction from Human Fecal Samples* (Spring 2011).

Plant and Microbial Biology research rotation #1, University of California Berkeley, principle investigator Dr. Michiko Taga, *Exploring Alternative Corrinoid Transport in Enteric Microorganisms* (Fall 2010).

Center for Disease Control and Prevention, Oak Ridge Institute for Science and Education Fellowship, Atlanta, Georgia, principal investigator Dr. Gregory M. Polzin, *Tar, Nicotine, and Carbon Monoxide Yields of Make-Your-Own Cigarettes* (Summer 2009).

Wentz Research Grant, Oklahoma State University, Stillwater, Oklahoma, principal investigator Dr. Robert V. Miller, *Pablo Picasso and Henry Moore meet Louis Pasteur* (2008-2009).

Research Abroad, University of Cardiff, Cardiff, Wales, United Kingdom, principal investigator Dr. Martin Day, *Small Colony Variants of Staphylococcus aureus* (Summer 2008).

Wentz Research Grant, Oklahoma State University, Stillwater, Oklahoma, principal investigator Dr. Robert V. Miller, *The Effect of Tanning Beds on the Normal Microbial Flora of the Human Skin* (2007-2008).

Presentations (presenter underlined):

Oral Presentations:

Brooks, B., Bhangar, S., Firek, B.A., Thomas, B.C., Baker, R., Morowitz, M.J., Banfield, J.F. *Accounting for cells: absolute quantification of abiotic and biotic particulate in the neonatal intensive care unit (NICU)*, Department of Integrative Biology Seminar Series, University of Colorado Denver, Denver, CO (June 2014).

Brooks, B., Firek, B.A., Miller, C.S., Thomas, B.C., Baker, R., Morowitz, M.J., Banfield, J.F. *Microbes in the neonatal intensive care unit are also found in the gut of premature infants*, Plant and Microbial Biology Department Seminar Series, University of California Berkeley, Berkeley, CA (September 2013).

Brooks, B., Firek, B.A., Miller, C.S., Thomas, B.C., Baker, R., Morowitz, M.J., Banfield, J.F. *How hospital microbes can influence gut development in NICU housed infants*, Neonatal Intensive Care Unit research briefing, continuing education units seminar, Magee-Womens Hospital of UPMC, University of Pittsburgh Medical Center, Pittsburgh, PA (August 2013).

Brooks, B., Firek, B.A., Miller, C.S., Thomas, B.C., Morowitz, M.J., Banfield, J.F. *Microbes in the neonatal intensive care unit are also found in the gut of premature infants*, Alfred P. Sloan Foundation Microbiology of the Built Environment Annual Meeting, Boulder, CO (May 2013).

Brooks, B., Firek, B.A., Miller, C.S., Thomas, B.C., Banfield, J.F., Morowitz, M.J. *The Role of the Hospital Room: How Microbes Found in the Neonatal Intensive Care Unit Influence Gut Colonization of Premature Infants*, Surgical Infection Society's 33rd Annual Meeting, Las Vegas, NV (April 2013).

Brooks, B., Firek, B.A., Miller, C.S., Thomas, B.C., Morowitz, M.J., Banfield, J.F. *Microbes in the neonatal intensive care unit are also found in the gut of premature infants*, Microbiology Student Group X1V Annual Symposium, University of California Berkeley, Berkeley, CA (April 2013).

Hettich, R., Young, J., **Brooks, B.**, Verberkmoes, N.C., Pan C., Mueller, R., Thomas, B., Banfield, J., Morowitz, M., *Metaproteomics Reveals Time-Dependent Functional Shifts in Human and Microbial Proteins in the Premature Infant Gut Microbiome*, General Meeting of the American Society for Microbiology, San Francisco, CA (June 2012).

Brooks, B., Miller, R.V., *Tar, Nicotine, and Carbon Monoxide Yields from Make-Your-Own Cigarettes*, Oklahoma Louis Stokes Alliance for Minority Participation in the Sciences, Technology, Engineering, and Mathematics (OK-LSAMP-STEM) 15th Annual Research Symposium (October 2009).

Brooks, B., Miller, R.V., *Antibiotic Resistance in Small Colony Variants of MRSA*, Oklahoma Louis Stokes Alliance for Minority Participation in the Sciences, Technology, Engineering, and Mathematics (OK-LSAMP-STEM) 14th Annual Research Symposium (October 2008).

Brooks, B., Miller, R.V., *Small Colony Variants of MRSA*, Native Americans in Biological Sciences 5th Annual Research Symposium, Oklahoma State University, Stillwater, Oklahoma (September 2008).

