

Towards Inclusive Advances in Electromicrobiology

Date: Thursday, March 27th, 2025, 1pm-2pm

Location: Engineering Building, CMSE conference room 1502

Invited Speaker: Prof. Gemma Reguera



Professor of Microbiology, Genetics & Immunology
Associate Dean for Faculty Affairs & Development
College of Natural Science
Michigan State University

Gemma Reguera is a Professor in the Department of Microbiology, Genetics & Immunology, and also serves as Associate Dean for Faculty Affairs and Development in the College of Natural Science at Michigan State University. She has a broad background in applied and environmental microbiology, with research projects spanning human, terrestrial, and anthropogenic environments. She holds a Ph.D. in microbiology from the University of Massachusetts-Amherst and received a postdoctoral fellowship from Spain's Ministry of Science to work on the ecology of infectious diseases (with Roberto Kolter, Harvard Medical School) and metal cycling (with Derek Lovley, University of Massachusetts-Amherst). Since joining Michigan State University in 2006, she has led seminal studies to describe the electric

nature of metal-reducing microbes and harness their activities to advance the climate economy and environmental justice. These studies have provided new paradigms in biological electron transfer and have established Electromicrobiology as a new subfield in Microbiology. Her group's research has also led to several patents, industrial partnerships, and training initiatives aimed at bridging the divide between academia and industry. She was elected to fellowship in the American Academy of Microbiology in 2019 and appointed in 2021 as Editor in Chief of *Applied and Environmental Microbiology*, one of the oldest and most recognizable scientific journals of the American Society for Microbiology. She is the recipient of the 2024 D.C. White Award for Interdisciplinary Research from the American Society for Microbiology, which recognizes distinguished accomplishments in interdisciplinary research and mentoring in microbiology. She is also known for her advocacy and initiatives to promote the full participation and advancement of women in the microbial sciences, efforts that were recognized in 2022 with the ASM Alice C. Evans Award from the American Society for Microbiology.

Abstract

At the nanoscale, microbial respiratory networks resemble the electronic circuits that sequentially move electrons in discreet steps to minimize electron losses to heat. Microbes, however, stand out by the versatility and originality of the electronic networks they use to gain energy for growth and colonize apparently inhospitable environments. This talk will describe the electron transfer circuitries used by *Geobacter* bacteria to wire their metabolism to extracellular metals and how we are harnessing their electric metabolism in biotechnology. At the core of these projects are novel methodologies we have developed to investigate the physiology of electric microbes and their interactions with biotic and abiotic components of their ecosystem. The basic research provides the fundamental knowledge for applied projects that harness the power of electric microbes while also providing an inclusive environment to ensure equitable advances in microbial sciences.



AIDMM-NRT@MSU

AI and Data enabled predictive Multiscale Modeling across STEM
NSF Research Traineeship Seminars



If you have any questions, please contact us via mayanrui@msu.edu.

Acknowledgement

This material is based upon work supported by the [National Science Foundation under Grant NO \(DGE-2152014\)](#).