(337)-309-5768 Lafayette, LA robert.bertrand53@gmail.com bit.ly/Bertrand-Robert-Scholar

Robert Bertrand

PhD CANDIDATE, RESEARCH ENGINEER

Education

2020 – Present **University of Louisiana at Lafayette**
PhD in Systems Engineering
Dissertation: "Methanotrophic Bioreactor Development"
Advisor: Emmanuel Revellame, PhD

2016 – 2018 **University of Louisiana at Lafayette**
MS Chemical Engineering
Performed research integral to patent development.
Thesis: "A Study on the Determination of Gelatinization Parameters, Ghost Structure Presence, and Emulsion Stabilizing Capacity of Waxy Corn Starch."
Advisor: Emmanuel Revellame, PhD

2011 – 2016 **McNeese State University**
BS Chemical Engineering
Directed SASOL water reclamation capstone project.
Performed undergraduate research in oil formation mechanics

Honors and Awards

2022 – 2023 **LaSPACE GSRA Grant**
Title: Bioreactor Design Simulations to Enhance Mass Transfer Coefficient for the Conversion of Methane to High– Value Products
This project involved the use of computational fluid dynamics to determine gas transfer rates and propose improvements to the design of bioreactors.

2023 **First Place: Graduate Presentation Competition**
Title: Jumping the Methanotroph Hurdle: Can a Novel Bioreactor Design Make Methane Upcycling More Industrially Promising?
Given at Engineering and Technology Week at the University of Louisiana at Lafayette

Experience

2025 – Present **University of Louisiana at Lafayette Lafayette, LA**
Title: Research Environmental Engineer
Supervisor: Emmanuel Revellame, PhD

- Performed Life Cycle Analysis (LCA) of various ports in Louisiana
- Developed model for per-region emissions factor for common US fuels and consumption strategies
- Collaborated with ports in Louisiana to both reduce emissions and increase resilience to storms

2020 – 2025 **University of Louisiana at Lafayette** Lafayette, LA
Dissertation Project: Improvements in Methanotrophic Bioreactor Design
Advisor: Emmanuel Revellame, PhD

- Constructed novel two– phase partitioning bioreactor for methanotrophic studies in bubble column which improved per-methane flow gas transfer by 900%.
- Implemented novel sensing techniques built on previous work to sense methane in non-aqueous fluids.
- Optimized gas transfer in experimental stirred tank reactor setup (increased by 30%)

2016 – 2018 **University of Louisiana at Lafayette** Lafayette, LA
Thesis Project: A Study on the Determination of Gelatinization Parameters, Ghost Structure Presence, and Emulsion Stabilizing Capacity of Waxy Corn Starch

- Solely responsible for repair and maintenance of scanning calorimetry apparatus
- Worked closely with funding organization to develop new processes to produce antimicrobial lotion.
- Performed process intensification operations at pilot plant located in Lafayette, LA

2011 – 2016 **McNeese State University** Lake Charles, LA
Advisor: Jacob Borden, PhD

- Responsible for repair and maintenance of sensitive analytical equipment (Thermogravimetric analyzer (TGA))
- Sourced experimental apparatus (TGA, oven) from adjacent departments such as biology/chemistry.
- Negotiated and set up of laboratory space for research projects at McNeese State University

Selected Publications

Journal publications

2019 R. Bertrand, W. Holmes, C. Orgeron, C. McIntyre, R. Hernandez, E.D. Revellame, Rapid Estimation of Parameters for Gelatinization of Waxy Corn Starch. *Foods* 2019, *8*, 556. https://doi.org/10.3390/foods8110556

2019 R. Bertrand, A Study on the Determination of Gelatinization Parameters, Ghost Structure Presence, and Emulsion Stabilizing Capacity of Waxy Corn Starch. Master's Thesis, University of Louisiana at Lafayette. UL Lafayette Masters Theses Catalog, https://library.louisiana.edu/research/find– theses– dissertations/masters– theses– catalog

2022 R. Bertrand, L. Dizon, W. Holmes, M. Zappi, R. Hernandez, D.L. Fortela, A. Chistoserdov, E.D. Revellame, Measurement of Volumetric Mass Transfer Coefficient in Lab-Scale Stirred Tank Reactors: Is there a Point of Diminishing Returns for Impeller Speed and Gas Flowrate? *Journal of the American Oil Chemists' Society* 99, 53-54.

