

Elizabeth N. Bess, PhD
Assistant Professor of Chemistry and Molecular Biology & Biochemistry

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Professional Positions Held

Assistant Professor of Chemistry (<i>primary</i>)	2018–Present
Assistant Professor of Molecular Biology & Biochemistry	2019–Present
University of California, Irvine—Irvine, CA	

Howard Hughes Medical Institute Postdoctoral Fellow of the Life Sciences Research Foundation	2015–2018
Dept. of Microbiology & Immunology, University of California, San Francisco—San Francisco, CA	
Research Advisor: Professor Peter J. Turnbaugh, PhD	

Clinical Research Coordinator	2009–2010
Emergency Department, School of Medicine, University of Utah—Salt Lake City, UT	
Advisor: Professor Troy Madsen, MD	

Assistant Research Coordinator	2008–2010
Pain Research Center, School of Medicine, University of Utah—Salt Lake City, UT	

Education & Training

Ph.D. in Chemistry	2010–2015
Department of Chemistry, University of Utah—Salt Lake City, UT	
Research Advisor: Professor Matthew S. Sigman	

Novartis Doctoral Traineeship	Summer 2014
Bioreactions Group, Novartis Institutes of BioMedical Research—Basel, Switzerland	
Research Advisor: Dr. Stephan Lütz	

B.S. in Biological Chemistry, <i>Magna Cum Laude</i>	2004–2009
Department of Chemistry, University of Utah—Salt Lake City, UT	

Honors & Awards

- ◆ Rising Star in Biological, Medicinal, & Pharmaceutical Chemistry, *ACS Bio & Med Chem Au* 2026
- ◆ National Science Foundation CAREER Award recipient 2024–2029
- ◆ De Gallow Professor of the Year Honorable Mention, UC Irvine 2023
- ◆ [Scialog Fellow: Microbiome, Neurobiology, and Disease, Research Corp.](#) 2021–2023
- ◆ [Young Investigator Grant for Probiotics Research, Global Probiotics Council](#) 2021
- ◆ [UC Irvine Hellman Fellow](#) 2020
- ◆ [Howard Hughes Medical Institute Postdoctoral Fellow, Life Sciences Research Fndtn](#) 2016–2018
- ◆ [Career Development Grant for Postdoctoral Women](#), Amer. Society for Microbiology ([profile](#)) 2016
- ◆ Cheves Walling Award for Excellence in Graduate Research, Dept. of Chem., Univ. of Utah 2015
- ◆ University of Utah Graduate Research Fellowship 2014–2015
- ◆ [Anna Louise Hoffman Award, Graduate Research](#), Iota Sigma Pi Nat'l Honor Society ([profile](#)) 2014
- ◆ IUPAC Poster Prize Certificate, OMCOS -17 Conference 2013
- ◆ NSF Graduate Research Fellowship Program, Honorable Mention 2012
- ◆ Dow Chemical 1st-Year Graduate Student Scholastic Achievement Award, Univ. of Utah 2011
- ◆ Chemistry Departmental Scholarship for Scholastic Excellence, Univ. of Utah 2008

- ♦ Joseph Turner Crockett, M.D., Memorial Scholarship, College of Science, Univ. of Utah 2008
- ♦ Marjorie N. Parry Scholarship, Women's Club, Univ. of Utah 2008
- ♦ Armantrout Memorial Scholarship, Dept. of Chemistry, Univ. of Utah 2007
- ♦ Mack Thomas Rozelle Scholarship, Dept. of Chemistry, Univ. of Utah 2006
- ♦ Honors at Entrance Scholarship, Univ. of Utah 2004–2008