Brooks, B., Miller, R.V., *Effects of Artificial Tanning on the Normal Microbial Flora of the Human Skin*, Fall Technical Meeting of the Oklahoma Academy of Science, Tulsa Community College, Tulsa, OK (November 2007).

Poster Presentations:

Brooks, B., Bhangar, S., Baker, R., Firek, B.A., Thomas, B.C., Tang, X., Morowitz, M.J., Nazaroff, W.W., Banfield, J.F. *Transmission of neonatal intensive care unit microbes to the gut of premature infants*, 5th International Human Microbiome Congress, Luxembourg City, Luxembourg (March 2015).

Brooks, B., Firek, B.A., Miller, C.S., Sharon, I., Thomas, B.C., Baker, R., Morowitz, M.J.,

Banfield, J.F. *Microbes in the neonatal intensive care unit resemble those found in the gut of premature infants*, University of California Berkeley Plant and Microbial Biology Departmental retreat, Pacific Grove, CA (September 2014).

Brooks, B., Firek, B.A., Miller, C.S., Sharon, I., Thomas, B.C., Baker, R., Morowitz, M.J., Banfield, J.F. *Microbes in the neonatal intensive care unit resemble those found in the gut of premature infants*, Northern California American Society for Microbiology Spring Meeting, Pleasanton, CA 1st Place (March 2014).

Brooks, B., Firek, B.A., Miller, C.S., Thomas, B.C., Morowitz, M.J., Banfield, J.F. *Transmission Patterns of Neonatal Intensive Care Unit Microbes to the Infant Gut*, Northern California American Society for Microbiology Spring Meeting, Pleasanton, CA 1st Place (March 2013).

Brooks, B., Firek, B.A., Miller, C.S., Thomas, B.C., Morowitz, M.J., Banfield, J.F. *Transmission Patterns of Neonatal Intensive Care Unit Microbes to the Infant Gut*, General Meeting of the American Society for Microbiology, San Francisco, CA, Poster Presentation (June 2012).

Brooks, B., Lamendella, R., Piceno, Y., Jansson, J., *Methods Comparison for Genomic DNA Extraction from Human Fecal Samples*, Bacterial Genetics and Ecology Conference (BAGECO '11), Corfu, Greece, Poster Presentation (May 2011).

Brooks, B., Miller, R.V., *Effects of Tanning Beds on the Normal Microbial Flora of the Human Skin*, Mexican American Engineers and Scientists 35th Annual National Symposium, Las Vegas, NV 3rd Place (November 2009).

Brooks, B., Miller, R.V., *Pablo Picasso and Henry Moore meet Louis Pasteur*, Society for the Advancement of Hispanics/Chicanos and Native Americans in Science (SACNAS) National Conference, Dallas, TX (October 2009).

Brooks, B., Miller, R.V., *Pablo Picasso and Henry Moore meet Louis Pasteur*, Wentz Spring Research Symposium, Oklahoma State University, Stillwater, Oklahoma (April 2009).

Brooks, B., Miller, R.V., *Effects of Tanning Beds on the Normal Microbial Flora of the Human Skin*, New England Science Symposium, Harvard Medical School, Boston, Massachusetts, Ruth and William Silen, MD Award, Honorable Mention (April 2009).

Brooks, B., Miller, R.V., *Pablo Picasso and Henry Moore meet Louis Pasteur*, Research Week, Oklahoma State University, Stillwater, Oklahoma (February 2009).

Brooks, B., Miller, R.V., *Effects of Tanning Beds on the Normal Microbial Flora of the Human Skin*, Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) National Conference, Salt Lake City, Utah (October 2008).

Brooks, B., Miller, R.V., *Effects of Tanning Beds on the Normal Microbial Flora of the Human*

Skin, Wentz Spring Research Symposium, Oklahoma State University, Stillwater, Oklahoma (April 2008).

Brooks, B., Miller, R.V., *Effects of Artificial Tanning Beds on the Normal Microbial Flora of the Human Skin*, Research Week, Oklahoma State University, Stillwater, Oklahoma (February 2008).

Membership in Professional Organizations:

American Society for Microbiology (2010-present)
Society for the Advancement of Hispanics/Chicanos and Native Americans in Science (2008-2014)
Native Americans in the Biological Sciences (2008-2009)
Louis Stokes Alliance for Minority Participation in Science, Technology, Engineering, and Mathematics (2008-2009)
Mexican American Engineers and Scientists (2008-2009)
Oklahoma Academy of Science (2007-2009)

Honors and Awards:

National Science Foundation Graduate Research Fellowship (2010-2015).

