

HEATHER D. BEAN

ASSOCIATE PROFESSOR • ARIZONA STATE UNIVERSITY • SCHOOL OF LIFE SCIENCES

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EDUCATION

- 2002 - 2008 **Doctor of Philosophy in Chemistry**
Georgia Institute of Technology, Atlanta, GA
Dissertation: Prebiotic Synthesis of Nucleic Acids; *Advisor:* Nicholas V. Hud, PhD
- 1995 - 1999 **Bachelor of Science in Chemistry, Biochemistry track**
Georgia Institute of Technology, Atlanta, GA
Summa cum Laude

RESEARCH & EMPLOYMENT HISTORY

- 2022 - present **Associate Professor**, Biomedicine & Biotechnology, School of Life Sciences, Arizona State University, Tempe, AZ
- 2015 - 2022 **Assistant Professor**, Biomedicine & Biotechnology, School of Life Sciences, Arizona State University, Tempe, AZ
- 2013 - 2015 **Carol Basbaum Cystic Fibrosis Foundation Postdoctoral Fellow**, Thayer School of Engineering Dartmouth College, Hanover, NH; *Advisor:* Jane E. Hill, PhD
- 2009 - 2013 **Postdoctoral Fellow**, School of Engineering, University of Vermont, Burlington, VT; *Advisor:* Jane E. Hill, PhD
- 2008 - 2009 **Postdoctoral Research Associate**, School of Chemical Engineering, Texas A&M University, College Station, TX; *Advisor:* Thomas K. Wood, PhD
- 2003 - 2008 **Graduate Research Assistant**, School of Chemistry & Biochemistry, Georgia Institute of Technology, Atlanta, GA; *Advisor:* Nicholas V. Hud, PhD
- 2003 - 2006 **Graduate Student Assistant**, Bioanalytical Mass Spectrometry Center, Georgia Institute of Technology, Atlanta, GA
- 2002 - 2003 **Graduate Teaching Assistant**, Biochemistry Lab I, II, Georgia Institute of Technology, Atlanta, GA
- 1999 - 2002 **Associate Quality Analyst**
Merck & Co., Inc., Albany, GA

SELECTED HONORS, POSITIONS & AWARDS

- 2022 The Graduate College Outstanding Faculty Mentor Award, Doctoral Mentor Finalist
- 2021 - present Faculty Mentor, ASU Grand Challenges Scholars Program
- 2020 The College of Liberal Arts and Sciences Teaching Award, Finalist
- 2017 - present Honors Faculty, Barrett, The Honors College, Arizona State University
- 2020 - present Scialog Fellow, Microbiome, Neurobiology, and Disease Initiative
- 2017 Packard Foundation Research Award, School of Life Sciences Nominee
- 2016 Blavatnik Award for Innovation in the Life Sciences, Arizona State University Nominee
- 2014 Genzo Shimadzu Best Oral Presentation Award, 11th GC×GC Symposium, Italy
- 2014 Emerald Award for Service to the Green Mountain Section of the ACS
- 2012 Carol Basbaum Memorial Research Fellow, Cystic Fibrosis Foundation
- 2011 NACFC Junior Investigator Best Abstract in Basic Science Award, Finalist
- 2010 American Chemical Society Younger Chemist Committee Leadership Award, Runner-up
- 2007 Graduate Student Award, School of Chemistry & Biochemistry, Georgia Tech
- 2006 Suddath Award, Parker H. Petit Institute of Bioengineering and Biosciences
- 2003 Outstanding Performance as a Graduate Teaching Assistant Award
- 1999 Analytical Chemistry Undergraduate Achievement Award
- 1999 Texaco Scholarship
- 1998 American Institute of Chemists Foundation Student Award
- 1996 National Collegiate Natural Sciences Award

PUBLICATIONS

ASU Trainees: ^UUndergraduate, ^GGraduate, ^BPost-Baccalaureate

Corresponding Author(s); *Co-First authors

Bean, HD – Total citations ([Google Scholar](#); 6/23/2022): 1501; h-index: 19; i10-index: 23

