**Management**: The research team will include Prof. Mikael Elias, Prof. Michael Freeman. Prof. Elias will be the project manager. The team assembled has unique, and complementary, skills necessary to achieve the goals of the project. The specific expertise of each team member is described below.

**Prof. Mikael Elias, PI,** is an Assistant Professor in the Department of Biochemistry, Molecular Biology and Biophysics at the University of Minnesota. Elias has over 10 years of research experience on insecticide biodegradation, producing 4 patents and >25 research articles on this topic alone (total of 55), including in prestigious journals (*JACS*, *Nature, PNAS*) and extensive know-how in protein engineering where he pioneered methods, such as the use of ancestral methods. He will invest most of his time on the project, and perform experiments and data analysis. Additionally, he reviews data and meets with laboratory personnel on a daily basis to promote the projects. He also prepares the dissemination of results, such as the proposed conference and publications. As the PI of the project, Dr. Elias will oversee the entire project, design the experiment plans, and draft the project reports.

**Prof. Michael Freeman, co-PI**, is an assistant professor in the Department of Biochemistry, Molecular Biology and Biophysics at the University of Minnesota. For over 15 years, Dr. Freeman has studied the biosynthesis of natural products and has characterized dozens of enzymes originating from soil bacteria, marine sponges, and mushrooms. He is currently an inventor on three patents and has published >15 papers on these topics in prestigious journals including *Science*, *Nature Chemistry*, and *Nature Chemical Biology*. Dr. Freeman has extensive expertise in identifying unique genes from complex biological samples (targeted metagenomics) and heterologous expression and mass spectrometric analysis of proteins. As a Co-PI, Dr. Freeman will spearhead the enzyme discovery aspects of this project and will oversee, along with Dr. Elias, the design, implementation, and analysis of all experiments related to this topic, as well as help writing project reports and publishing manuscripts.

**Organization**: the University of Minnesota has several missions: improve lives through research, education, and outreach. The University possess extensive facilities that ensure high research performance. In particular, for this project:

• Biotechnology Resource Center: (<http://www.bti.umn.edu/brc/index.html>) A wide variety of bench-scale to pilot scale fermenters is available, up to 500L, and will be used in this project to produce cost-effective biomaterials.

Elias Lab: 1,800 sq. ft. of renovated research space is dedicated to Dr. Elias. This space is located on the 1st floor of the GortnerLab Building, on the St Paul campus. Elias’s office space is adjacent to the laboratory. The lab contains all of the necessary equipment for molecular biology, biochemistry, protein production and purification, enzyme kinetics, and crystallography. Numerous facilities are available, such as microplate readers, spectrophotometers, scintillation counters, fplc, liquid nitrogen storage, -80 freezers, incubators/shakers, autoclave, as well as 4 and -20 rooms.

Freeman Lab: The PI’s laboratory, located in newly renovated lab space in Gortner Laboratory, occupies ~1800 square feet within the Department of Biochemistry, Molecular Biology, and Biophysics at the University of Minnesota’s St. Paul campus. The lab has desk and bench space for eight researchers and ample accessible storage space for equipment and supplies; the PI’s office is located within the laboratory in an adjacent room with direct access to the lab. The PI’s lab is outfitted with all required molecular biological and biochemical equipment necessary for the described experiments. This lab shares the floor with three additional senior researchers studying natural products and/or anaerobic microorganisms, with shared centrifuges, gel-doc, fluorescent microscope, autoclaves, an ultrapure water source, glass-washing station, walk-in 4 ºC room, and a communal meeting area/lunch room. As a BioTechnology Institute member, the PI has direct access to Biotechnology Resource Center (housed in the same building), which provides a variety of microbiological services including a wide-range of fermentation and heterologous expression technologies.

The collective research, organizational, and administrative experiences of the project team members and the resources available to this project from the University of Minnesota should ensure the successful completion of the proposed project goals.