Peer-Reviewed Publications

* Denotes corresponding author

25. Dicksion, C. A.; Chao, D. N.; Rickmeyer, J. D.; **Bess, E. N.*** A Validated LC–MS/MS Method for Quantifying Phenolic Acids, Lignans, and Enterolignans from Human Fecal Samples. In Revision. [bioRxiv](#).
24. Balsamo, J. M.; Yan, Y.; Thai, D.; Cologna, S. M.*; **Bess, E. N.*** Multiomic Analysis Reveals Molecular Pathways Associated with Intestinal Aggregation of α -Synuclein. [ACS Chem. Biol.](#), **2026**, ASAP.
23. Alam, Y.; Hakopian, S.; Ortiz de Ora, L.; Tamburini, I.; Avelar-Barragan, J.; Jung, S. ; Long, Z.; Chao, A.; Whiteson, K.; Jang, C.*; **Bess, E. N.*** Variation in Human Gut Microbiota Impacts Tamoxifen Pharmacokinetics. [mBio](#), **2024**, *16*, e01679-24.
 - [Editor's Pick](#)
 - Reported on by [Cancerworld](#)
22. Balsamo, J. M. ; Zhou, K.; Kammarchedu, V.; Ebrahimi, A.*; **Bess, E. N.*** Mechanistic Insight into Intestinal α -Synuclein Aggregation in Parkinson's Disease Using a Laser-Printed Electrochemical Sensor. [ACS Chem. Neurosci.](#), **2024**, *15*, 2623–2632.
 - Highlighted on [CBS News Radio](#)
 - Reported on by [LiveScience](#) and by [Futurity](#)
 - Media Interview, [Nature Outlook: The Gut Microbiome](#)
21. Kyaw, T.S.; Zhang, C.; Sandy, M.; Trepka, K.; Zhang, S.; Ramirez Hernandez, LA.; Goh, J.J.N.; Yu, K.; Dimassa, V.; **Bess, E.N.**; Brockert, J.G.; Dumlao, D.S.; Bisanz, J.E.; Turnbaugh, P.J. Human Gut Actinobacteria Boost Drug Absorption by Secreting P-Glycoprotein ATPase Inhibitors. [iScience](#), **2024**, doi: 10.1016/j.isci.2024.110122.
20. Ortiz de Ora, L.; Balsamo, J.; Uyeda, K. S.; **Bess, E. N.*** Discovery of a Gut Bacterial Metabolic Pathway that Drives α -Synuclein Aggregation and Neurodegeneration. [ACS Chem. Biol.](#), **2024**, *19*, 1011–1021.
 - Reported on by [LiveScience](#) and by [Futurity](#)
 - Media Interview, [Nature Outlook: The Gut Microbiome](#)
19. Rich, B.E.; Jackson, J. C.; Ortiz de Ora, L.; Long, Z. G.; Uyeda, K. S.; **Bess, E. N.*** Alternative Pathway for Dopamine Production by Acetogenic Gut Bacteria that O-Demethylate 3-Methoxytyramine, a Metabolite of Catechol O-Methyltransferase. [J. Appl. Microbiol.](#) **2022**, *133*, 1697-1708.
18. Ortiz de Ora, L.; **Bess, E. N.*** The Emergence of *Caenorhabditis elegans* as a Model Organism for Dissecting the Gut–Brain Axis. [mSystems](#), **2021**, *6*, e00755-21.
17. Maini Rekdal, V; Bernardino, P. N.; Luescher, M. U.; Kiamehr, S.; Le; C.; Bisanz, J. E.; Turnbaugh, P. J.; **Bess, E. N.**; Balskus, E.P. A Widely Distributed Metalloenzyme Class Enables Gut Microbial Metabolism of Host- and Diet-Derived Catechols. [eLife](#), **2020**, *9*, e50845.

