

Kristin Jansen Labby

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PROFESSIONAL APPOINTMENTS

- 2016-present Assistant Professor of Chemistry – Beloit College, Beloit, WI
2014- 2016 Visiting Assistant Professor of Chemistry – Beloit College, Beloit, WI
2013-2014 Lecturer I – Department of Chemistry, University of Michigan, Ann Arbor, MI

EDUCATION AND TRAINING

- 2013-2014 Postdoctoral Research Fellow - Department of Chemistry, University of Michigan
Research advisor: Prof. Brent Martin
2012-2013 Postdoctoral Fellow - Life Sciences Institute, University of Michigan, Ann Arbor, MI
Research advisor: Prof. Sylvie Garneau-Tsodikova
2007-2012 Ph.D. (Organic Chemistry), Northwestern University, Evanston, IL
Research advisor: Prof. Richard B. Silverman
2003-2007 B.S. (Chemistry, Biochemistry), University of Wisconsin, Madison, WI
Research advisors: Prof. Andrew F. Bent, Prof. Hans J. Reich, Prof. Martin T. Zanni

HONORS AND AWARDS

- 2020 Beloit College Phee Boon Kang '73 Prize for Innovation in Teaching with Technology
2019 Chemistry Community of Scholars (cCWCS-NSF) Conference Travel Award
2013 Spring 2013 CIBA Young Scientist Travel Award presented by the ACS Younger Chemists Committee
2012 Spring 2012 ACS Biological Chemistry Division Travel Award
2011-2012 National Science Foundation (NSF) GK-12 Fellowship
2011 Sigma Aldrich Award for Outstanding Poster Presentation, 16th Annual Drug Discovery Symposium, Chicago, IL
2011 Guiding Green Graduate Student Award, 15th Annual Green Chemistry Conference
2006 UW-Madison Hilldale Undergraduate Research Fellowship
2006 UW-Madison Department of Plant Pathology Summer Symbiosis Program Participant
2006 UW-Madison Department of Chemistry Margaret McLean-Bender Scholarship for Undergraduate Academic Achievement

GRANTS AND FUNDING

- 2020 Phee Boon Kang Prize for Innovation in Teaching with Technology, Beloit College (\$1400)
2019 Tiny Earth and the Chan Zuckerberg Initiative: A Pilot Bridging Communities through Soil and Discovery (\$1500)
2016 Labs Across the Curriculum Award, Beloit College (\$645)

TEACHING EXPERIENCE

BELOIT COLLEGE: COURSES TAUGHT SINCE 2014:

- CHEM 117: Introductory Chemistry
CHEM 225: Instrumental Analysis of Art and Artifacts
CHEM 225: Instrumental Analysis: NMR, IR and Mass Spectroscopy
CHEM 230: Organic Chemistry-I
CHEM 232: Organic Chemistry with a Biological Emphasis
CHEM 280: Professional Tools for Scientific Careers (sophomore level)
CHEM 360: Microbes to Molecules: Antibiotic Discovery (a Tiny Earth course)

CHEM 370: Topics in Chemistry: Chemistry in Art
 CHEM 370: Topics in Chemistry: Next-Generation Antimicrobials
 CHEM 380: Professional Tools for Scientific Careers (capstone course)

UNIVERSITY OF MICHIGAN:

CHEMISTRY 130: General Chemistry (Summer 2013)
 CHEMISTRY 210: Structure & Reactivity (Fall 2013, Spring 2014)

ADDITIONAL TEACHING EXPERIENCES:

2013-2014 **Center for Talent Development, Northwestern University**
 Accelerated Weekend Experience: *Biotechnology*, Mar. 1-2, 2015.
 Accelerated Weekend Experience: *Outbreak! Exploring Epidemiology*, Nov. 7-8, 2014.
 Accelerated Weekend Experience: *The Architecture of Molecules: Building 3-D Visualizations of Biological Structures*, Dec 7-8, 2013 and Dec 8-9, 2012.

2011-2012 **NSF GK-12 Fellowship (Reach for the Stars), Northwestern University,**
 Partnership with Nettelhorst Middle School, Chicago Public Schools.