2023 L. Dizon, R. Bertrand, W. Holmes, M. Zappi, R. Hernandez, D.L. Fortela, A. Chistoserdov, E.D. Revellame, Assessment of the Effects of Methanotrophic Growth Conditions on Methane Biocatalysis for Lipid Production: An Initiative Towards Climate Change Mitigation. https://doi.org/10.3390/ASEC2022-13953

2023 L. Dizon, R. Bertrand, W. Holmes, R. Hernandez, D.L. Fortela, A. Chistoserdov, M. Zappi, E.D. Revellame, Analysis of Methanotroph

Populations from Various Sources for Production of High-Value Products. *Engineering Proceedings*, 2023, 31, 30 https://doi.org/10.3390/ASEC2022-13953

2025 R. Bertrand, L. Dizon, L. Chapman, W. Holmes, M. Zappi, R. Hernandez, D.L. Fortela, A. Chistoserdov, E.D. Revellame, Design and Evaluation of a Novel Two-Phase Partitioning Bioreactor to Enhance Methane Mass Transfer. *J Chem Technol Biotechnol*, 100: 2455-2464. https://doi.org/10.1002/jctb.70063

Conference papers

2022 R. Bertrand, L. Dizon, C. McGovern, W. Holmes, M. Zappi, R. Hernandez, D.L. Fortela, A. Chistoserdov, E.D. Revellame, *Mass Transfer in Methanotrophic Bioreactors: is There a Diminishing–Returns Point for Coefficient Based on Critical Factors of Operation?* Presented at LSUS Student Scholars Forum, March 11, 2022

2022 R. Bertrand, L. Dizon, C. McGovern, W. Holmes, M. Zappi, R. Hernandez, D.L. Fortela, A. Chistoserdov, E.D. Revellame, *Construction of a Sensor for Rapid and Online Measurement of Dissolved Methane in Bioreactor Systems*. Presented at AIChE National Conference, Phoenix Convention Center, November 16, 2022

2023 R. Bertrand, L. Dizon, C. McGovern, W. Holmes, M. Zappi, R. Hernandez, D.L. Fortela, A. Chistoserdov, E.D. Revellame, *Meeting Increased Methane Emissions with Methanotrophs: Addressing Mass Transfer Problems in Reactor Design*. Presented at AIChE National Conference, Hyatt Regency Orlando, November 11, 2023

2025 R. Bertrand, L. Dizon, L. Chapman, W. Holmes, M. Zappi, R. Hernandez, D.L. Fortela, A. Chistoserdov, E.D. Revellame, Biological Upcycling of Natural Gas: Does Bioreactor Modification Make Sense? Presented at Americas LNG Summit & Exhibition, L'Auberge Resort Lake Charles, October 20, 2025

Professional Affiliations

2020 – Present Member, American Institute of Chemical Engineers (AIChE)

2022 – Present Member, American Oil Chemists' Society (AOCS)

Professional Service

2016 – Present **Presenter**
Engineering and Technology week, UL Lafayette

Skills

Project skills	Communication Data Analysis Project Management Lean Six Sigma Analytical Processes and Equipment
Applications	Microsoft Office Applications Microsoft Excel Expertise JMP Statistical Analysis Design Expert Experimental Design Software Fusion 360 CAD ANSYS Fluid Dynamics Suite (FLUENT, CFX)
Subject Knowledge	Chemistry Rheology Emulsion Science Thermodynamics Process Intensification Scale-Up Operations

References

Dr. Jacob Borden	Professor, Allen School of Engineering and Computing, Trine University, One University Avenue, Angola, IN 46703, (260)– 655–4614, bordenj@trine.edu
Dr. Emmanuel Revellame	Professor, College of Engineering, University of Louisiana at Lafayette, 104 E. University Circle, Lafayette, LA 70503, (337)–482– 6983, erevellame@louisiana.edu
William Holmes	Director of Process Analytics and Process Chemistry, Energy Institute of Louisiana, 131 Rex Street, Lafayette, LA 70503, (337)–482– 2939, william.holmes@louisiana.edu