

Exponent®
Engineering & Scientific Consulting

Gerardo Rivera-Castro, Ph.D., CFEI

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Professional Profile

Gerardo Rivera is a chemical engineer that applies his expertise in a diverse slate of topics, including chemistry, energy and sustainability, and oil and gas to provide consulting services to address different challenges. His areas of focus include analysis, investigation and safety of chemical processes, natural gas and LNG, fires, explosions, toxic releases, industrial equipment and consumer products. Additionally, Gerardo is fluent in Spanish.

Prior to joining Exponent, Gerardo Rivera obtained his B.S. in Chemical Engineering from the University of Puerto Rico – Mayaguez and completed his Ph.D. studies in Chemical and Biomolecular Engineering at the University of Notre Dame. During his doctoral studies, Gerardo focused on processes for converting natural gas into value-added liquid fuels using unconventional approaches. His experimental research included catalyst synthesis, material characterization, reaction engineering and kinetics, and plasma physics. This work enhanced his expertise in a variety of areas in chemical engineering, including reaction engineering, transport phenomena, and thermodynamics. Additionally, during his doctoral studies, Gerardo participated in a series of courses for process commercialization, submitting two patent applications related to natural gas conversion technologies.

Academic Credentials & Professional Honors

Ph.D., Chemical Engineering, University of Notre Dame, 2025

B.S., Chemical Engineering, University of Puerto Rico, 2019

Edison Innovation Fellowship for Entrepreneurship and Deep-Tech Commercialization.

Graduate School Professional Development Award – University of Notre Dame.

GEM (Graduate Education for Minority Students) Fellow

Kinesis-Fernandez Richards Family Endowed Fellowship.

Chemical Engineering Honor Roll Award – University of Puerto Rico, Mayagüez.

Chemical Engineering Honor Roll Award – University of Puerto Rico, Mayagüez.

Professional Affiliations

American Institute of Chemical Engineers (AIChE)

National Association of Fire Investigators (NAFI)

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National Fire Protection Association (NFPA)

Publications

Rivera-Castro G, Wang N, Otor HO, Hicks JC. Plasma Catalysis for Hydrogen Production: A Bright Future for Decarbonization. ACS Catal. 2024; 14(9):6749–6798.

Rivera-Castro G, Scotto d'Apollonia A, Cho Y, Hicks JC. Plasma-Catalyst Synergy in the One-Pot Non-Thermal Plasma-Assisted Synthesis of Aromatics from Methane. Ind. Eng. Chem. Res. 2023; 62(44):18394–18402.

Akintola I, Rivera-Castro G, Yang J, Secrist J, Hicks JC, Veloso F, Go DB. Temperature Inhibition of Plasma-Driven Methane Conversion in DBD Systems. Plasma Chem. Plasma Process. 2023; 43(6):1999–2016.

Yan C, Waitt C, Akintola I, Lee G, Easa J, Clarke R, Geng F, Poirier D, Otor H, Rivera-Castro G, Go DB, O'Brien CP, Hicks JC, Schneider WF, Ma H. Recent Advances in Plasma Catalysis. J. Phys. Chem. C 2022; 126(23):9611–9614.

MacQueen B, Barrow E, Rivera-Castro G, Pagan-Torres Y, Heyden A, Lauterbach J. Optimum Reaction Conditions for 1,4-Anhydroerythritol and Xylitol Hydrodeoxygenation over a ReOx–Pd/CeO2 Catalyst via Design of Experiments. Ind. Eng. Chem. Res. 2019; 58(20):8681–8689.

Presentations

Rivera-Castro G, Scotto d'Apollonia A, Cho Y, Hicks JC. Plasma-Catalyst Synergy in the One-Pot Non-Thermal Plasma-Assisted Synthesis of Aromatics from Methane. Oral, AIChE Annual Meeting, Orlando, Fl, 2023.

Rivera-Castro G, Akintola I, Go D, Hicks J. Low-Temperature Production of Aromatics from Non-Thermal Plasma Stimulation of Methane over Mo/H-ZSM-5. Oral, North American Catalysis Society Meeting, Providence, RI, 2023.

Rivera-Castro G, Cho Y, Akintola I, Go D, Hicks J. Production of Aromatics via Plasma-Assisted Methane Dehydroaromatization over Mo/H-ZSM-5. Poster presentation, CCC Young Scientist Symposium Meeting, 2023.

Rivera-Castro G, Hicks J. Methane Dehydroaromatization over Mo/H-ZSM-5 under Non-Thermal Plasma Stimulation. Oral, AIChE Annual Meeting, Phoenix, AZ, 2022.

Rivera-Castro G, Hicks J. Non-Thermal Plasma Approaches for the Conversion of Methane over Mo/H-ZSM-5 to Value-Added Fuels and Chemicals. Poster presentation, University of Notre Dame, South Bend, IN, 2022.

Rivera-Castro G, Hicks J. Facilitating methane dehydroaromatization pathways over Mo/H-ZSM-5 under non-thermal plasma stimulation. Oral, ACS Fall, Chicago, IL, 2022.

Rivera-Castro G, Nacy A, Albarracin-Suazo S, Pagan-Torres Y. Heterogenous Catalyst for the Production of Bio-Based Commodity Chemicals. Poster presentation, Forward Research and Innovation Center, 2018.

Rivera-Castro G, MacQueen B, Barrow E, Lauterbach J. Hydrogenation of 2-Methyl-3-Butyn-2-Ol over Pd/CaCO3 Catalyst to Investigate the Mass Transfer in a Homebuilt Batch Reactor. Oral, Summer Research Symposium, Columbia, SC, 2018.