Peer Reviewed Journal Articles

29. Jennifer Barrila, Jiseon Yang, Karla P. Franco Meléndez, Shanshan Yang, **Trenton J. Davis^G**, Bruce J. Aronow, **Heather D. Bean**, Richard R. Davis, Rebecca J. Forsyth, C. Mark Ott, Sandhya Gangaraju, Bianca Y. Kang, Brian Hanratty, Seth D. Nydam, Eric A. Nauman, Wei Kong, Jason Steel, Cheryl A. Nickerson. (2022) Spaceflight analogue culture enhances the host-pathogen interaction between *Salmonella* and a 3-D biomimetic intestinal co-culture model. *Frontiers in Cellular and Infection Microbiology*, **12**, 705647.
28. **Emily A. Higgins Keppler^G**, Heather L. Mead, Bridget M. Barker, **Heather D. Bean**. (2021) Life cycle dominates the volatilome character of dimorphic fungus *Coccidioides* spp. *mSphere*. **6**, e00040-21.
27. **Trenton J. Davis^G**, **Ava V. Karanjia^U**, **Charity N. Bhebhe^U**, **Sarah B. West^U**, Matthew Richardson, **Heather D. Bean**. (2020) *Pseudomonas aeruginosa* volatilome characteristics and adaptations in chronic cystic fibrosis lung infections. *mSphere*. **5**, e00843-20.
26. **Carrie L. Jenkins^G**, **Heather D. Bean**. (2020) Dependence of the staphylococcal volatile metabolome composition on microbial nutrition. *Metabolites*. **10**, 347.
25. Jarrett Eshima, **Trenton J. Davis^G**, **Heather D. Bean**, John Fricks, Barbara S. Smith. (2020) A metabolomic approach for predicting circadian changes in cortisol. *Metabolites*. **10**, 194.
24. Ghazal Ebadzadsahrai, **Emily A. Higgins Keppler^G**, Scott Soby, **Heather D. Bean**. (2020) Inhibition of fungal growth and induction of a novel volatilome in response to *Chromobacterium vaccinii* volatile organic compounds. *Frontiers in Microbiology*. **11**, 1035.
23. Heather L. Mead, Chandler C. Roe, **Emily A. Higgins Keppler^G**, Marley C. Caballero Van Dyke, Klaire L. Laux, Aubrey L., Funke, Karis J. Miller, **Heather D. Bean**, Jason W. Sahl, Bridget M. Barker. (2020) Defining critical genes during spherule remodeling and endospore development in the fungal pathogen *Coccidioides posadasii*. *Frontiers in Genetics*. **11**, 483.
22. Andrea Hahn, Katrine L. Whiteson, **Trenton J. Davis^G**, Joann Phan, Iman Sami, Anastassios C. Koumbourlis, Robert J. Freishtat, Keith A. Crandall, **Heather D. Bean**. (2020) Longitudinal associations of the cystic fibrosis airway microbiome and volatile metabolites: A case study. *Frontiers in Cellular and Infection Microbiology*. **10**, 174.
21. **Carrie L. Jenkins^G**, **Heather D. Bean**. (2020) Influence of media on the differentiation of *Staphylococcus* spp. by volatile compounds. *Journal of Breath Research*. **14**, 016007.
20. Jarrett Eshima, Stephanie Ong, **Trenton J. Davis^G**, Christopher Miranda, Devika Krishnamurthay, Abigail Nachtsheim, Christopher Plaiser, John Stuffken, John Fricks, **Heather D. Bean**, Barbara S. Smith. (2019) Monitoring changes in the healthy female metabolome across the menstrual cycle using GC×GC-TOFMS. *Journal of Chromatography B*. **1121**, 48-57.
19. Mavra Nasir, **Heather D. Bean**, Agnieszka Smolinska, Christiaan A. Rees, Edith Zemanick, Jane E. Hill. (2018) Volatile molecules from bronchoalveolar lavage fluid can “rule-in” *Pseudomonas aeruginosa* and “rule-out” *Staphylococcus aureus* infection in cystic fibrosis patients. *Scientific Reports*. **8**, 826.
Featured in [Plenary Session I](#) of the North American Cystic Fibrosis Conference, Oct 19, 2018
18. Lawrence A. Adutwum, A. Paulina de la Mata, **Heather D. Bean**, Jane E. Hill, James J. Harynuk. (2017) Estimation of start and stop numbers for cluster resolution feature selection algorithm; An empirical approach using null distribution analysis of Fisher ratios. *Analytical and Bioanalytical Chemistry*. **409**, 6699-6708.
17. **Heather D. Bean***, Christiaan A. Rees*, Jane E. Hill. (2016) Comparative analysis of the volatile metabolomes of *Pseudomonas aeruginosa* clinical isolates. *Journal of Breath Research*. **10**, 047102.