March 29, 2010 **Northwestern University SPLASH Workshop Molecules to Medicines**

2007-2008 **Northwestern University Organic Chemistry: Teaching Assistant**

2005-2006 **UW-Madison Chemistry Learning Center: Science Scholars Fellow**

UNDERGRADUATE RESEARCH STUDENTS MENTORED

BELOIT COLLEGE:

Onix Roige-Diez '23, summer 2021 (Optimize FAME GC methods)
 Alyssa Morris '21 Summer 2020 (Norris Summer Science Scholar, Pigment Synthesis, Honors Term S21)
 Marit Simmons '20, Summer 2019, Fall 2020 (Pakula Biomedical Fellow, Honors Term F20)
 Koleman Lund '20, Summer 2019, Spring 2020 (Pakula Biomedical Fellow, Honors Term S20)
 Brenda Martinez-Flores Spring 2019 – present (McNair Scholar)
 Jenna Nordin '20 Spring 2018 (CHEM 390).
 Melissa Pelkey '19 Summer 2017 (Biomedical Scholars)
 Leah Mellett '18 Summer 2017 – Fall 2017 (Summer Science Scholars, CHEM390)
 Zachary Cole '17 Summer 2017 (Summer Science Scholar)
 Miranda Simes '17 Spring 2015 – Fall 2017 (CHEM 390, Biomedical Scholars, Honors Term).
 Larkin Miers '17, Spring 2015 - Fall 2016 (CHEM 390).

UNIVERSITY OF MICHIGAN:

Jasmine Palakurthi '16, Martin Lab Fall 2013- Spring 2014
 Mackenzie Ellsberry '15 Martin Lab Spring-Summer 2014

NORTHWESTERN UNIVERSITY:

Jigar Patel '11, Silverman Lab Fall 2010-Spring 2011.
 Stephanie Choing '10, Silverman Lab Fall 2008 – Spring 2010.

PUBLICATIONS

JOURNAL ARTICLES:

1. Tom, C. T. M. B., Crellin, J. E., Motiwala, H. F., Stone, M. B., Davda, D., Walker, W., Kuo, Y-H., Hernandez, J.L., **Labby, K.J.**, Gomez-Rodriguez, L., Jenkins, P.M., Veatch, S.L., Martin, B.R. Chemoselective ratiometric imaging of protein S-sulfenylation. *Chem Comm*, **2017**, 53(53), 7385–7388.
2. Majmudar, J.D., Konopko, A.M., **Labby, K.J.**, Tom, C.T.M.B., Crellin, J.E., Prakash, A., Martin, B.R., Harnessing redox cross-reactivity to profile distinct cysteine modifications. *J. Am. Chem. Soc.* **2016**, 138(6), 1852-1859.
3. Won, S.J., Davda, D., **Labby K.J.**, Hwang, S.Y., Pricer, R., Majmudar, J.D., Armacost, K.A., Rodriguez, L.A., Rodriguez, C.L., Chong, F.S., Torossian, K.A., Palakurthi, J., Hur, E.S., Meagher, J.L., Brooks, C.L., Stuckey, J.A., Martin, B.R. Molecular Mechanism for Isoform-Selective Inhibition of Acyl Protein Thioesterases 1 and 2 (APT1 and APT2), *ACS Chem. Biol.* **2016**, 11(12), 3374-3382.

