

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

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Professional Positions Held

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

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	

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

♦ 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 1 st -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**Independent Research:**

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.; 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.

Postdoctoral, Graduate, and Post-Baccalaureate Research:

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.; Sugeran, 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.

Invited Lectures

- ◆ 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.
- ◆ Keynote Address; Gordon Research Seminar on Drug Metabolism; July 2020. *Conference was cancelled due to pandemic*
- ◆ 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 Meeting; 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.
- ◆ 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.

Teaching & Outreach

- ◆ **Instructor: Chem 219, Chemical & Structural Biology**, UC Irvine (Fall 2018, Fall 2019, Winter 2021). 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.
- ◆ **Instructor: Chem 51B, Organic Chemistry**, UC Irvine (Winter 2019, Winter 2020, Winter 2021). Taught undergraduate-level course on reactions mechanisms in organic chemistry for chemistry majors and non-majors.
- ◆ **Faculty Mentor: UC Irvine Association for Women in Science (AWIS), The Inner Circle Program** (2019–Present)
- ◆ **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. 2014, Jan. 2013)
- ◆ **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)
- ◆ **Teaching Assistant: Organic Chemistry**, University of Utah (Spring 2011, Spring 2008, Summer 2007)
- ◆ **Instructor: ACT Mathematics Preparation Course**, program for low-income or first-generation college students, West Jordan, Utah (September 2011)
- ◆ **Teaching Assistant: Inorganic Chemistry**, University of Utah (Fall 2010)
- ◆ **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

Professional Activities & Memberships

- ◆ Faculty Advisory Board: UC Irvine Infectious Disease Science Initiative (2019–Present)
- ◆ 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)

Other Leadership Roles & Training

- ◆ Scientific Leadership & Management Skills Course, UC San Francisco, 16-hr training (November 2017)
- ◆ Asst. Research Coordinator, Pain Research Center, University of Utah School of Medicine (2008–2010)
- ◆ Violin Instructor, Black Violin Studio, Bountiful, Utah (2005–2009)

Research Funding**Current Support:**

Global Probiotics Council's PI: Bess 4/27/2021–4/26/2022
 Young Investigator Grant for Probiotics Research
"Using Dietary Fiber to Harvest Novel Probiotics from the Human Gut Microbiota"

Departmental Start-Up Funds, University of California, Irvine 7/1/2018–6/30/2021

Prior Support:

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"

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"

American Cancer Society Institutional Research Grant PI: Bess 11/1/2019–10/31/2020
"Uncovering the Human Gut Microbiome's Role in Estrogen Metabolism"

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"

University of Utah Graduate Research Fellowship 8/16/2014–5/15/2015