16. Alex Gifford, Sven Willger, Emily Dolben, Lisa Moulton, Dana Dorman, **Heather D. Bean**, Jane E. Hill, Thomas Hampton, Alix Ashare, Deborah A. Hogan. (2016) The use of a multiplex transcript method for the analysis of the *Pseudomonas aeruginosa* gene expression profiles in the cystic fibrosis lung. *Infection and Immunity*. **84**, 2995-3006.
15. **Heather D. Bean***, Theodore R. Mellors*, Jiangjiang Zhu, Jane E. Hill. (2015) Profiling aged artisanal cheddar cheese using secondary electrospray ionization-mass spectrometry (SESI-MS). *Journal of Agricultural and Food Chemistry*. **63**, 4386-4392.
14. **Heather D. Bean**, Jane E. Hill, Jean-Marie D. Dimandja. (2015) Improving the quality of biomarker candidates in untargeted metabolomics via peak table-based alignment of two dimensional gas chromatography-mass spectrometry data. *Journal of Chromatography A*. **1394**, 111-117.
13. **Heather D. Bean***, Jaime Jiménez-Díaz*, Jiangjiang Zhu, Jane E. Hill. (2015) Breathprints of model murine bacterial lung infections are linked with immune response. *European Respiratory Journal*. **45**, 181-190. **Editorial Feature Article: European Respiratory Journal**. **45**, 21-24.
12. **Heather D. Bean***, Jiangjiang Zhu*, Jackson C. Sengle, Jane E. Hill. (2014) Identifying methicillin-resistant *Staphylococcus aureus* (MRSA) lung infections in mice via breath analysis using secondary electrospray ionization-mass spectrometry (SESI-MS). *Journal of Breath Research*. **8**, 041001. [*co-first authors] **Publisher Featured Article**
11. Jiangjiang Zhu, Jaime Jiménez-Díaz, **Heather D. Bean**, Nirav A. Dapthary, Minara I. Aliyeva, Lennart K. A. Lundblad, Jane E. Hill. (2013) Robust detection of *P. aeruginosa* and *S. aureus* acute lung infections by secondary electrospray ionization-mass spectrometry (SESI-MS) breathprinting: From initial infection to clearance. *Journal of Breath Research*. **7**, 037106.
10. Jiangjiang Zhu, **Heather D. Bean**, Jaime Jiménez-Díaz, Jane E. Hill. (2013) Secondary electrospray ionization-mass spectrometry (SESI-MS) breathprinting of multiple bacterial pathogens, a mouse model study. *Journal of Applied Physiology*. **114**, 1544-1549.
9. Jiangjiang Zhu, **Heather D. Bean**, Matthew J. Wargo, Laurie W. Leclair, Jane E. Hill. (2013) Detecting bacterial lung infections: *In vivo* evaluation of *in vitro* fingerprints. *Journal of Breath Research*. **7**, 016003. **Publisher Featured Article**
8. **Heather D. Bean**, Jean-Marie D. Dimandja, Jane E. Hill. (2012) Bacterial volatile discovery using solid phase microextraction and comprehensive two-dimensional gas chromatography – time-of-flight mass spectrometry. *Journal of Chromatography B*. **901**, 41-46.
7. Lakshmi N. Anumukonda, Avery Young, David G. Lynn, Ragan Buckley, Amena Warrayat, Christina L. Graves, **Heather D. Bean**, and Nicholas V. Hud. (2011) Adenine synthesis in a model prebiotic reaction: Connecting origins of life chemistry with biology. *Journal of Chemical Education*. **88**, 1698-1701.
6. **Heather D. Bean**, Jiangjiang Zhu, Jane E. Hill. (2011) Characterizing bacterial volatiles using secondary electrospray ionization mass spectrometry. *Journal of Visualized Experiments*. **52**, <http://www.jove.com/details.php?id=2664>.
5. Jiangjiang Zhu, **Heather D. Bean**, Yin-Ming Kuo, Jane E. Hill (2010). Fast detection of volatile organic compounds from bacterial cultures by SESI-MS. *Journal of Clinical Microbiology* **48**, 4426-4431.
4. Irena Mamajanova, Aaron E. Engelhart, **Heather D. Bean**, Nicholas V. Hud (2010). DNA and RNA in anhydrous media: Evidence for duplex, triplex, and G-quadruplex secondary structures in a deep eutectic solvent. *Angewandte Chemie, International Edition* **49**, 6310-6314.
3. Yinghong Sheng, **Heather D. Bean**, Irena Mamajanov, Nicholas V. Hud, Jerzy Leszczynski (2009). Comprehensive investigation of the energetics of pyrimidine nucleoside formation under prebiotic conditions. *Journal of the American Chemical Society* **131**, 16088-16095.
2. **Heather D. Bean**, Yinghong Sheng, James P. Collins, Frank A. L. Anet, Jerzy Leszczynski, Nicholas V. Hud (2007). Formation of a β -pyrimidine nucleoside by a free pyrimidine base and ribose in a plausible prebiotic reaction. *Journal of the American Chemical Society* **129**, 9556-9557.

1. **Heather D. Bean**, Frank A. L. Anet, Ian R. Gould, Nicholas V. Hud (2006). Glyoxylate as a backbone linkage for a prebiotic ancestor of RNA. *Origins of Life and Evolution of Biospheres* **36**, 39-63.