16. Bisanz, J. E.; Soto-Perez, P.; Noecker, C.; Aksenov, A.; Lam, K. N.; Kenney, G. E.; **Bess, E. N.**; Haiser, H. J.; Kyaw, T. S.; Yu, F. B.; Rekdal, V. M.; Ha, C. W. Y.; Devkota, S.; Balskus, E. P.; Dorrestein, P. C.; Allen-Vercoe, E.; Turnbaugh, P. J. A Genomic Toolkit for the Mechanistic Dissection of Intractable Human Gut Bacteria. *Cell Host Microbe* **2020**, *27*, 1001-1013.e9.
15. **Bess, E. N.**; Bisanz, J.; Yarza, F.; Bustion, A.; Rich, B. E.; Li, X.; Kitamura, S.; Waligurski, E.; Ang, Q. Y.; Alba, D. L.; Spanogiannopoulos, P.; Nayfach, S.; Koliwad, S. K.; Wolan, D. W.; Franke, A. A.; Turnbaugh, P. J. Genetic Basis for the Cooperative Bioactivation of Plant Lignans by *Eggerthella lenta* and Other Human Gut Bacteria. *Nature Micro.* **2020**, *5*, 56–66.
14. Carmody, R.; Bisanz, B.; Bowen, B.; Maurice, C.; Lyalina, S.; Louie, K.; Treen, D.; Chadaideh, K.; Rekdal, V.; **Bess, E. N.**; Spanogiannopoulos, P.; Ang, Q. Y.; Bauer, K.; Balon, T.; Pollard K.; Northen, T.; Turnbaugh, T. Cooking Shapes the Structure and Function of the Gut Microbiome. *Nature Micro.* **2019**, *4*, 2052–2063.
13. Maini Rekdal, V.; **Bess, E. N.**; Bisanz, J. E.; Turnbaugh, P. J.; Balskus, E. P. Discovery and Inhibition of an Interspecies Gut Bacterial Pathway for Levodopa Metabolism. *Science* **2019**, *364*, eaau6323.
12. Sigman, M. S.; Harper, K. C.; **Bess, E. N.**; Milo, A. The Development of Multidimensional Analysis Tools for Asymmetric Catalysis and Beyond. *Acc. Chem. Res.* **2016**, *49*, 1292–1301.
11. Spanogiannopoulos, P.; **Bess, E. N.**; Carmody, R. N.; Turnbaugh, P. J. The Microbial Pharmacists Within: A Metagenomic View of Xenobiotic Metabolism. *Nature Rev. Microbiol.* **2016**, *14*, 273–287.
10. Mougél, V.; Santiago, C. B.; Zhizhko, P. A.; **Bess, E. N.**; Varga, J.; Frater, G.; Sigman, M. S.; Coperet, C. Quantitatively Analyzing Metathesis Catalyst Activity and Structural Features in Silica-Supported Tungsten Imido-Alkylidene Complexes. *J. Am. Chem. Sci.* **2015**, *137*, 6699–6704.
9. **Bess, E. N.**; Guptill, D.; Davies, H. M. L.; Sigman, M. S. Using IR Vibrations to Quantitatively Describe and Predict Site-Selectivity in Multivariate Rh-Catalyzed C–H Functionalization. *Chem. Sci.* **2015**, *6*, 3057–3062.
8. **Bess, E. N.**; Bischoff, A. J.; Sigman, M. S. Designer Substrate Library for Quantitative, Predictive Modeling of Reaction Performance. *Proc. Natl. Acad. Sci. U.S.A* **2014**, *111*, 14698–14703.
7. **Bess, E. N.**; DeLuca, R. J.; Tindall, D. J.; Oderinde, M. S.; Roizen, J. L.; Du Bois, J.; Sigman, M. S. Analyzing Site Selectivity in Rh₂(esp)₂-Catalyzed Intermolecular C–H Amination Reactions. *J. Am. Chem. Soc.* **2014**, *136*, 5783–5789.
6. Milo, A.; **Bess, E. N.**; Sigman, M. S. Interrogating Selectivity in Catalysis using Molecular Vibrations. *Nature* **2014**, *507*, 210–214.
5. **Bess, E. N.**; Sigman, M. S. Distinctive *Meta*-Directing Group Effect for Iridium-Catalyzed 1,1-Diaryllkene Enantioselective Hydrogenation. *Org. Lett.* **2013**, *15*, 646–649. Highlighted in *Angew. Chem. Int. Ed.* **2013**, *52*, 8795-8797.
4. Harper, K. C.; **Bess, E. N.**; Sigman, M. S. Multidimensional Steric Parameters in the Analysis of Asymmetric Catalytic Reactions. *Nature Chem.* **2012**, *4*, 366–374.
3. Sherwood, K.; Sugerman, S.; Bossart, P.; Bledsoe, J.; Barton, E.; Bernhisel, K.; **Bess, E.**; Madsen, T. EDOU Staffing by PAs: What are the Effects on Patient Outcomes? *JAAPA* **2011**, *24*, 31–37.