Sponsored Projects for Undergraduate Research (SPUR) Mentor, University of California Berkeley, Berkeley, California (2014-2015).

Northern California American Society for Microbiology Spring Meeting, Pleasanton, CA 1st Place Poster Award (March 2014)

Northern California American Society for Microbiology Spring Meeting, Pleasanton, CA 1st Place Poster Award (March 2013)

University of California Berkeley Chancellor's Fellowship for Graduate Study, Awarded to less than four percent of entering doctoral students (2010-2012).

Mexican American Engineers and Scientists 35th Annual National Symposium, Las Vegas, NV 3rd Place Poster Award (2009).

University of California Berkeley EDGE Program, University of California Berkeley, Berkeley, California (2009).

New England Science Symposium, Harvard Medical School, Boston, Massachusetts, Ruth and William Silen, MD Award, Honorable Mention (2009).

Educational Program of the Year Award, Oklahoma State University, Stillwater, Oklahoma, *Scones and Scholars* (2009).

Hunter Stone Gambill Scholarship for Native Americans in Human Health Research, Oklahoma State University (2009).

Outstanding Senior Award-Top Microbiology Student, Oklahoma State University, Stillwater, OK (2009).

Departmental Honors Award in Microbiology, Oklahoma State University, Stillwater, OK (2009).

International Endorsement from the Honors College, Oklahoma State University, Stillwater, OK (2009).

Phi Kappa Phi Honor Society-Top 10% of Students at OSU, Oklahoma State University, Stillwater, OK (2008).

Founding Member of Beta Beta Beta Honor Society for the Life Sciences, Oklahoma State University, Stillwater, OK (2008).

Sigma Alpha Lambda National Leadership and Honors Association (2008-2009).

Wentz Travel Scholarship, University of Cambridge Study Abroad, Cambridge, England, United Kingdom (Summer 2008).

Study Abroad Scholarship, Oklahoma State University, Stillwater, OK (2008).

Alpha Epsilon Delta-Pre Medical Honor Society, Oklahoma State University, Stillwater, OK (2007-2008).

Golden Key International Honour Society (2007-present).

Magna Cum Laude-The National Scholars Honor Society (2007-present).

Iota Kappa-Sophomore Level Honor Society (2006-2007).

National Society of Collegiate Scholars (2006-present).

Academic Excellence Scholarship, Oklahoma State University, Stillwater, OK (2005-2009).

President or Dean’s Honor Roll, Oklahoma State University, Stillwater, OK (2005-2009).

Work Experience:

Graduate Student Instructor for PMB 13 *Genetic Revolutions*, University of California Berkeley, Berkeley, CA (2014).

Graduate Student Instructor for PMB 112L *Introduction to Microbiology Laboratory*, University of California Berkeley, Berkeley, CA (2011).

Berger des Vélos, Fat Tire Bike Tours Paris, Paris, France (2010).

Undergraduate Researcher for Native Americans in Biological Research, Oklahoma State University, Stillwater, Oklahoma, 15 hours per week (2007-2009).

Resident Advisor, Oklahoma State University, Stillwater, Oklahoma, 26 hours per week (2006-2009).

Nehi Leader-Leadership Through Community Service, New Life Ranch, Colcord, OK (Summer 2006 and 2007).

Mentorship:

Jennifer Yip, trained 2016-present, expected graduation from UC Berkeley in 2018.

Karina Soenjoyo, trained in 2015, attending Duke-NUS Medical School Fall 2016.

Sophia Riemer, trained in 2015, currently the Operations Director at Sprouts Cooking Club 2015-present.

Dylan Dahan, trained in 2014, currently a PhD candidate at University of Oxford 2014-present.

Other Undergraduate Memberships and Activities:

Oklahoma Intercollegiate Legislature Delegate, Capital Building, Oklahoma City, OK (2007).

Member, American Medical Student's Association (2006-2007).

Cowboy Cousins-International Student Mentor, Oklahoma State University, Stillwater, OK (2007-2008).

Supreme Court Justice, Student Government Association, Oklahoma State University, Stillwater, OK (2005-2009).

Founder of Beta Upsilon Chi Fraternity, President and Chaplain, Oklahoma State University, Stillwater, OK (2005-2008).

President's Leadership Council Facilitator-Leader of the Top 100 OSU Freshmen, Oklahoma State University, Stillwater, OK (2005-2009).