Exponent®
Engineering & Scientific Consulting

Alexandra Cordova, Ph.D.

Scientist | Environmental and Earth Sciences
Austin
+1-512-634-2963 tel | acordova@exponent.com

Professional Profile

Dr. Cordova is a toxicologist with a background in analytical and environmental chemistry and regulatory toxicology. Her doctoral dissertation focused on developing an analytical-to-in vitro approach to decipher the bioactive fraction of complex substances that may pose risks to human or environmental health. Her expertise includes the environmental chemistry of PAHs and other hydrocarbons as well as PFAS. The approaches she helped to develop have broad applicability to oil spill fingerprinting, environmental forensics, and exposure and risk assessment for emerging contaminants.

During her graduate education at Texas A&M University, Dr. Cordova developed expertise in new methodologies for the characterization of complex substances, including crude and refined petroleum products, to elucidate their composition and potential impacts on human health. She also developed frameworks to apply this high-throughput information to address regulatory drivers, such as product registration and hazard evaluation. She specialized in nontarget and targeted analytical techniques, including ion mobility spectrometry-mass spectrometry (IMS-MS), GC-MS, and GC-MS/MS. With the Texas A&M Superfund Research Program, she developed techniques that could later be applied to other complex substances and environmental mixtures, especially in rapid-response disaster scenarios. Dr. Cordova also held two internships during her doctoral studies. In 2021, she worked as a Health, Safety, and Environment Intern for Chevron, where she researched the uses of remote sensing in the energy industry and evaluated the operational environment, safety, security, and health risks associated with various assets across the company. Dr. Cordova was also awarded a KC Donnelly Research Supplement and worked with Los Alamos National Laboratory on a pilot project in 2022 using remote sensing techniques for oil spill chemical characterization. Dr. Cordova is active in the Society of Toxicology and the Society of Environmental Toxicology and Chemistry and has shared her work at various conferences and via publications.

Academic Credentials & Professional Honors

Ph.D., Toxicology, Texas A&M University, 2023

B.S., Chemistry, Southern Methodist University, 2018

KC Donnelly Award Supplement, Research Intern, Los Alamos National Laboratory, 2022

Health, Safety, and Environment Intern, Chevron, 2021

National Institute of Environmental Health Sciences Superfund Research Program Trainee, 2020-2023

National Institute of Health T32 Trainee Fellowship, 2019

Prior Experience

KC Donnelly Research Intern, Los Alamos National Laboratory, 2022

Health, Safety, and Environment Intern, Chevron, 2021

Professional Affiliations

2020 – Present, Society of Environmental Toxicology and Chemistry (SETAC)

2019 – Present, Society of Toxicology (SOT)

Publications

Cordova, A. C., Dodds, J. N., Tsai, H. D., Lloyd, D. T., Roman-Hubers, A. T., Wright, F. A., Chiu, W. A., McDonald, T. J., Zhu, R., Newman, G., & Rusyn, I. (2023). Application of Ion Mobility Spectrometry-Mass Spectrometry for Compositional Characterization and Fingerprinting of a Library of Diverse Crude Oil Samples. Environmental toxicology and chemistry, 42(11), 2336–2349. https://doi.org/10.1002/etc.5727

Cordova, A. C., Klaren, W. D., Ford, L. C., Grimm, F. A., Baker, E. S., Zhou, Y. H., Wright, F. A., & Rusyn, I. (2023). Integrative Chemical-Biological Grouping of Complex High Production Volume Substances from Lower Olefin Manufacturing Streams. Toxics, 11(7), 586. https://doi.org/10.3390/toxics11070586

Cordova, A. C., Ford, L. C., Valdiviezo, A., Roman-Hubers, A. T., McDonald, T. J., Chiu, W. A., & Rusyn, I. (2022). Dosing Methods to Enable Cell-Based In Vitro Testing of Complex Substances: A Case Study with a PAH Mixture. Toxics, 11(1), 19. MDPI AG. http://dx.doi.org/10.3390/toxics11010019

Roman-Hubers, A. T.*, Cordova, A. C.*, Aly, N. A., McDonald, T. J., Lloyd, D. T., Wright, F. A., Baker, E. S., Chiu, W. A., & Rusyn, I. (2021). Data Processing Workflow to Identify Structurally Related Compounds in Petroleum Substances Using Ion Mobility Spectrometry-Mass Spectrometry. Energy & fuels : an American Chemical Society journal, 35(13), 10529–10539.

