Toufiq Reza, Ph.D.

Assistant Professor | Biomedical and Chemical Engineering and Sciences at Florida Tech

Melbourne, FL, US

Dr. Reza's research interests involve converting wastes to biofuels.

About

Dr. Reza earned his M.S. and Ph.D. in chemical engineering from University of Nevada, Reno. He was appointed as research scientist in Liebniz Institute for Agricultural Engineering in Potsdam, Germany. Following stints at University of Nevada, Reno and Ohio University, Dr. Reza came to Florida Tech in August 2019. His research, which involves wastes to biofuels and materials, has been funded by National Science Foundation, U.S. Department of Agriculture, American Chemical Society, and other state and federal agencies. It falls into three main categories: Hydrothermal Carbonization (HTC): In this process, wet biomass (e.g., garbage, food waste, animal waste, sewage sludge, mixed plastics) are treated at high temperature and high pressure. Water being a reaction medium for HTC is beneficial as the wet biomass could be utilized without expensive drying. Depending on process conditions and catalysts, HTC process yields solid fuel (hydrochar), liquid fuel (biocrude) and renewable natural gas (methane). Solid hydrochar could also be activated for energy storage and use to adsorb contaminants from water. Deep Eutectic Solvents (DES): This is a new class of solvents targeted for specific applications including but not limited to BTX from naphtha, platform chemicals from HTC process water, clean-up oil spills, and wastewater treatment from power plants. Pyrolysis and Torrefaction: Dry biomass could be converted to biochar, solid fuel or liquid biocrude at high temperature in inert atmosphere. Torrefaction occurs at 200-350 C, where volatile materials from biomass leaves an energy dense solid fuel. Meanwhile, pyrolysis occurs at 350-650 C, where a carbon-rich porous biochar formed. Biochar can be used as carbon sequestration, soil amendment, and slow-release fertilizer. The Reza research group promotes diversity and practices laboratory safety.

Industry Expertise

Research, Education/Learning

Areas of Expertise

Biomass Conversion, Waste Valorization, Waste to Energy, Biomaterials, Biofuels

Affiliations

Bangladesh Student Association, Nevada : Secretary, Differential Fee Committee, College of Engineering, UNR : Graduate Representative, American Chemical Society : Senior Member, American Institute of Chemical Engineers : Senior Member, American Society of Agricultural and Biological Society : Member

Education

Leibniz Institute for Agricultural Engineering
Postdoc

University of Nevada
Ph.D. Chemical Engineering

University of Nevada
M.S. Chemical Engineering

Bangladesh University of Engineering and Technology
B.S. Chemical Engineering

Accomplishments

American Chemical Society Petroleum Research Fund (ACS-PRF) Award
2019 ? American Chemical Society

Marvan E. and Ann D. White Research Award
2019 ? Russ College of Engineering, Ohio University

Innovation Strategy Award
2016 and 2017 ? Ohio University

Stocker Faculty Enrichment Award
2016, 2017 and 2018 ? Ohio University

Outstanding Graduate Student Researcher
2013 ? Governor, State of Nevada

Outstanding Graduate Student Researcher Award
2013 ? UNR

Outstanding International Student
2012 ? College of Engineering, UNR
