Exponent®
Engineering & Scientific Consulting

Caitlin McCadden, Ph.D.

Scientist | Chemical Regulation and Food Safety
Washington DC
+1-202-772-4929 | cmccadden@exponent.com

Professional Profile

Dr. Caitlin McCadden is a multidisciplinary scientist with expertise in natural product chemistry, molecular biology, bioanalytical chemistry, and biocatalysis. She has extensive experience in heterologous expression, structural elucidation, protein engineering, high-throughput screening, and natural product biosynthesis. Her research combined experimental approaches with bioinformatics and computational biology to discover first-in-class bacterial enzymes with evolutionary significance. At Exponent, Dr. McCadden focuses on regulatory support for pesticide products under EPA's Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), preparing registration packages and guiding clients through complex federal and state compliance requirements. Her diverse background and ability to manage complex research projects enable her to deliver innovative solutions that integrate rigorous science with regulatory strategy.

Dr. McCadden's recent work includes the discovery and characterization of novel bacterial enzymes and natural products, resulting in publications in Nature Communications, ACS Catalysis, and Organic & Biomolecular Chemistry. During her doctoral research, she leveraged computational biology, enzyme characterization, and advanced analytical techniques, including LC/MS, LC/MS/MS, NMR, and chromatography, to understand how nature catalyzes complex chemical reactions and evolves over time. She has been awarded NIH Supplemental Graduate Training Grant, multiple departmental scholarships for research excellence, and presented at national conferences. Additionally, she developed heterologous expression platforms to expand chemical diversity and investigate green catalysis methods. Her prior industry experience includes optimizing extraction processes and authoring SOPs for regulatory compliance in the cannabis sector. By combining deep technical expertise with a collaborative approach, Dr. McCadden helps clients translate complex scientific data into practical strategies for successful product registration.

Academic Credentials & Professional Honors

Ph.D., Chemistry, University of Florida, 2025

B.A., Chemistry, McDaniel College, 2019

Univ. of FL Office of Research Graduate Student Travel Grant (2025)

National Institute of General Medical Sciences (NIGMS) of the National Institute of Health (NIH) Diversity Grant Scholar Awardee: R35GM142574 (2023-2025)

ACS Division of Biological Chemistry Travel Award (2024)

Univ. of FL College of Liberal Arts and Sciences Travel Grant (2024)

William R. & Arlene F. Ruegamer Scholarship for Overall Excellence in Graduate Biochemistry Research

(2023)

American Society of Pharmacognosy President’s Travel Grant (2022)

University of FL. Women’s Club Graduate Scholarship (2021)

Phi Beta Kappa, National Historic Honors Society (2019)

The Janus Yentsch Ellenburg '42 Scholarship for Women in Chemistry (2019)

McDaniel College Undergraduate Creativity Grant (2018)

Psi Chi, International Honors Society in Psychology (2018)

The H. Samuel Case and Susan Snodgrass Case Award for Excellence in Scholarly Research (2018)

Beta Beta Beta, National Biology Honors Society (2017)

Gamma Sigma Epsilon, National Chemistry Honors Society (2017)

Licenses and Certifications

Good Clinical Practices (GCP) in Medical Device Clinical Investigations

Academic Appointments

Undergraduate Research Mentor, Chemistry, University of Florida, 2023-2025

Committee Member - Chemical-Biology Interface, College of Pharmacy, University of Florida, 2023-2025

Biohazardous Waste Lab Manager, Chemistry, University of Florida. 2021-2025

LC/MS Instrument Lab Manager, Chemistry, University of Florida, 2020-2025

Graduate Recruitment Ambassador, Chemistry, University of Florida, 2020-2025

Teaching Assistant, Chemistry, University of Florida, 2019-2022

Teaching Assistant, Chemistry, McDaniel College, 2017-2019

Tutor, Chemistry, McDaniel College, 2017-2019

Prior Experience

Ph.D. Candidate, University of Florida, 2019-2025

Laboratory Technician, Maryland Compassionate Care and Wellness, 2018-2019

Independent Researcher, McDaniel College, 2017-2018

Professional Affiliations

Household and Commercial Products Association (HPCA)

American Society of Pharmacognosy (ASP)

American Chemical Society (ACS)

Publications

McCadden C, Łomowska-Keehner D, Qu T, Nafie J, Alsup T, Rudolf J. Discovery of a plant-like tridomain bifunctional syn-abieta-7,13-diene synthase in Streptomyces. Organic & Biomolecular Chemistry 2025; 23:9845-9850

McCadden C, Alsup T, Ghiviriga, I, Rudolf J. Biocatalytic diversification of abietic acid in Streptomyces. Journal of Industrial Microbiology and Biotechnology 2025; 52:kuaf003.