Roman-Hubers, A. T., Cordova, A. C., Barrow, M. P., & Rusyn, I. (2023). Analytical chemistry solutions to hazard evaluation of petroleum refining products. Regulatory toxicology and pharmacology : RTP, 137, 105310. https://doi.org/10.1016/j.yrtph.2022.105310

Roman-Hubers, A. T., Cordova, A. C., Rohde, A. M., Chiu, W. A., McDonald, T. J., Wright, F. A., Dodds, J. N., Baker, E. S., & Rusyn, I. (2022). Characterization of Compositional Variability in Petroleum Substances. Fuel (London, England), 317, 123547. https://doi.org/10.1016/j.fuel.2022.123547

Valdiviezo, A., Aly, N. A., Luo, Y. S., Cordova, A., Casillas, G., Foster, M., Baker, E. S., & Rusyn, I. (2022). Analysis of per- and polyfluoroalkyl substances in Houston Ship Channel and Galveston Bay following a large-scale industrial fire using ion-mobility-spectrometry-mass spectrometry. Journal of environmental sciences (China), 115, 350–362. https://doi.org/10.1016/j.jes.2021.08.004

Zhang, S., Trammell, R., Cordova, A., Siegler, M. A., & Garcia-Bosch, I. (2021). Cu-promoted intramolecular hydroxylation of CH bonds using directing groups with varying denticity. Journal of inorganic biochemistry, 223, 111557. https://doi.org/10.1016/j.jinorgbio.2021.111557

Trammell, R., Cordova, A., Zhang, S., Goswami, S., Murata, R., Siegler, M. A., & Garcia-Bosch, I. (2021). Practical One-Pot Multistep Synthesis of 2H-1,3-Benzoxazines Using Copper, Hydrogen Peroxide and Triethylamine. European journal of organic chemistry, 2021(32), 4536–4540. https://doi.org/10.1002/ejoc.202100783

Trammell, R., D'Amore, L., Cordova, A., Polunin, P., Xie, N., Siegler, M. A., Belanzoni, P., Swart, M., & Garcia-Bosch, I. (2019). Directed Hydroxylation of sp2 and sp3 C-H Bonds Using Stoichiometric Amounts

of Cu and H2O2. Inorganic chemistry, 58(11), 7584–7592. https://doi.org/10.1021/acs.inorgchem.9b00901

Presentations

Alexandra Cordova. Chemical Characterization of Volatile Organic Emissions from Complex Environmental Substances. 2022 NIEHS Superfund Annual Meeting. December 14-16, 2022.

Alexandra Cordova. Compositional characterization and fingerprinting of a diverse library of 218 crude oil samples using ion mobility spectrometry-mass spectrometry. 2022 Society of Environmental Toxicology and Chemistry Annual Meeting. November 13-17, 2022.

Alexandra Cordova. Dosing Methods to Enable Cell-Based In Vitro Testing of Complex Environmental Samples & UVCB Substances. 2022 Society of Toxicology Annual Meeting. March 27-31, 2022.

Alexandra Cordova. Dosing Methods to Enable Cell-Based In Vitro Testing of Complex Environmental Samples & UVCB Substances. 2022 Lone Star Society of Toxicology Annual Meeting. January 13-14, 2022.

Alexandra Cordova. A Data Processing Workflow to Identify Structurally Related Compounds in Petroleum Substances Using Ion Mobility Spectrometry-Mass Spectrometry. Texas A&M Superfund Research Center (SRC) External Advisory Board Meeting. November 30 – December 1, 2021.

Alexandra Cordova. An Analytical to In Vitro Approach: Deciphering the Bioactive Fraction of Complex Substances. 2021 Texas A&M Interdisciplinary Faculty of Toxicology Seminar Series. August 31, 2021.

Alexandra Cordova. An Analytical to In Vitro Approach: Deciphering the Bioactive Fraction of Complex Substances. 2021 Chevron Environment & Sustainability Technical Speaker Series. June 27-28, 2021.

Alexandra Cordova. A Data Processing Workflow to Identify Structurally Related Compounds in Petroleum Substances Using Ion Mobility Spectrometry-Mass Spectrometry. 2021 SETAC South Central Regional Virtual Annual Meeting. April 16-17, 202

Alexandra Cordova. Developing passive dosing methods to enable in vitro testing of environmental samples and complex mixtures. 2020 NIH/NIEHS Superfund Research Program Virtual Annual Meeting. December 14-15, 2020.

Alexandra Cordova. Developing passive dosing methods to enable in vitro testing of environmental samples and complex mixtures. Lone Star Society of Toxicology Annual Conference. Virtual; College Station, TX. November 19-20, 2020.