Rafael Hernandez, Ph.D.

Education/Training:

PhD, Chemical Engineering
Mississippi State University (2002)
MS, Chemical Engineering,
University of Puerto Rico (1996)
BS, Chemical Engineering,
University of Puerto Rico (1993)

Total Years Experience at UL: 5.5

UL Experience Summary:

- Associate Director of the Energy Institute, UL (2013-Present)
- Head and Professor of Chemical Engineering, UL (2013-Present)
- J. Madison Nelson/BORSF Professorship, UL (2013-Present)
- While at UL published over 20 peer-reviewed archival papers and prepared over 20 technical presentations for technical conferences.
- Over **$300 k** as single PI, and over **$275 k** as Co-PI since appointment at UL (2013-Present).
- Member of the Graduate Council for 6 years.

MSU Experience Summary:

- Associate Director of the Sustainable Energy Research Center and Associate Professor of Chemical Engineering, MSU (9/2010-4/30/13)
- Assistant Professor of Chemical Engineering at MSU (5/2003-8/2009)

Selected Publications for Professorship Application (8/>80):

- Fortela, D.L., Sharp, W.W., Revellame, E.D., Hernandez, R., Gang, D., and Zappi, M., "Computational Evaluation for Effects of Feedstock Variations on the Sensitivities of Biochemical Mechanism Parameters in Anaerobic Digestion Kinetic Models," (2018) *Biochemical Engineering Journal*, Vol 143, pp. 212-223.
- Fortela, D.L., Mikolajczyk, A, Hernandez, R., Revellame, E., Holmes, W., Zappi, M., "Techno-economic Potential of Integrated Anaerobic Digestion and Aerobic Lipid Accumulation for Fuels and Materials Recovery from Wastewater Treatment Plants," (2018) Journal of Fundamentals of Renewable Energy and Applications, Vol. 8, Issue 4.
- Belgodere, J., Revellame, E., Hernandez, R., Holmes, W., Collazos, L., Bajpai, R., and Zappi, M., "Liquid-Liquid Equilibria for volatile fatty (acids+water+alcohol ethoxylate): Experimental measurements of pseudo-ternary systems, (2018) The Journal of Chemical Thermodynamics, 128, DOI: 10.1016/j.jct.2018.08.027.
- Subramaniam, R., Yasa, S., Bertrand, T., Fontenot, B., Dupuis, T., Hernandez, R., "Advanced simulation of H_2S scavenging process with triazine at different depths of gas well," (2017) Journal of Natural Gas Science and Engineering, 49, DOI:10.1016/j.jngse.2017.11.025
- Zappi, M., Bajpai, R., Hernandez, R., Taconi, K., Gang, D.D., "Reclamation of Smaller Volumes of Petroleum Hydrocarbon Contaminated Soil Using an Innovative Reactor System: A Case Study Evaluation of Design," (2017) Agricultural Sciences (08 (07), pp. 600-615.
- Fortela, D.L., Hernandez, R., Zappi, M., French, W.T., Bajpai, R., Chistoserdov, A., Revellame, E. and Holmes, W. (2016a) Microbial Lipid Accumulation Capability of Activated Sludge Feeding on Short Chain Fatty Acids as Carbon Sources through Fed-Batch Cultivation. Journal of Bioprocessing & Biotechniques 6, 275.
- Fortela, D.L., Hernandez, R., Chistoserdov, A., Zappi, M., Bajpai, R., Gang, D., Revellame, E. and Holmes, W. (2016b) Biodiesel Profile Stabilization and Microbial Community Selection of Activated Sludge Feeding on Acetic Acid as a Carbon Source. ACS Sustainable Chemistry & Engineering 4(12), 6427-6434.
- Mondala, A., Hernandez, R., French, T., Green, M., McFarland, L. and Ingram, L. (2015) Enhanced microbial oil production by activated sludge microorganisms from sugarcane bagasse hydrolyzate. Renewable Energy 78(0), 114-118.

Graduate Students (current and completed: 2013-2018) and Dissertations/Theses:

- Dhan Fortela, Ph.D., Spring 2016: "Enhancement of Microbial Oil and Biodiesel Production from Activated Sludge by Cultivation on Short Chain Fatty Acids".

- Jorge Belgodere, MS, Summer 2016, "Liquid-Liquid Extraction of Volatile Organic Acids using Specialty Surfactants".
- Gopi Chand Tripuraneni, MS, Spring 2017, "Performance Analysis of Enhanced Activated Sludge as Drilling Mud Additive".
- Jerry Conerly, MS, estimated graduation Fall 2018, "Removal of H2S from natural gas streams using an iron based catalyst".
- Liew Go, Ph.D., estimated graduation Fall 2019, "Development of green corrosion inhibitors and corrosion sensing molecules".
- Brandon Plaisance, Ph.D., estimated graduation Spring 2020, "Production of microbial lipids from waste generated by a Mars colony".

PATENTS

1. U.S. Provisional Patent Application (USPO-PP No. 15/828,809) Filed on December 1, 2017
2. U.S. Provisional Patent Application No. 62/531,035; File July 2018
3. U.S. Provisional Patent Application No. 17220–110; Submitted Reviewed Draft January 2019

FUNDED AS PRINCIPAL INVESTIGATOR LAST 5 YEARS

TITLE: Production of Fuels and Other Life Support Products Using Wastewaters as a Feed into a Space-Based Biochemical Conversion System (BIOSYS)grant. (6/1/18 – 6/01/21)
SPONSOR: NASA
ROLE ON PROJECT: Co-PI
AMOUNT FOR CONTRACT DURATION: $1,500,000
PERCENT RESPONSIBILITY FOR CONTRACT: 15%

TITLE: FEW - Relating energy, water, and land use footprints to decision making in agricultural system. Food-Energy-Water Nexus Supplement to current WSC-Category 1 grant. (8/1/14 – 7/31/17)
SPONSOR: National Science Foundation
ROLE ON PROJECT: Participant
AMOUNT FOR CONTRACT DURATION: $96,645
PERCENT RESPONSIBILITY FOR CONTRACT: 10%

TITLE: H_2S Transfer Modeling, Corrosion Inhibition Studies, and Catalyst Testing (Starts: July 1, 2014)
SPONSOR: Coastal Chemical Co, LLC
ROLE ON PROJECT: Principal Investigator
AMOUNT FOR CONTRACT DURATION: $169,671
PERCENT RESPONSIBILITY FOR CONTRACT: 75%
END DATE: JUNE 30, 2016

TITLE: Biocrude Thrust Area (Starts: May 16, 2013)
SPONSOR: DOE-SERC 4 and Mississippi State University
ROLE ON PROJECT: Principal Investigator
AMOUNT FOR CONTRACT DURATION: $188,000
PERCENT RESPONSIBILITY FOR CONTRACT: 100%

TECHNICAL REVIEWER

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SCIENTIFIC AND PROFESSIONAL SOCIETIES

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