Wei X, Ning W, **McCadden C**, Alsup T, Li Z, Łomowska-Keehner D, Nafie J, Qu T, Osei Opuku M, Gillia, G, Xu B, Icenhour D, Rudolf J. Exploring and expanding the natural chemical space of bacterial diterpenes. Nature Communications. Nature Communications 2025; 16:3721.

Alsup T, Łomowska-Keehner D, Osei Opoku M, Li Z, **McCadden C**, Qu T, Gillia G, Nafie J, Rudolf J. Discovery of UbiA-type cyathane synthases in bacteria. ACS Catalysis 2025; 15(19):16873–16881.

Alsup T, Li Z, **McCadden C**, Jagels A, Łomowska-Keehner D, Marshall E, Dong L.B, Loesgen S, Rudolf J. Early-stage biosynthesis of phenalinolactone diterpenoids involves sequential prenylation, epoxidation, and cyclization. Royal Society of Chemical Biology 2024; 5:1010–1016.

van Santen J, Poynton E, Iskakova D, McMann E, Alsup T, Clark T, Fergusson C, Fewer D, Hughes A, **McCadden C**, Parra J, Soldatou S, Rudolf J, Janssen E, Duncan K, Linington R. The Natural Products Atlas 2.0: a database of microbially-derived natural products. Nucleic Acids Research 2022; 50(1):1317–1323.

Holechek J, Lease R, Thorsell A.G., Karlberg T, **McCadden C**, Grant R, Keen A, Callahan E, Schuler H, Ferraris D. Design, synthesis and evaluation of potent and selective inhibitors of mono-(ADP-ribosyl)transferases PARP-10 and PARP-14. Bioorganic & Medicinal Chemistry Letters 2018; 28(11):20502054.

Presentations

McCadden C. Discovery and characterization of bacterial bifunctional diterpene synthases reveal evolutionary insights. ACS National Meeting, March 2025.

McCadden C. Utilizing biocatalytic strategies to explore terpenoid diversity in bacteria. Invited Scholar: NIH Diversity Supplement Professional Development and Networking Workshop, Sept 2024.

McCadden C. Biocatalytic diversification of a diterpenoid substrate using a cytochrome P450 targeted approach. Awarded Presentation: ACS National Meeting, March 2024.

McCadden C. The importance of funding opportunities in the advancement of graduate research. Invited Speaker: CLAS Advancement Meeting, Jan 2023.

McCadden C. Genome-guided discovery of bacterial cytochromes P450 for diterpene functionalization. Best Poster Award: Chemistry-Biology Interface (CBI) Predoctoral Training Program Mini-Symposium, Sept 2022.

McCadden C. Genome mining of bacterial cytochrome P450 enzymes for novel biocatalysts. Awarded Presentation: American Society of Pharmacognosy Annual Meeting, July 2022.

McCadden C. Functional characterization of cytochrome P450 enzymes from Streptomyces. Awarded

Presentation: Florida Annual Meeting and Exposition (FAME) Conference, Sept 2021.

McCadden C. Optimization of the decarboxylation of Δ9-tetrahydrocannabinol to produce medical cannabis concentrates. Presentation: McDaniel College Academic Affairs Undergraduate Research Reception, May 2019.

McCadden C. Design, synthesis, and evaluation of selective inhibitors of mono-(ADP-ribosyl)transferase, PARP-10. Poster: ACS National Meeting, March 2018.

McCadden C. Gamma Beta Chapter Representative. 47th Biennial Gamma Sigma Epsilon Chemistry Honors Society Convention, Niagara University, 2017.

Project Experience

Dr. McCadden provides regulatory and technical support for products regulated under the US Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), including conventional pesticides, biopesticides, and antimicrobials. At the federal level, she prepares registration packages for new products, amendments, and notifications, and at the state level, she coordinates the submission of state registrations and renewals.