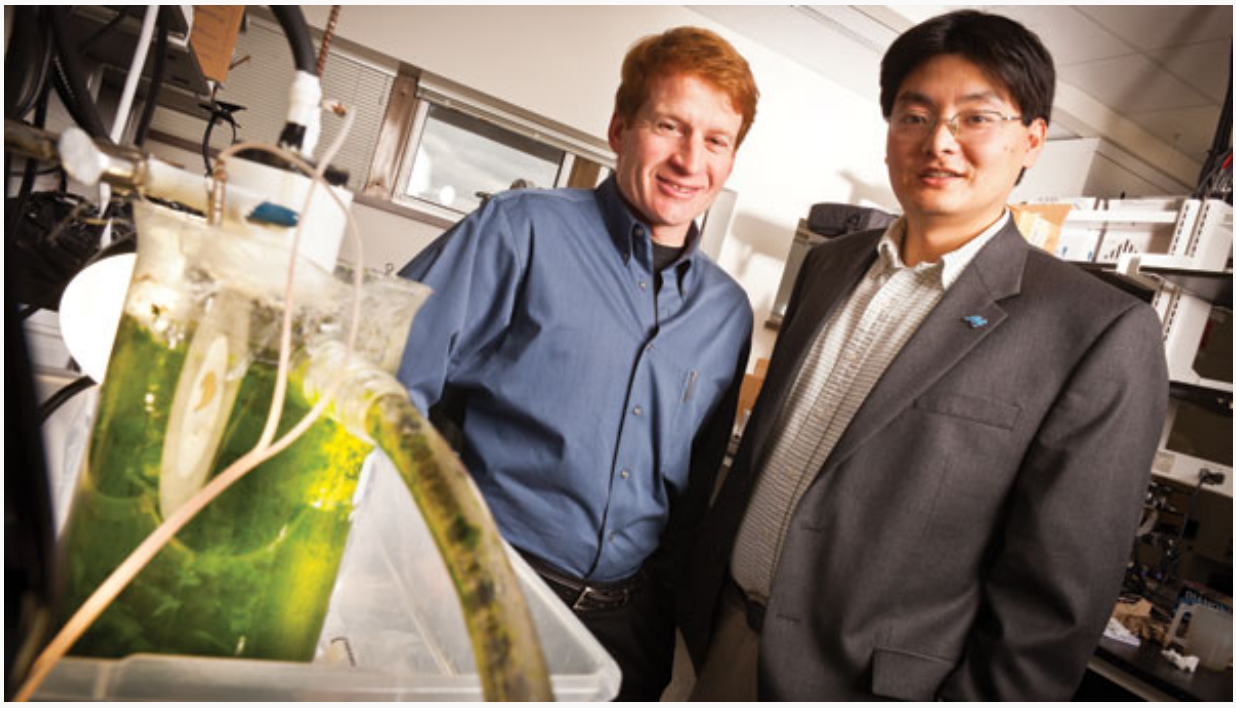
Triple-duty fuel cell launches UWM startup company

By Laura L. Hunt on February 2, 2012

News from the University of Wisconsin - Milwaukee

By Laura L. Hunt on February 2, 2012



Zhen “Jason” He, assistant professor of engineering (right), and Mark Murphy of Hydrotech innovations

The organic contaminants in wastewater that can make people sick and pollute the environment are often the same ones that feed bacteria. A device called a microbial fuel cell (MFC) takes advantage of this, using bacteria to purify wastewater and harnessing their metabolic energy to generate electricity.

An expert on the relatively new MFC technology, Zhen “Jason” He, an assistant professor of engineering, is building on its “double play” capabilities.

He recognized that, while the MFC removes organic waste from water, it doesn’t address nutrients, like the nitrogen and phosphorus often present in urban storm water runoff. So, He has created an MFC with a third function – nutrient removal.

The device and related research forms the basis of the third start-up company to launch from faculty research through UWM’s Research Foundation (UWMRF). Named HydroTech Innovations LLC, the company will explore applications of He’s research that is not already corporately sponsored.

Starring role for algae

“Algae are the natural choice to drive this nutrient-removal process,” says He. “When you think of algae blooms in freshwater lakes, those are caused by an overload of nutrients, such as fertilizers, in stormwater runoff.”

In the same way that bacteria gorge on the organic matter in wastewater, algae thrive on the nutrients, eliminating them as the wastewater cycles through the MFC. Because both processes occur in a continuous flow, there is no interruption in the electricity generated.

Business partner Mark Murphy met He at a gathering sponsored by the UWMRF. Murphy, who had sold his family’s trucking business a few years ago, was interested in finding a new venture.

“I have a bachelor’s degree in science, and I was particularly attracted to a water-related business or going in a more environmental direction,” says Murphy. “My passion has always been in the outdoors.”

Federal interest

He and Murphy have garnered an early vote of confidence from the National Science Foundation (NSF) by inclusion in its brand-new program, Innovation Corps (I-Corps). The program guides promising research into the commercial realm by testing its business-readiness.

The $50,000 funding covers intensive entrepreneurial training, including copious amounts of face-to-face contact with potential customers. He’s I-Corps grant team, which also includes UWM graduate student Kyle Jacobson, currently is building a 50-liter prototype reactor to demonstrate the triple-duty MFC concept.

“The I-Corps program is trying to determine the same thing I am – whether this can be commercially viable,” says Murphy.

Meanwhile, the company has filed for a federal Small Business Innovation Research (SBIR) grant, and is working on its next product – a greener method of softening water, using enzymes rather than salt.

Posted in Features, Research