- Garneau-Tsodikova, S, **Labby, K.J.** Mechanisms of Resistance to Aminoglycoside Antibiotics: Overview and Perspectives, *Med. Chem. Comm.* **2016**, *7*, 11-27. *Featured in themed issue: Antibiotic Resistance.*
- Labby, K. J.**, Watsula, S. G., Garneau-Tsodikova, S. Interrupted adenylation domains: unique bifunctional enzymes involved in nonribosomal peptide biosynthesis. *Natural Product Reports* **2015**, *32*, 641-653.
- Davydov, R., **Labby, K. J.**, Chobot, S. E., Lukoyanov, D. A., Crane, B. R., Silverman, R. B., Hoffman, B. M. Enzymatic and cryoreduction EPR studies of the hydroxylation of methylated N^ω-hydroxy-L-arginine analogues by nitric oxide synthase from *Geobacillus stearothermophilus*. *Biochemistry*, **2014**, *53*, 6511–6519.
- Jennings, B.C.*, **Labby, K. J.***, Garneau-Tsodikova, S. Redesign of substrate specificity and identification of aminoglycoside binding residues of Eis from *Mycobacterium tuberculosis*. *Biochemistry*, **2013**, *52(30)*, 5125-5132. (* denotes equal author contribution)
- Labby, K. J.**, Garneau-Tsodikova, S., Strategies to overcome the action of aminoglycoside-modifying enzymes for treating resistant bacterial infections. *Future Med. Chem.* **2013**, *5(11)*, 1285-1309.
- Zrihen-Berkov, Y., Green, K. D., **Labby, K. J.**, Feldman, M., Garneau-Tsodikova, S., Fridman, M. Synthesis and evaluation of hetero- and homodimers of ribosome-targeting antibiotics: Antimicrobial activity, in vitro inhibition of translation, and drug resistance. *J. Med. Chem.* **2013**, *56(13)*, 5613-5625.
- Labby, K. J.**, Li, H., Roman, L. J., Martásek, P., Poulos, T. L., Silverman, R. B. Methylated N^ω-hydroxy-L-arginine analogues as mechanistic probes for the second step of the nitric oxide synthase-catalyzed reaction. *Biochemistry*. 2013, *52(18)*, 3062-3073.
- Trippier, P., **Labby, K. J.**, Hawker, D. D., Mataka, J., Silverman, R. B. Target- and mechanism-based therapeutics for neurodegenerative diseases: Strength in numbers. *J. Med. Chem. (Perspective)*, **2013**, *56(8)*, 3121-3147.
- Li, H., Xue, F., Kraus, J.M. Ji, H., **Labby, K. J.** Mataka, J., Delker, S. Martásek, P., Roman, L. J., Poulos, T. L., Silverman, R.B. Cyclopropyl- and methyl-containing inhibitors of neuronal nitric oxide synthase. *Bioorg. Med. Chem.* **2013**, *21(5)*, 1333-1343.
- Huang, H., Ji, H., Li, H., Jing, Q., **Labby, K. J.**, Martásek, P., Roman, L. J., Poulos, T. L., Silverman, R.B. Selective monocationic inhibitors of neuronal nitric oxide synthase. Binding mode insights from molecular dynamics simulations. *J. Am. Chem. Soc.* **2012**, *134(28)*, 11559-11572.
- Labby, K. J.**, Xue, F., Kraus, J. M., Ji, H., Mataka, J., Li, H., Martásek, P., Roman, L. J., Poulos, T. L., Silverman, R. B. Intramolecular hydrogen bonding: a potential strategy for more bioavailable inhibitors of neuronal nitric oxide synthase. *Bioorg. Med. Chem.* **2012**, *20(7)*, 2435-2443.
- Sun, W., Cao, Y., **Labby, K. J.**, Bittel, P., Boller, T., Bent, A. F. Probing the Arabidopsis flagellin receptor: FLS2-FLS2 association and the contributions of specific domains to signaling function. *Plant Cell* **2012**, *24(3)*, 1096-1113.
- Xue, F., Kraus, J. M., **Labby, K. J.**, Ji, H., Mataka, J., Xia, G., Li, H., Delker, S. L., Roman, L. J., Martásek, P., Poulos, T. L., Silverman, R. B. Improved synthesis of chiral pyrrolidine inhibitors and their binding properties to neuronal nitric oxide synthase. *J. Med. Chem.* **2011**, *54(18)*, 6399-6403.
- Jones, A. C., Sanders, A. W., Sikorski, W. H., **Jansen, K. L.**, Reich, H. J. Reactivity of the triple ion and separated ion pair of tris(trimethylsilyl)methyl lithium with aldehydes: a RINMR study. *J. Am. Chem. Soc.* **2008**, *130(19)*, 6060-6061.
- Dunning, F. M., Sun, W., **Jansen, K. L.**, Helft, L., Bent, A. F. Identification and mutational analysis of Arabidopsis FLS2 leucine-rich repeat domain residues that contribute to flagellin perception. *Plant Cell* **2007**, *19(10)*, 3297-3313.

