

# LABORATORY FOR AGNOSTIC BIOSIGNATURES



## New Postdoctoral Position in Astrobiology

The Laboratory for Agnostic Biosignatures (LAB) – a NASA-funded project consisting of 15 investigators at 7 Institutions – is seeking applicants for a postdoctoral fellowship in astrobiology, with a focus on life detection. The LAB Project is developing techniques to detect life in the universe that humans can't conceive of. The LAB team includes biologists, chemists, computer scientists, mathematicians, and instrument engineers. Together, these scientific disciplines aim to define potential extraterrestrial biosignatures, or signs of life, by imagining beyond the molecular framework and underlying biochemistry of the only life we know of here on Earth. The team is designing tools and techniques for detecting these signatures as well as strategies for interpreting them, with the aim of advancing the *in situ* search for life on Mars, Titan, Enceladus, Europa and other bodies within our Solar System.

A postdoctoral scientist is sought to work on testing disequilibrium energy-transfer biosignatures using electrochemical methods. The postdoc will utilize a suite of electrochemical techniques to produce a robust set of electrochemical criteria that can be used to agnostically differentiate between biological and abiotic electrochemical reactions. These reactions are the basis of energy production in all known life, and may form the basis of life in any environment.

This project will include a combination of culturing and electrochemical measurements with experiments focusing on constraining the relationships between four key variables: viable biomass, metabolic activity, current production, and environmental chemistry as it influences electrochemical measurements and properties. These will be studied using a series of well-known electrochemically-active bacteria such as *Shewanella odeinensis*, *Desulfobulbus propionicus*, *Arcobacter nitrifigilis*, and *Methanosarcina barkerii*.

As a highly interdisciplinary position, combined skills and training are desired. Experience with 1) culturing anaerobes, lithotrophs or methanogens, 2) working with bacteria that perform extracellular electron transfer (EET), 3) using electrochemical instrumentation (e.g., potentiostats and chemostats) or electrochemical techniques (e.g., potentiometry, amperometry, electrochemical impedance spectroscopy), 4) conducting experiments with bioelectrochemical systems (e.g. electrochemical studies of microbial fuel cells or wastewater processes), 5) performing field electrochemical experiments (sediments, agriculture, wastewater, etc.), 6) working with microscopy (confocal fluorescence, electron microscopy), and/or 7) coding and scripting in the R environment would be an asset.

The work will be conducted in close coordination with researchers at Georgetown University (Dr. Sarah Stewart Johnson), NASA's Goddard Space Flight Center (Dr. Heather Graham), Harvard University (Dr. Pete Girguis), the University of New Brunswick (Dr. Allison Enright), and Boston

University (Dr. Jeff Marlow). The successful candidate will work closely with the group of interdisciplinary researchers within the LAB team. The postdoctoral fellow will also be strongly encouraged to interact and collaborate with members of the larger LAB, NASA, and university communities.

Candidates should demonstrate a track record of publication; have strong organizational, written, and oral communication skills; and be able to work both independently and as part of a collaborative team. Initial appointment will be for one year, with renewal for an additional year depending on progress. There may be flexibility as to whether the candidate is physically based in the Washington, D.C./Maryland region or in Boston, Massachusetts. Additional resources are available to assist with travel and other research needs.

To apply, please send an email to Bradley Burcar at [bb1129@georgetown.edu](mailto:bb1129@georgetown.edu) containing your CV and cover letter. Please include names and contact information of at least three references. If you have questions about the nature of the position, please also email [bb1129@georgetown.edu](mailto:bb1129@georgetown.edu). Hiring is rolling.

LAB is an equal opportunity employer dedicated to hiring a diverse team of researchers and research trainees. All qualified applicants are encouraged to apply and will receive consideration for employment without regard to race, color, religion, national origin, age, sex (including pregnancy, gender identity and expression, and sexual orientation), disability status, protected veteran status, or any other characteristic protected by law. If you are a qualified individual with a disability and need a reasonable accommodation for any part of the application and hiring process, please don't hesitate to contact Georgetown University's Office of Institutional Diversity, Equity & Affirmative Action (IDEAA) at (202) 687-4798.

For more information, see [www.agnosticbiosignatures.org](http://www.agnosticbiosignatures.org).