2. Lingenfelter, E. M.; Davis, V.; Larrabee, K.; **Bess, E.**; Canning, P.; Madsen, T. 192: Cholesterol Screening and Intervention Compliance In Chest Pain Patients In the Emergency Department Observation Unit Setting. [*Ann. Emerg. Med.* **2010**, *56*, S64.](#)
1. Bledsoe, J.; Hamilton, D.; **Bess, E.**; Holly, J.; Sturges, Z.; Madsen, T. Treatment of Low-risk Pulmonary Embolism Patients in a Chest Pain Unit. [*Crit. Pathw. Cardiol.* **2010**, *9*, 212–215.](#)

Book Chapters

Bess, E. N.; Sigman, M. S. Linear Free Energy Relationships (LFERs) in Asymmetric Catalysis. In [*Asymmetric Synthesis II: More Methods and Applications*](#), Christmann, M.; Bräse, S., Eds. Wiley-VCH Verlag GmbH & Co. KGaA: Weinheim, 2012; pp 363–370.

Research Funding

Total Funding Raised as PI: \$3.6M

Current Support:

NIH NINDS R01 PI: Bess 9/1/2024–8/31/2029
“Discovery of Chemical Factors in the Gut Microbiome that Control Alpha-Synuclein Aggregation in Parkinson's Disease”

The overall objective of this project is to focus a chemical biology lens on α -synuclein aggregation in mammalian intestinal cells. Specifically, by using electrochemical biosensors, proteomics, and bioluminescent reporters, we will characterize this process at a molecular-level of detail never seen before. The approaches to achieve the objectives of this project interrogate intestinal α -synuclein aggregation at the level of molecules, the microbial ecosystem, and host physiology, collectively providing a holistic roadmap for clinical translation.

Total Award Amount: \$2,346,866

NSF CAREER Award PI: Bess 4/01/2024–3/31/2029
“CAREER: The human gut as an untapped reservoir for bacteria and enzymes that degrade lignin, a potential sustainable source for critical chemicals”

The overall objective of this project is to uncover new bacteria to convert lignin to value-added products and to develop reliable tools that can be used to discover such biocatalysts in any biological system.

Total Award Amount: \$663,610

Center for Space and Earth Science, Student Fellow Program PI: Bess 10/1/2023–9/30/2026
 Los Alamos National Laboratory (Student support; no direct costs to PI/lab)
“Discovering Gut Bacteria Responsible for Degrading Dietary Lignocellulose”

The goal of this project is to use flow cytometry and single-cell genomics to isolate and identify gut bacteria that deconstruct lignin. This program provides support for a student in my laboratory to visit LANL for 4 months per year for 3 years. Funds are provided to the PI to visit LANL for 1 week each year.

Total Award Amount: \$180,000

CFCCC Pilot Projects: Anti-Cancer Challenge 2022 PI: Bess 7/1/2023–6/30/2026 (NCE)
 Chao Family Comprehensive Cancer Center
“Elucidating the role of gut microbiome in tamoxifen pharmacokinetics”

The goal of this project is to determine the role of gut microbiota β -glucuronidase (GUS) activity in controlling serum levels of endoxifen, the bioactive form of tamoxifen. This project is conducted in collaboration with co-PI Cholsoon Jang (UCI) and co-I Katrine Whiteson (UCI).

Total Award Amount: \$60,000

Departmental Start-Up Funds, University of California, Irvine

7/1/2018–No expiry

Prior Support:

Scialog Grant #28626

PI: Bess 7/15/2022–7/14/2025 (NCE)

Sponsored by Research Corporation for Science

Advancement, the Frederick Gardner Cottrell Foundation,

and the Paul G. Allen Frontiers Group

“Electrifying Mechanisms of Intestinal α -Synuclein Aggregation in Parkinson’s Disease Onset”

The goal of this project is to use electrochemical and impedance sensing tools developed by collaborator Aida Ebrahimi (Penn State) to characterize, in real-time, a novel mechanism discovered in the Bess Lab by which gut bacteria induce pathogen aggregation of α -synuclein, a protein key to Parkinson’s disease pathogenesis.

Total Award Amount: \$55,000

Scialog Grant #28648

PI: Bess 7/15/2022–7/14/2025 (NCE)

Sponsored by Research Corporation for Science

Advancement, the Frederick Gardner Cottrell Foundation,

and the Paul G. Allen Frontiers Group

“Tracking α -Synuclein from Enteroendocrine Cells to the Enteric Nervous System”

The goal of this project is to determine whether α -synuclein aggregates that form in intestinal enteroendocrine cells can propagate to the enteric nervous system.