Peer Reviewed Book Chapters & Review Articles

3. Cristina E. Davis, Jane E. Hill, Matthias Frank, Mitchell M. McCartney, Michael Schivo, **Heather D. Bean**. (2020) Breath analysis for respiratory infections, in *Breathborne Biomarkers and the Human Volatilome*, C. E. Davis, J. D. Beauchamp, J. D. Pleil, Eds. Elsevier: Amsterdam, Netherlands; pp. 335-347.
2. **Emily A. Higgins Keppler^G**, **Carrie L. Jenkins^G**, **Trenton J. Davis^G**, **Heather D. Bean** (2018). Advances in the application of comprehensive two-dimensional gas chromatography in metabolomics. *Invited review, Trends in Analytical Chemistry* **109**, 275-286.
1. **Heather D. Bean**, David G. Lynn, Nicholas V. Hud (2009). Self-Assembly and the origin of the first RNA-like polymers, in *Chemical Evolution II: From the Origins of Life to Modern Society*, Zaikowski, L., Friedrich, J. M. and Seidel, S. R., Eds. Washington, DC, American Chemical Society. **1025**: 109-132.

Editorials & Opinions

3. **Heather D. Bean** (2021). Hot Topics in Gas Chromatography: Using the three Cs of data visualization as a life raft when you're drowning in multidimensional chromatography peaks. *LCGC North America* **39** (s6b), 16-18.
2. **Heather D. Bean** (2019). In my view: Repeat after me... How committed are we to reproducibility in science? *The Analytical Scientist* **82**, 14-15. <https://theanalyticalscientist.com/business-education/repeat-after-me>
1. **Heather D. Bean**, Joachim D. Pleil, Jane E. Hill (2015). Editorial: New analytical and statistical approaches for interpreting the relationships among environmental stressors and biomarkers. *Biomarkers* **20**, 1-4.

Manuscript Preprints

1. **Tarek Firzli^{B*}**, **Trenton J. Davis^{G*}**, **Emily A. Higgins Keppler^{G*}**, Matthew Richardson, **Heather D. Bean**. Addressing missing data in untargeted metabolomics: Identifying missingness type and evaluating the impact of imputation methods on experimental replication. *Accepted, Analytical Chemistry. Preprint:* <https://chemrxiv.org/engage/chemrxiv/article-details/6143ba82aeaa6e41afeeb276>

RESEARCH SUPPORT

Current

Cystic Fibrosis Foundation Therapeutics HILL18A0-CI	04/2018 – 03/2023
Project title: Improving <i>P. aeruginosa</i> Detection in Non-Expectorators via Breath Testing	
Role: Co-PI (Jane Hill, U. British Columbia, PI; Edith Zemanick, U. Colorado, Co-PI)	
Arizona Biomedical Research Centre AZ New Investigator Award ADHS18-198861	04/2018 – 09/2022
Project Title: Volatile Biomarkers for a Valley Fever Breath Test	
Role: PI	
NASA Space Biology Program 16-16ROSBDFP-0025	10/2018 – 09/2022
Project title: Contributions of the Microbiome in Astronaut Health: A New Dimension in Modeling Crew Infectious Disease Risks	
Role: Co-I (Cheryl Nickerson, ASU, PI)	
NIH R01HL157239	04/2021 – 03/2025
Project Title: Identifying Breath Biomarkers for <i>S. aureus</i> Methicillin Resistance and Small Colony Variants	
Role: PI	
DARPA	10/2021 – 03/2023
Project Title: Integrated Fatigue Analysis and Prediction using Breath Analysis and Wearable Sensors Referenced to Neurophysiological Fatigue Indices	
Role: Co-PI (Roozbeh Jafari, Texas A&M U., PI)	

Completed

Cystic Fibrosis Foundation Postdoctoral Research Fellowship <i>Carol Basbaum Memorial Fellow for the Best Priority Score</i> Project title: Volatile Biomarkers of <i>P. aeruginosa</i> Adaptation to the CF Lung Role: PI	05/2012 – 04/2016
Cystic Fibrosis Foundation Pilot and Feasibility Grant Project title: Rapid, Non-Invasive Detection of <i>Pseudomonas</i> and <i>Staph</i> CF Lung Infections Role: Co-I (Jane Hill, Dartmouth College, PI)	04/2016 – 03/2018
Swette Center Seed Grant Project Title: Is There an Alternative to GMO Crops to Improve Agricultural Production? Role: Co-PI (Roberto Gaxiola, ASU, Co-PI; Ferran Garcia-Pichel, ASU, Co-PI)	07/2019 – 06/2020
Cystic Fibrosis Foundation “NIH-Unfunded” Pilot Grant HILL17P0 Project title: Improving Outcomes in CF Patients: Toward Rapid Detection of <i>P. aeruginosa</i> Role: Co-PI (Jane Hill, Dartmouth College, Lead PI; Edith Zemanick, U. Colorado, Co-PI)	02/2018 – 01/2020
NIH R56HL139846, High Priority, Short-Term Project “Bridge Award” Project title: Improving Outcomes in CF Patients: Toward Rapid Detection of <i>P. aeruginosa</i> Role: Co-I (Jane Hill, Dartmouth College, PI; Edith Zemanick, U. Colorado, Co-I)	09/2018 – 03/2021
Dartmouth Neukom CompX Faculty Grant Project title: Integrating Rich Data from Lung Infections for Contextually-Framed Biomarker Discovery Role: Lead Scientist (Jane Hill, Dartmouth College, PI)	02/2015 – 01/2016
Dartmouth Synergy Pilot Award Project title: Biomarker Discovery and Validation for Lung Infection in CF Patients Role: Co-I (Jane Hill, Dartmouth College and Alix Ashare, Dartmouth College, co-PIs)	05/2015 – 04/2016
Cystic Fibrosis Foundation Therapeutics Project title: Determination and Validation of the Volatile Molecular Signature for <i>Pseudomonas</i> and <i>Staphylococcus</i> Lung Infections in CF Patients using BALF Role: Lead Scientist (Jane Hill, Dartmouth College, PI)	04/2015 – 03/2016