BOOK CHAPTERS:

- Chevrette, M. G.; Selem-Mojica, N.; Aguilar, C.; **Labby, K.**; Bustos-Diaz, E. D.; Handelsman, J.; Barona-Gómez, F. Evolutionary Genome Mining for the Discovery and Engineering of Natural Product Biosynthesis. In *Engineering Natural Product Biosynthesis: Methods and Protocols, Methods in Molecular Biology*; volume 2489, Skellam, E., Ed.; Humana: New York, NY, 2022. DOI: 10.1007/978-1-0716-2273-5_8
- Labby, K. J.** The Chemistry of Art and Artifacts: A Sophomore-Level, Thematic Chemical Instrumentation Course. In *Contextualizing Chemistry in Art and Archaeology: Inspiration for*

- Instructors*; Braun K. L., Labby, K. J., Eds.; ACS Symposium Series, Vol. 1386; American Chemical Society: Washington, DC, USA, 2021; pp 113- 133. DOI: 10.1021/bk-2021-1386.ch007
3. **Labby, K. J.**; Braun, K. L.; Preface—Chemistry’s Diverse Applications in Art and Archaeology. In *Contextualizing Chemistry in Art and Archaeology: Inspiration for Instructors*; Braun K. L., Labby, K. J., Eds.; ACS Symposium Series, Vol. 1386; American Chemical Society: Washington, DC, USA, 2021; pp xi-xvii. DOI: 10.1021/bk-2021-1386.pr001

BOOK EDITED:

Contextualizing Chemistry in Art and Archaeology: Inspiration for Instructors, ACS Symposium Series vol. 1386, Editor(s): Braun, K. L.; Labby, K.J., Publication Date (Web): September 3, 2021.

SEMINARS AND POSTER PRESENTATIONS**SYMPOSIA ORGANIZED:**

Teaching Chemistry through Art and Archaeology, 2022 Biennial Conference on Chemical Education, West Lafayette, IN, July 31-August 4, 2022.

Chemistry Connections in Art & Archaeology, 2020 Biennial Conference on Chemical Education.

SEMINARS:

1. Accepted for July 2022 BCCE: Technical Analysis of Paintings Course and Museum Exhibition (final paper number: BCCE 370)
2. **Labby, K.J.** Tapas Talks: Tiny Earth Chem Updates from Beloit College, 2021 Tiny Earth Symposium (virtual), June 4, **2021**.
3. **Labby, K.J.** “Tapas Talks” 2020 Tiny Earth Symposium (hosted virtually), June 17, **2020**.
 - a. Introductory Phylogeny Activity with Connections to Tiny Earth Isolates
 - b. Chan-Zuckerberg Initiative Tiny Earth at Beloit College
4. **Labby, K. J.** Chemistry in art within an analytical chemistry course. American Chemical Society Spring 2019 National Meeting, Orlando, FL, USA, Apr. 3, **2019**. *CHED 1856*. (Also invited to *Sci-Mix poster session*).
5. **Labby, K. J.**, Parmentier, L. E. NMR analysis of essential oils: an adaptable (and fragrant!) undergraduate laboratory experiment. American Chemical Society Spring 2019 National Meeting, Orlando, FL, USA, Mar 31, **2019**. *CHED 80*.
6. **Labby, K. J.**, Parmentier, L. E. Isolation and analysis of lavender essential oil: an undergraduate organic chemistry experiment. American Chemical Society 2018 Midwest Regional Meeting, Ames, IA, USA, Oct. 22, **2018**.
7. **Labby, K.J.** Scientists vs. Bacteria Part 2: Mechanisms of Resistance to Antibiotics, Beloit College Science Friday, Beloit, WI, Feb. 5, 2016.
8. **Labby, K.J.** Scientists vs. Bacteria Part 1: Natural Products, Beloit College Science Friday Seminar Series, Beloit, WI, Sep. 11, 2015.
9. **Labby, K. J.** Putting Your Best Foot Forward in the Lab- Lab Expectations. Michigan Health Sciences Undergraduate Research Academy, University of Michigan, Ann Arbor, MI, Jun. 3, **2014**.
10. **Labby, K. J.** and Hernandez, J.L Introduction to Cancer Research. Undergraduate Research Opportunity Program (UROP), University of Michigan, Ann Arbor, MI, USA, Mar. 13, **2014**.
11. **Labby, K. J.** Protein Visualization Workshop: Interactive Biochemistry using PyMOL and the PDB. 246th Conference of the American Chemical Society, Indianapolis, IN, USA, Sept. 11, **2013**. *CHED 381*.
12. **Labby, K. J.**, Paulsen, M. Introducing medicinal chemistry research to middle school students: a multi-faceted approach from a GK-12 experience. 245th Conference of the American Chemical Society, New Orleans, LA, USA, Apr. 10, **2013**. *CHED 1655*.