Total Award Amount: \$55,000

TheoryLab Collaborative (TLC) Grant

PI: Bess

1/1/2023–12/31/2024

American Cancer Society

“Defining In Vivo Tamoxifen Metabolism by Host–Microbe Interactions”

The goal of this project is to provide the first systematic map of tamoxifen metabolism and distribution that accounts for both the host and its gut microbiota. Tamoxifen is an anti-breast cancer drug that has variable effectiveness across patients. Inter-individual variations in microbiota composition and tamoxifen catabolism may be a critical determinant of patient responsiveness. Conducted in collaboration with Cholsoon Jang (UCI), our quantitative analysis of tamoxifen metabolism is expected to pave the way for predicting drug bioavailability across patients.

Total Award Amount: \$30,000

Global Probiotics Council’s

PI: Bess

4/27/2021–7/31/2024

Young Investigator Grant for Probiotics Research

“Using Dietary Fiber to Harvest Novel Probiotics from the Human Gut Microbiota”

The goal of this project is to identify the bacteria and enzymes responsible for degrading dietary lignocellulose, what metabolites result, and how this shapes bacterial community function.

Total Award Amount: \$50,000

Susan Samueli Integrative Health Institute Pilot Studies Award
UC Irvine

Co-I: Bess

7/1/2023–6/30/2024

“Investigating the role of Bifidobacterium diversity on fiber degradation for development of multi-strain

Probiotics

The overall objective of this project is to determine which specific strains of bifidobacteria degrade which specific types of polysaccharide dietary fiber. Bess is a co-I on this project with the role of preparing magnetic beads that are coated with polysaccharides and measuring polysaccharide degradation by bifidobacteria.

Total Award Amount: \$25,000

University of California

PI: Bess

10/1/2020–9/30/2021

Cancer Research Coordinating Committee

“Leveraging the Human Gut Microbiome to Predict Efficacy of Tamoxifen in Breast Cancer”

The goal of this project was to determine how communities of gut bacteria are shaped by exposure to the anti-cancer drug tamoxifen as well as whether gut bacteria metabolize tamoxifen.

Total Award Amount: \$75,000

Hellman Fellowship Program, UC Irvine

PI: Bess

7/1/2020–6/30/2021

“Using Dietary Fiber to Harvest Novel Probiotics from the Human Gut Microbiome”

The goal of this project was to generate preliminary data to show that gut bacteria degrade lignin, a dietary fiber.

Total Award Amount: \$50,000

American Cancer Society Institutional Research Grant

PI: Bess

11/1/2019–10/31/2020

“Uncovering the Human Gut Microbiome’s Role in Estrogen Metabolism”

The goal of this project was to determine how gut bacteria counterbalance the role of liver catechol-*O*-methyltransferase (COMT) is regulating host levels of catecholic hormones (e.g., estrogens and dopamine).

Total Award Amount: \$45,000

Postdoctoral and Graduate Research Fellowships:

Howard Hughes Medical Institute Fellow of

PI: Bess

8/1/2016–6/30/2018

Life Sciences Research Foundation

“Discovery of a Bacterial Gene in the Gut Microbiome Encoding Metabolism of Dietary Lignans”

The goal of this project was to discover the genetic and biochemical basis for gut bacteria converting molecules rich in a plant-based diet into bioactive metabolites linked to anti-breast cancer effects.

University of Utah Graduate Research Fellowship

8/16/2014–5/15/2015

The goal of this project was to develop a mathematics-based approach to predict and optimize the behavior of molecules in chemical reactions.

Invited Lectures

Upcoming:

- ♦ Department of Biochemistry & Molecular Biology; Penn State University; December 2025
 - *Postponed*
- ♦ Student-Nominated Speaker; UC Davis Miller Symposium; March 2026.
- ♦ Perspectives in Neuroscience; Western University, London, Ontario, Canada; March 2026.