INVITED PRESENTATIONS (Since 2015)

Conference Podium Presentations

May 2022	19 th GC×GC Symposium	Virtual Symposium
“Identifying Missingness Type and Replacing Missing Values in GC×GC Untargeted Metabolomics Data”		
Mar 2022	Society of Toxicology 61 st Annual Meeting	San Diego, CA
“Developing a Valley fever breath test: Characterizing the <i>in vitro</i> and <i>in vivo</i> volatile metabolome of <i>Coccidioides</i> ”		
Jul 2021	DTRA Breath-Based Diagnostics Workshop	Virtual Symposium
(Plenary) “Developing Breath Tests that are Fit for Purpose: Considerations for Study Design”		
Jun 2021	18 th GC×GC Symposium	Virtual Symposium
“The Three Cs for Engaging Your Brain’s Visual Center to Extract Biological Information from Untargeted GC×GC Metabolomics Data”		
Feb 2021	12 th Multidimensional Chromatography Workshop	Virtual Symposium
(Keynote) “GC×GC for Separation Anxiety: Treatment, Outcomes, and Side Effects”		
Sep 2020	North American GC×GC Symposium and Workshop	Virtual Symposium
"Data Analysis Methods for Untargeted Metabolomics and Biomarker Discovery"		
May 2020	44 th ISCC & 17 th GC×GC Symposium (<i>cancelled</i>)	Riva del Garda, Italy
"Detecting Emergent Properties of Microbial Volatilomes using HS-SBSE and GC×GC-TOFMS"		

Sep 2019	International Association for Breath Research Summit "Identifying Volatile Biomarkers for a Valley Fever Breath Test"	Loughborough, UK
May 2019	43 rd ISCC & 16 th GC×GC Symposium "Drowning in GC×GC Peaks: Data Reduction and Visualization as a Life Raft for Untargeted Metabolomics and Biomarker Discovery"	Fort Worth, TX
Mar 2019	Pittcon "Application of Comprehensive Two-Dimensional Gas Chromatography to Breath Biomarker Discovery"	Philadelphia, PA
May 2018	Canadian Society for Chemistry "Investigating Metabolic Selection in <i>P. aeruginosa</i> Infections Using GC×GC-TOFMS"	Edmonton, Canada
May 2017	41 st ISCC & 14 th GC×GC Symposium (Keynote) "Tracking Chronic Lung Disease Progression through Volatile Biomarkers of <i>P. aeruginosa</i> "	Fort Worth, TX
Sep 2016	International Association for Breath Research Summit (Keynote) "Bridging Gaps: Linking <i>In Vivo</i> to <i>In Vitro</i> , and Metabolomes to Transcriptomes to Identify Volatile Biomarkers of Bacterial Phenotypes"	Zurich, Switzerland
May 2016	40 th ISCC & 13 th GC×GC Symposium "GC×GC-TOFMS for the Identification of Soluble and Volatile Biomarkers in Bronchoalveolar Lavage Fluid"	Riva del Garda, Italy
Apr 2016	32 nd Intl. Symposium on Microscale Separations & Bioanalysis "Discovering biomarkers using GC×GC-TOFMS for the detection of infection phenotypes directly from lung samples"	Toronto, ON