POSTERS:

1. Mellett, L., Pelkey, M., Simes, M.L. Cole, Z., **Labby, K.J.** Synthesis of potential AAC(6’)-Ib inhibitors to combat bacterial resistance to aminoglycoside antibiotics. 255th ACS, New Orleans, LA, USA (CHED 1175) Mar 18-22, **2018**.

2. Simes, M. L., Miers, L., **Labby, K. J.** Synthesis of potential AAC(6')-Ib inhibitors to combat bacterial resistance to aminoglycoside antibiotics.
 - a. 253rd ACS, San Francisco, CA, USA (CHED 1211) Apr 2-6, **2017**.
 - b. ASBMB Annual Meeting, Chicago, IL, USA Apr 22-26, **2017**.
3. **Labby, K. J.**, Palakurthi, J., Martin, B.R. Structure and inhibition of acyl protein thioesterases.
 - a. 249th ACS, Denver, CO, USA, Mar. 22-25, **2015**. *BIOL 51*.
 - b. 34th Midwest Enzyme Chemistry Conference, Evanston, IL. Sep. 27, **2014**.
4. **Labby, K. J.**, Paulsen, M. Introducing medicinal chemistry research to middle school students: a multi-faceted approach from a GK-12 experience. 245th ACS, New Orleans, LA, USA, Apr. 7-11, **2013** (*Invited to SCI-MIX poster session*).
5. **Labby, K. J.**, Davydov, R., Li, H., Hoffman, B. M., Poulos, T. L., Silverman, R. B. Substrate analogs as mechanistic probes of nitric oxide synthase. (MEDI-104) 243rd ACS, San Diego, CA, USA, Mar. 25-29, **2012**.
6. **Labby, K. J.**, Xue, F., Kraus, J. M., Ji, H., Li, H., Poulos T. L., Silverman, R. B. Intramolecular hydrogen bonding: A strategy for more bioavailable inhibitors of neuronal nitric oxide synthase.
 - a. 16th Annual Drug Discovery Symposium, Chicago, IL, Oct. 12, **2011**. (*Awarded Outstanding Graduate Student Presentation*)
 - b. 31st Midwest Enzyme Chemistry Conference, Chicago, IL, Oct. 15, **2011**.
 - c. Novartis Lecture in Organic Chemistry, Evanston, IL Nov. 17, **2011**.

STUDENT PRESENTATIONS:

1. 2021 Tiny Earth Symposium, June 4, 2021 (University of Wisconsin-Madison, hosted virtually)
 - a. Tyler Hoover, *Screening Bacterial Isolates For Potential Antibiotic Activity*.
 - b. Namwali Ndalama, *Characterization of Antibiotic Producers From Soil*.
 - c. Zachary Wienberg, *BUGging the Question*.
 - d. Rose Williams, *A Hole new Frontier: Discovering new Antibiotics through the soil beneath us*.
2. 2020 Tiny Earth Winter Symposium, December, 2020 (University of Wisconsin-Madison, hosted virtually)
 - a. Marit Simmons, *Optimization of Natural Product Extraction Methods for the Tiny Earth Chem Course*.
3. 2020 Tiny Earth Symposium, June 11, 2020 (University of Wisconsin-Madison, hosted virtually)
 - a. Alyssa Morris, *Soil Nutrient Level and Antibiotic Producing Bacteria*.
 - b. Brenda R. Martinez-Flores, *Effect of Milk Thistle Supplement on Bacteria Diversity and Antibiotic Producer Growth*.
 - c. Marit Simmons, *Supplementation of Culture Media with Breastmilk for the Growth of Antibiotic-Producing Soil Bacteria*.
4. Brenda R. Martinez-Flores, Solving the Antibiotic Crisis with Soil. Oral Presentation, Ronald E. McNair Scholars Research Conference, Albuquerque, NM, USA, Oct 3-4, 2019.