Completed:

- ◆ University of Southern California; Dept. of Pharmacology & Pharmaceutical Science; October 2025.
- ◆ Prostate Cancer Foundation Annual Retreat; Carlsbad, CA; October 2025.
- ◆ Keynote Speaker; UC San Diego Center for Microbiome Innovation; June 2025.
- ◆ University of California, Santa Barbara; Department of Chemistry; May 2025.
- ◆ Keynote Speaker, Midwest Microbiome Symposium; May 2025.
- ◆ University of Wisconsin, Madison; Department of Chemistry; May 2025.
- ◆ Cancer Research Institute Symposium on Basic Cancer Research; UC Irvine; May 2025.
- ◆ MARC in Cairo, Egypt; The Remedy Within Seminar Series; April 2025.
- ◆ Rising Stars in Biochemistry and Chemical Biology; American Chemical Society National Meeting, San Diego; March 2025.
- ◆ Los Alamos National Laboratory; Bioscience Division; December 2024.
- ◆ UCLA; Department of Chemistry and Biochemistry; April 2024.
- ◆ Harvard University; Department of Chemistry and Chemical Biology; December 2023.
- ◆ Boston College; Chemistry Department; December 2023.
- ◆ UC San Francisco; Biological and Medical Informatics, Biophysics, and Chemistry and Chemical Biology Seminar Series; November 2023.
- ◆ Arizona State University; School of Molecular Sciences; October 2023.
- ◆ Cornell University; Department of Chemistry & Chemical Biology; October 2023.
- ◆ North Carolina State University; Microbiome Seminar Series; October 2023.
- ◆ University of North Carolina, Chapel Hill; Department of Chemistry; October 2023.
- ◆ Duke University; Duke Microbiome Center; October 2023.
- ◆ UC Santa Cruz, Department of Microbiology & Environmental Toxicology; October 2023.
- ◆ University of Utah, Department of Chemistry; Salt Lake City, UT; May 2023.
- ◆ Keynote Address; Gordon Research Seminar on Drug Metabolism; Holderness, NH; July 2022.
- ◆ NSF Center for C–H Functionalization Sunset Symposium; Atlanta, Georgia; July 2022.
- ◆ American Society of Microbiology, Microbe Meeting; Washington DC; June 2022.
- ◆ American Chemical Society, “Gut Reaction” Session, San Diego, CA/Virtual; March 2022.
- ◆ NSF Center for C–H Functionalization Virtual Symposium: Alumni Edition; May 2021.
- ◆ STEM Scholars Program; Willamette University, Salem, Oregon; April 2021.
- ◆ Neuro-Rehabilitation Seminar Series; University of Southern California; April 2021.
- ◆ Center for Epigenetics and Metabolism; University of California, Irvine; December 2019.
- ◆ National Taiwan University–University of California, Irvine Symposium; Irvine, CA; December 2019.
- ◆ California State University, Los Angeles; Minority Opportunities in Research; November 2019.
- ◆ Chapman University; Chemistry & Biochemistry Program; Orange, CA; October 2019.
- ◆ Southern California Microbiome Symposium; Irvine, CA; September 2019.
- ◆ California State University, Los Angeles; Department of Chemistry & Biochemistry; September 2019.
- ◆ Breast Oncology Disease-Oriented Team; UC Irvine Medical Center; April 2019.
- ◆ Allergan Pharmaceutical; Irvine, CA; March 2019.
- ◆ Minority Sciences Program; University of California, Irvine; February 2019.
- ◆ American Chemical Society Meeting, Orange County Section; Santa Ana, CA; January 2019.
- ◆ University of California, Irvine; Department of Molecular Biology & Biochemistry; October 2018.
- ◆ UCI Microbiome Initiative; University of California, Irvine; October 2018.
- ◆ Breast Oncology Program Scientific Retreat; University of California, San Francisco; February 2018.
- ◆ University of California, Santa Barbara; Department Chemistry & Biochemistry; February 2018.
- ◆ University of Utah; Department of Biochemistry; Salt Lake City, UT; February 2018.
- ◆ University of Utah; Department of Pharmacology & Toxicology; Salt Lake City, UT; February 2018.
- ◆ University of Wisconsin-Madison; Department of Chemistry; Madison, WI; January 2018.
- ◆ Arizona State University; School of Molecular Sciences; Tempe, AZ; December 2017.