Scientific Lectures & Seminars

Jun 2022	CF Foundation, NIAID, NHLBI, and NIDDK Workshop "Monitoring CF Health using Breath" in the Workshop on the Current and Future Research Needs in the Era of Highly Effective Modulator Therapies for Cystic Fibrosis	Virtual Workshop
April 2022	University of Alabama Cystic Fibrosis Research Center "Using Breath Biomarkers to Monitor Lung Infections in the Era of CFTR Modulators"	Webinar
Feb 2022	Michigan State University Department of Biochemistry "Developing a Breath Test for Valley Fever using GC×GC Untargeted Metabolomics"	Webinar
Dec 2021	Portuguese Society of Chemistry "Developing a Breath Test for Valley Fever using GC×GC Untargeted Metabolomics"	Webinar
Oct 2021	Microbiome Centers Consortium "Chemical Code Talkers: Deciphering the Language of Infections and Microbiomes"	Webinar
Oct 2021	Cystic Fibrosis Foundation Detection and Diagnosis "Exhaled Breath Markers for Detection and Diagnosis of CF Infections"	Virtual Workshop
Jun 2021	6 th Telluride Workshop on Cystic Fibrosis " <i>Pseudomonas</i> Can Taste and Smell <i>Staph</i> , with Potentially Different Physiological Effects"	Webinar
Dec 2020	Chromatography Forum of Delaware Valley "GC×GC for Separation Anxiety: Treatment, Outcomes, and Side Effects"	Webinar
Sep 2020	Symposium on Breath-Based Diagnostics for Viral Infections "Biomarker Discovery for Viral Respiratory Infections"	Webinar
May 2018	Mountain West Cystic Fibrosis Meeting "Progress Toward Breath-Based Diagnostics for CF Lung Infections"	Phoenix, AZ
Mar 2018	University of Arizona School of Medicine "Microbial Metabolomics in Polymicrobial Infections"	Phoenix, AZ
Aug 2017	5 th Telluride Workshop on Cystic Fibrosis " <i>P. aeruginosa</i> Metabolomic Changes in Chronic CF Infections"	Telluride, CO

Mar 2017	Pacific Northwest Mass Spectrometry Group	Seattle, WA
"Mass Spectrometry for the Discovery of Volatile Biomarkers of Lung Infections: A Chromatographer's Perspective"		
Nov 2016	Marine Biological Laboratory Workshop	Woods Hole, MA
"A Brief History of Breath-Based Diagnostics: From Hippocrates to the Era of Personalized Medicine"		
Jun 2016	American Society for Mass Spectrometry, LECO Seminar	San Antonio, TX
"Discovering Volatile Biomarkers Using GC×GC-TOFMS: Detecting and Phenotyping Infections Directly From Lung Samples"		
Aug 2015	4 th Telluride Workshop on Cystic Fibrosis	Telluride, CO
"Volatile Metabolomics in CF"		

TEACHING & CURRICULUM DEVELOPMENT

Microbiology, MIC 205

Spring 2017, 2019, 2020, 2021, 2022

3 credit lecture science elective for non-majors presenting a broad overview of microbiology.

Advanced Bacteriology Laboratory, MIC 302

Fall 2016, 2017, 2018, 2019, 2020, 2021

2 credit laboratory course required for Microbiology undergraduates to develop critical thinking skills and bacteriology expertise.

Biomarkers and Medical Diagnostics, BIO 498 / BIO 591

Fall 2015

3 credit elective for graduate students and senior undergraduates covering foundational diagnostic technologies and the development of new technologies from the lab to the market.

Emergent Properties of Microbiomes, MIC 591

Spring 2018

1 credit seminar for graduate students teaching the ecological principles governing microbial interactions and investigating evidence of emergent properties in microbiomes.

Research Paper, MIC 401

Spring 2019, 2020, Fall 2020, 2021

1 credit, required capstone course for undergraduate Microbiology and Medical Microbiology majors in which students develop a research proposal on a topic of their choosing.

Careers in Life Sciences Recitation, BIO 189

Fall 2016, 2017

5 lectures, required for undergraduate Life Sciences majors; *Topic: Biology: Life imitates art!* - an exploration of biological technologies that sound like they come straight out of science fiction.

Undergraduate Research & Honors Directed Study, BIO/MIC/MBB/BCH 392/492/493/495

Fall 2016 - present

1-3 credit undergraduate elective for supervised research in biology, microbiology, and molecular biosciences and biotechnology.

MENTORING (Since 2015)

Doctoral Scholars

2017 – present

Emily Higgins Keppler, ASU Microbiology PhD candidate

Thesis topic: Volatile biomarkers for a Valley fever breath test

2019 – present

Daniela Gutiérrez-Muñoz, ASU Microbiology PhD pre-candidate

Thesis topic: Volatile biomarkers of *S. aureus* clinical phenotypes

2022 – present

Paige Mitchell, ASU Molecular and Cellular Biology PhD pre-candidate

Thesis topic: Emergent properties of microbial volatile interactions

2022 - present

Ian McGill, ASU Microbiology PhD pre-candidate

Thesis topic: Time-dependent changes in volatile metabolomes

2016 – 2022 **Dr. Trenton Davis, ASU Microbiology PhD**
Thesis title: Comprehensive two-dimensional gas chromatography (GC×GC) as a tool for exploring the *in vitro* volatile metabolome of *Pseudomonas aeruginosa*: A case study in untargeted metabolomics

