Project description:   
Note: BerbeeWalsh Foundation Prototype Pathway projects should provide description of device need, clinical impact, why funding is needed, and current funding available for the project. \*

The ichip (Nichols, et al., 2010, App & Env Micro) is a diffusion micro-chamber chip designed to greatly increase the number of cultivable bacteria found in soils and isolate them for use in the discovery and production of novel antibiotic compounds. Our need of this device in the Department of Soil Science will be to isolate and study microorganisms with unique metabolisms using recalcitrant soil organic carbon and whose sequenced genomes expand existing but still incomplete taxonomic databases often used in the bioinformatics pipelines characterizing microbial communities of the human microbiome, other host microbiomes, and environmental systems. Reproducibility of this device at the UW-Madison may increase its use in the departments Bacteriology, Plant Pathology, and many others. The dimensions of the chamber are roughly 2.5 cm in width, 7 cm in length, and 3cm in depth, composed of three parts: a thin hard-plastic plate of polyoxymethylene or equivalently hard plastic, sandwiched by two thicker plates of the same material. All pieces have 4-6 through-holes for fitting bolts and two groups of very small (<1 mm) through-holes grouped together in the diameter of standard 0.02µm filters. By applying pressure on these filters covering the microchambers of the internal plate, the system allows the diffusion of dissolved organic carbon but disallows the movement of microbial cells from one microchamber to another. Funding is available for this project under the O. N. Allen Microbial Sciences Professorship offered to Dr. Thea Whitman in 2016 to better characterize soil microhabitats and their inhabitants.

Please describe the unique capabilities of the Morgridge Institute for Research that led you to us: \*

My doctoral minor advisor, Dr. Kalin Vetsigian, recommended that I contact George Petry in regard to developing this device. The training, instrumentation, and tools available for rapid prototyping with close attention to microbial scales and processes are essential to successfully reproducing and improving this design for our needs in soil ecology and microbial genomics.

Please describe the desired outcome resulting from our relationship; i.e. research paper, grant, intellectual property, business start-up, competition, etc . . . \*

The desired outcome resulting from our relationship is a research paper implementing the device.