- ♦ Boston College; Chemistry Department; Chestnut Hill, MA; December 2017.
- ♦ University of California, Irvine; Department of Chemistry; Irvine, CA; November 2017.
- ♦ Rising Stars Symposium; University of Utah; Salt Lake City, UT; September 2017.
- ♦ American Chemical Society Annual Meeting; San Francisco, CA; April 2017.
- ♦ Microbial Pathogenesis Seminar Series; University of California, San Francisco; March 2017.
- ♦ American Chemical Society Annual Meeting; Philadelphia, PA; August 2016.
- ♦ NSF Center for C–H Functionalization Symposium; Atlanta, GA; August 2013.

University Teaching

- ♦ **Instructor: UNI STU 3, Freshman Seminar–Gut Reactions**, UC Irvine (Winter 2025, Winter 2026). Designed and taught introductory level course on gut microbiomes. This course is part of an NSF CAREER-funded study (PI: Bess) to improve STEM self-efficacy for students. The course leverages popular interest in the gut microbiome combined with experiential learning to engage students in scientific inquiry.

Total Enrollment: 28 students

- ♦ **Instructor: Chem 219, Chemical & Structural Biology**, UC Irvine (Fall 2018, Fall 2019, Winter 2021, Winter 2022, Winter 2023, Winter 2025). Taught graduate-level course on chemical biology based on the primary literature. Implemented new modules on writing research proposals and constructing and delivering scientific presentations.

Total Enrollment: 141 students

- ♦ **Instructor: Chem 51B, Organic Chemistry**, UC Irvine (Winter 2019, Winter 2020, Winter 2021, Winter 2022, Winter 2023, Winter 2025). Designed and taught undergraduate-level course on reactions mechanisms in organic chemistry for chemistry majors and non-majors. Designed extensive online platform to support and scaffold student learning.

Total Enrollment: 2,005 students

- ♦ **Teaching Assistant** for Introductory Undergraduate Organic Chemistry, University of Utah; Spring 2011, Spring 2008, Summer 2007.

- ♦ **Teaching Assistant** for Upper-Division Undergraduate Inorganic Chemistry, University of Utah; Fall 2010

University Service

- ♦ Organizer, UC Irvine–Los Alamos National Lab Connection Catalyst, June 2025.
- ♦ Chair, Mass Spectrometry Facility Faculty Oversight Committee, 2024–Present.
- ♦ Chemistry Department Graduate Admissions Committee, 2018–2023, 2024–Present.
- ♦ Cellular & Molecular Biosciences Graduate Program Admission Interviews and Recruiting, 2019–2023, 2024–2025.
- ♦ Small Animal Research Facilities Committee, 2018–2023.
- ♦ Chemical Biology Faculty Search Committee, 2021–2022.
- ♦ Host–Microbiome Faculty Search Committee, 2019–2020.

Professional Activities

- ♦ Peer-reviewer for publications, including *ACS Chemical Biology*, *mSystems*, *Cell Reports Medicine*, *Current Opinion in Chemical Biology*, *International Journal of Toxicology*, *Nature Reviews Microbiology*, *Natural Products Reports*.
- ♦ Reviewer, Grants: National Institutes of Health, Member Conflict: Topics in Gastroenterology Study Section, 2024.
- ♦ Faculty Advisory Board: UC Irvine Infectious Disease Science Initiative; 2019–2022.

- ◆ Member: Chao Family Comprehensive Cancer Center and Breast Oncology Disease-Oriented Team; 2019–Present.
- ◆ American Chemical Society; member from 2016–Present.
- ◆ American Society for Microbiology; member from 2019–Present.
- ◆ International Society for Microbial Ecology; member from 2019–Present.