2017 – 2021 **Dr. Carrie Jenkins, ASU Molecular and Cellular Biology PhD**
Thesis title: Influence of media on breath biomarker development for staphylococcal infections

Undergraduate and Post-Baccalaureate Scholars

2020 – present **Bilal Ali, ASU Microbiology**
Research topic: Constructing a retention index library for bacterial volatile metabolomics

2022 – present **Kiran Thallikar, ASU Barrett Honors Student**
Research topic: Volatile metabolomes of *P. aeruginosa*

2019 – present **Tarek Firzli, ASU Post-Baccalaureate**
Research topic: Missingness in untargeted metabolomics data

2020 – 2021 **C. Johanna O'Malley, ASU Post-Baccalaureate**
Research topic: Data analysis pipelines for untargeted metabolomics

2018 – 2020 **Brianna Lopez, ASU Barrett Honors Student**
Thesis topic: The influence of *S. aureus* volatiles on *P. aeruginosa* phenotypes

2017 – 2020 **Ava Karanjia, ASU Barrett Honors Student**
Thesis topic: Role of quorum sensing regulators on *P. aeruginosa* chronic infection phenotypes

2017 – 2019 **Sarah West, ASU Barrett Honors Student**
Thesis topic: Influence of *S. aureus* on *P. aeruginosa* chronic infection phenotypes

2016 – 2018 **Hayden Kutemeier, ASU Barrett Honors Student**
Thesis title: "The inactivation of pathogens in contaminated medications via selection photonic disinfection"

2019 – 2020 **Diana Ramirez, ASU Microbiology**
Research topic: Influence of growth conditions on *Chromobacterium* VOCs

2018 – 2019 **Carolyn Metcalfe, ASU**
Research topic: Allelic replacement in *P. aeruginosa*

2017 – 2017 **Jeffrey Luo, ASU Barrett Honors Student**
Research topic: Antibiotic sensitivity of *P. aeruginosa* clinical isolates

2015 – 2018 **Charity Bhebhe, ASU Barrett Honors Student**
Thesis title: "Genetic manipulation of *Pseudomonas aeruginosa* clinical isolates"

2015 – 2017 **Jonathan Kiermayr, ASU Barrett Honors Student**
Thesis title: "The effects of environmental changes on the rhamnolipid production in *Pseudomonas aeruginosa*"

2015 – 2017 **Lea Witzel, ASU Barrett Honors Student**
Thesis topic: Environmental influences on *P. aeruginosa* pyocyanin production

2015 – 2017 **Amritha Venguideshe, ASU Barrett Honors Student**
Research topic: Environmental influences on *P. aeruginosa* protease production

2015 – 2017 **Darrin Ellison, ASU**
Research topic: Phenotypic characterization of *P. aeruginosa* clinical isolates

2015 – 2016 **Nathan Dacasin, ASU**
Research topic: Phenotypic characterization of *P. aeruginosa* clinical isolates

2015 – 2016 **Julianne Matics, ASU**
Research topic: Phenotypic characterization of *P. aeruginosa* clinical isolates

Postdoctoral Scholars

2022 – present	Dr. Trenton Davis, PhD <i>Research topic:</i> Untargeted metabolomics data analysis and modeling
2019, Summer	Dr. Michael Wilde, PhD , University of Leicester, Visiting Scholar

Other

2016, Co-founding adviser for the School of Life Sciences and Biodesign Institute Postdoctoral Group (now a part of the Postdoctoral Affairs Office managed by the ASU Graduate College).

2015 – present **8 Undergraduate Honors, 10 MS, and 15 PhD thesis committees**

PROFESSIONAL SERVICE

International, National, and Regional

Conferences, Symposia, and Professional Organizations

2022	GC×GC Symposium Advanced Chromatography Workshop	Co-Developer/Organizer
2021 - 2022	International Association for Breath Research Breath Summit	Organizing Committee
2021 - 2024	GC×GC Symposium Steering Committee	Member
2019	BioSci Southwestern Symposium	Abstract Committee
2019, 2021	GC×GC Symposium and ISCC	Local Organizing Committee
2015 - 2019	GC×GC Symposium	Session Chair
2017	North American Cystic Fibrosis Conference	Session Chair
2014	248 th ACS National Meeting	ENVR Symposium Organizer
2012, 2013	American Chemical Society, Green Mountain Local Section	Chair
2011	American Chemical Society, Green Mountain Local Section	Chair-Elect
2006	Gordon-Kenan Graduate Research Seminar: Origin of Life	Co-Chair
2006	Gordon Research Conference: Origin of Life	Session Chair

Editorial & Reviewer Boards

2020 – Present	mSystems	Editor
2021 – Present	Frontiers in Cellular and Infection Microbiology	Associate Editor
2019 – Present	Journal of Breath Research	Editorial Board Member
2020 – Present	Separations	Reviewer Board Member & Topic Editor