EXHIBITIONS

November 2021- *ART IN A NEW LIGHT: SCIENTIFIC ANALYSIS OF WORKS IN THE WRIGHT MUSEUM*

WORKSHOP FACILITATIONS

March 26th 2021 **Tiny Earth Chemistry Course** (virtual)
 June, 17 2020 **Tiny Earth Symposium 2020** (virtual)
 Cohosted antiSMASH workshop for ~75 Tiny Earth Partner Instructors.

WORKSHOPS ATTENDED

June 22-24, 2022 Associated Colleges of the Midwest (ACM) Supporting Student Well-Being and Academic Engagement.
 May 27-28, 2020 **Beloit College Mellon Universal Design for Learning Workshop** “Mentoring and Advising in STEM” Lead by Prof. Becky Packard.

- Aug 12-13, 2019 **Beloit College Mellon Universal Design for Learning Workshop** “High-Impact Practices for Inclusivity and Diversity” Lead by Prof. Thomas Laird.
- Jan 7–11, 2019 **Tiny Earth Partner Instructor Training, UW-Madison Institute for Discovery** Training to instruct Tiny Earth, “student-sourcing antibiotic discovery” research curriculum within an undergraduate course.
- July 31-Aug4 2017 **NSF cCWCS Advanced Chemistry in Art Workshop, Villanova University** Lectures, labs, field trip to Philadelphia Museum of Art conservation labs and Chemical Heritage Foundation. Art conservation and restoration and instrumental analysis of artworks.
- July 19-24, 2015 **NSF cCWCS Chemistry and Art Workshop, Bismarck State College** Lectures, labs, activities, and field trips in topics of chemistry and art: light and color, paints and pigments, metals, fiber arts, papermaking, conservation science, and museum studies.
- July 14-16, 2014 **Midwest Regional POGIL Workshop, University of St. Thomas, St. Paul, MN** Introductory/Intermediate workshop for Process Oriented Guided inquiry Learning
- Jun 18-29, 2012 **Dissertation Boot Camp, Northwestern University**
- Mar 16-18, 2012 **GK-12 Annual Meeting, Washington DC**
Updates from other GK-12 programs, networking, perpetrations for the future of the NSF GK-12 Program.
- May 31, 2011 **Improving Your Skills as a Research Mentor, Chris Pfund, Northwestern University**
- Jun 21-23, 2011 **15th Annual Green Chemistry & Engineering Conference Washington, DC**
Seminars and perspectives in green chemistry, workshop for graduate students to learn outreach activities in green chemistry and sustainability.

SERVICE

INTERNAL (BELOIT COLLEGE):

- 2020-present Health Professions Advisory Committee (HPAC) Chair, Beloit College
- 2020-present Health & Healing Career Channel Co-coordinator
- 2020-2022 Beloit College Curriculum Oversight Committee (COA)
- 2017-2019 Beloit College Academic Performance Committee (aPC)

EXTERNAL:

- 2021-present Tiny Earth Classic Curriculum Committee, member
- 2020-present Tiny Earth Chemistry Course Working Group, Co-Chair
- 2020-2021 Tiny Earth Curriculum Pivot-to-Online Working Group, member

MANUSCRIPT REVIEWER:

Journals: *Antimicrobial Agents and Chemotherapies*, *Journal of Chemical Education*, *Medicinal Chemistry Communications*, *PLOS ONE*.

Book Series: American Chemical Society Symposium Series, *Frontiers in Clinical Drug Research*.

MEMBERSHIPS IN PROFESSIONAL SOCIETIES

- Tiny Earth Partner Instructor (since 2019)
- American Chemical Society (ACS, since 2007)
- Phi Lambda Upsilon (PLU), The National Chemistry Honor Society, since 2007.

COMMUNITY OUTREACH

- Beloit College's Wisconsin Science Festival Event* Oct 23, 2021
- Beloit College's First Wisconsin Science Festival Event* Oct 19, 2019
- Beloit College Family Discovery Night Volunteer* 2014-2016
- UW-Madison Discovery Center Volunteer* 2014-present
- Materials Research Science and Engineering Center (MRSEC) Science Speakers Core* 2010-2011
- Materials Research Science and Engineering Center (MRSEC) Outreach Associate, Northwestern University* 2009-2010