Community Outreach

- ◆ Homecoming Speaker, UC Irvine School of Physical Sciences; March 2025.
- ◆ UC Irvine School of Physical Sciences Emeriti Luncheon Speaker; September 2024.
- ◆ UC Irvine [EarthRise Philanthropic Campaign Interview](#); September 2024.
- ◆ [Podcast Guest on “ChemTalk”](#). Interviewed July 2022; air date October 3, 2022.
- ◆ [California State Summer School for Mathematics and Science \(COSMOS\) Instructor](#): Partnered with Prof. Allon Hochbaum to design the new COSMOS cluster “Stressed Out Bugs: How Bacteria Respond to Changing Environments” for high school students; Summer 2022, Summer 2023, Summer 2024.
- ◆ Mentorship Panel: Gordon Research Seminar on Drug Metabolism; July 2022.
- ◆ PacificSTEM Speaker and Panelist: Spoke with students in middle and high schools from South LA and Orange Counties, as well as their families, about having a career in STEM; March 2022.
- ◆ Faculty Mentor: UC Irvine Association for Women in Science (AWIS), The Inner Circle Program; 2019.
- ◆ Lecturer: Osher Lifelong Learning Institute, UC Irvine; October 2019.
- ◆ Lecturer: Southern California Undergraduate Research Symposium, UC Irvine; August 2019.
- ◆ Keynote Speaker: ACS Orange County Undergraduate Awards Ceremony, Cypress College; April 2019.
- ◆ Guest Lecturer: Bridges to the Baccalaureate Program, City College of San Francisco; October 2016.
- ◆ Museum Exhibitor: Human Gut Microbiome Interactive Museum Exhibit, California Academy of Sciences, Nightlife Event; August 2016.
- ◆ Career-Day Speaker: Benjamin Franklin Intermediate School, Daly City, CA; January 2016.
- ◆ Investor Liaison: Wayne Brown Institute, non-profit venture accelerator, Salt Lake City, Utah; Fall 2014.
- ◆ Science Fair Judge: Greater Salt Lake City Area; Jan. 2013, Jan. 2014.
- ◆ Education, Outreach & Diversity Representative: NSF Center for C–H Functionalization Student Advisory Board; 2013–2014.
- ◆ Tutor: Upward Bound, program for low-income or first-generation college students, University of Utah; 2011–2012.
- ◆ Instructor: ACT Mathematics Preparation Course, program for low-income or first-generation college students, West Jordan, Utah; September 2011.
- ◆ Service Committee Chair: Student Alumni Board, University of Utah; 2007–2009.
- ◆ President: Phi Eta Sigma Honor Society, University of Utah; 2007–2008.
- ◆ Counselor: Rocky Mountain Candlelighters for Childhood Cancer, Salt Lake City, Utah; 2007

Other Training

- ◆ QPR Gatekeeper Certificate for Suicide Prevention, UC Irvine; November 2022.
- ◆ ZotAbility Ally Training, Disability Services Center, UC Irvine; October 2020.
- ◆ Digital Learning Institute Fellow; Digital Learning Institute, UC Irvine; 12-hour training; Fall 2020.
- ◆ Certified Engaged Instructor, Active Learning Institute, Division of Teaching Excellence & Innovation, UC Irvine; Based on in-class assessment of implementation of evidence-based active learning techniques; January 2020.

- ♦ Active Learning Institute, Division of Teaching Excellence & Innovation, UC Irvine; 8-week/12 hour training; July–August 2019.
- ♦ New Faculty Teaching Academy, UC Irvine; 2-day training; September 2018.
- ♦ Scientific Leadership & Management Skills Course, UC San Francisco; 16-hr training; November 2017.

Compliance-Intensive Research Infrastructure

Human Subjects Research

- ♦ Principal Investigator, IRB Protocol #2019-5091: “Functional Characterization of the Human Gut Microbiome.” Approved by UCI, 2019–Present.
Participants Consented: 26 people (60-minute/participant for PI to perform enrollment)
- ♦ Principal Investigator, IRB Protocol #4368: “Gut Reactions: A research-immersion program exploring human gut microbiotas to improve STEM self-efficacy,” Approved by UCI IRB, 2024–Present.
Participants Consented: 19 people.
- ♦ Principal Investigator, IRB Protocol #6790: “GUTSY-PD: GUT Microbiome and α -Synuclein in Parkinson’s Disease—Exploring the Gut Microbiome to Unravel Parkinson’s Disease.”
In review by UCI IRB.
- ♦ Principal Investigator, IRB Protocol #7314: “Gut Reactions: A research-immersion program with diet intervention exploring human gut microbiotas to improve STEM self-efficacy.”
In review by UCI IRB.

Animal Research

- ♦ Principal Investigator, IACUC Protocol #18-181 for Animal (Mouse) Research, “Bess Lab Gnotobiotic Protocol,” Approved by UCI IACUC, 2019–2024.
Animals Bred: 297 mice.

Biohazardous Research

- ♦ Principal Investigator, BUA Protocol #BUA-R255 for Biosafety Research.