Manuscript Peer Reviewer (45)

Record at ASU (38 reviews): <https://publons.com/author/1237268/heather-bean>

Grant Reviewer

2016	Natural Sciences and Engineering Research Council of Canada	Ad-hoc Reviewer
2019	Sandia National Laboratories' Laboratory Directed R&D Program	Ad-hoc Reviewer
2021 - 2022	NIH Special Emphasis Panel ZTR1 DPI-5 (01)	Reviewer
2021	South Africa's National Research Foundation	Ad-hoc Reviewer

Arizona State University

Committees, Boards, and Groups

2016 – 2022	School of Life Sciences, Seminar Committee	Chair
2019 – 2022	Biosciences Core Governance Board	Member
2021 – Present	Barrett, the Honors College	Faculty Honors Advisor
2021 – Present	School of Life Sciences, Facilities Committee	Member
2020 – Present	School of Life Sciences, Microbiology B.S. Degree Programs	Faculty Representative
2021 – Present	School of Life Sciences, Microbiology BioSpine Initiative	Member
2020 – Present	Graduate College, Postdoctoral Affairs Office Advisory Board	Member
2020	School of Life Sciences, Special Advisory Committee	Member
2019 – 2020	Biodesign Electronic Notebook Steering Committee	Member
2015 – 2017	School of Life Sciences, Communications Committee	Member

2015 – 2016	Microbiome Faculty Search Committee	Member
2015 – 2016	Molecular and Cellular Biol. Graduate Admissions Committee	Ad-hoc Member
2016 – 2019	School of Life Sciences, Postdoc Group	Advisor
2017	Microbiology Graduate Admissions Committee	Ad-hoc Member
2018	SOLUR Researcher/Fellow Scholarship Committee	Ad-hoc Member
2018 – 2019	Microbiome Faculty Search Committee	Member

Grant Reviewer

2016	Mayo-ASU Team Science Grants	Ad-hoc Reviewer
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Educational & Professional Outreach

2021	AZ Postdoc Career Conference – Negotiating Your Startup Package	Session Leader
2021	Postdoc Lunch & Learn – Negotiating Your Startup Package	Speaker
2020	ASU Grants, Research, and Special Projects (GRASP) Symposium	Panelist
2019	AZ Postdoc Career Conference – Negotiating Your Startup Package	Session Leader
2018	Postdoc Lunch & Learn – Steps in Obtaining a Faculty Position, ASU	Speaker
2018	SOLS Graduate Retreat, ASU	Panelist
2018	Estrella Mountain Community College Transfer Student Workshop, ASU	Panelist
2017	Work/Life Balance Panel Discussion for SOLUR, ASU	Panelist
2016	Center for Chemical Evolution Annual Meeting, Atlanta, GA	Career Panelist
2016	ASU School of Life Sciences Faculty/Staff Research Seminar	Presenter
2016	Intel International Science and Engineering Fair	Judge
2016-2022	BioBridge, School of Life Sciences, ASU	Faculty Mentor

PROFESSIONAL DEVELOPMENT

2021 - 2022	School of Life Sciences Leadership Development Program	ASU
2020	School of Life Sciences Teaching Workshop	ASU
2019	NIH Regional Seminar on Program Funding	Phoenix, AZ
2019	Mastering the Personal Statement Workshop	ASU
2019	Promotion and Tenure Workshop	ASU
2018	Writing Your Next Grant Proposal Workshop (2 of 2 sessions)	ASU
2018	Mastering the CV and Personal Statement Workshop	ASU
2017	SBIR/STTR Road Tour	Phoenix, AZ
2017	DARPA Young Faculty Award Proposers' Day	Webinar
2017	Writing Successful NIH Grants (4 of 4 sessions)	Webinar
2016	College of Liberal Arts and Sciences Instructional Demofest	ASU
2016	Alan Alda Center for Communicating Science Workshop	ASU
2016	Evidence-Based Teaching in STEM (2 of 4 sessions)	ASU
2015 - 2016	New Faculty Workshop Series; College of Liberal Arts and Sci. (5 of 5 sessions)	ASU

PROFESSIONAL AFFILIATIONS

2004 - Present	American Chemical Society
2010 - Present	American Society for Microbiology
2016 - Present	American Society for Mass Spectrometry
2016 - Present	Arizona State University Faculty Women's Association
2016 - Present	BioDesign Center for Fundamental and Applied Microbiomics, ASU
2016 - Present	BioDesign Center for Immunotherapy, Vaccines, and Virotherapy, ASU
2016 - Present	International Association for Breath Research
2022 - Present	BioDesign Center for Health through Microbiomes, ASU
2022 - Present	American Thoracic Society
2003 - 2008	Center for Fundamental and Applied Molecular Evolution (FAME), Georgia Tech
2007 - 2008	Center for Chemical Evolution, Georgia Tech