*"Low-cost water purification systems for arsenic removal from drinking water in rural China"*

A proposal to the
Harvard China Fund

By

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Arsenic is a naturally occurring metalloid that is used in agriculture, construction and metal alloy production. Arsenic is highly toxic to people, causing high blood pressure, neurological diseases, diabetes, cancer and early death. The World Health Organization estimates that greater than 200 million people are drinking arsenic-contaminated water and posits that clean water should be a top priority for improving quality of life and economic development. A recent national water quality survey in China found that up to 65 million Chinese rely on underground water supplies that are contaminated with arsenic. In urban areas, large scale mechano-chemical purification systems are used to remove arsenic and other contaminants. In rural areas, however, such systems are not cost effective and so water treatment is minimal.

Methods for decontaminating arsenic-laden drinking water exist, but they are costly, inefficient or short-lived systems that require frequent servicing. However, recent research has shown that arsenic compounds can be oxidized to less soluble forms using treated graphite electrodes poised at particular electrical potentials. **Here we propose to develop a small-scale system that uses energy derived from biomass to remove arsenic from drinking water at a high rate and low cost.** The proposed research is highly collaborative and represents a significant effort and investment on the part of the Girguis lab at Harvard and the Yuan lab at Tianjin University. Students and postdoctoral scholars at both Universities will be involved in generating and disseminating the findings. The research will be "open source", and we will widely disseminate all the data and engineering specifications to foster rapid commercialization by local enterprises in China and elsewhere. To date, there are few examples of U.S.-Chinese collaborations to address environmental issues that affect poor, rural populations. We hope this project will serve as an example of open, collaborative efforts between the U.S. and China.