



Qiang Hu inspects algae samples.



Milton Sommerfeld in his research lab.

ScienceFoundation

Green Gold

ASU professors win Science Foundation of Arizona award for algae-to-jet fuel technology

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Two ASU professors who seek to replace petroleum-based jet fuel with algae have won \$1.5 million from Science Foundation Arizona (SFAz)

to further their research.

Qiang Hu and Milton Sommerfeld also got a matching \$1.5 million grant from private equity investor Helix Development LLC, which has partnered in the fuel project to use the abundant and environmentally sustainable algae.

The project is dubbed *Algae-to-Fuel* and Hu and Sommerfeld, who co-direct

ASU's Laboratory for Algae Research and Biotechnology, see great opportunity in the green substance. Last fall, *Time* magazine recognized the pair's research as No. 11 on their Top 50 list of Best Inventions in 2008.

Jet fuel made from petroleum is used exclusively for airplanes, while other forms of alternative energy, including natural gas or electricity are not viable substitutes for planes. The two professors are working to further develop an algae-derived kerosene jet fuel that can propel planes as cheaply as possible.

This is the second year SFAz has funded Hu and Sommerfeld, who also have employed algae in the production of commercially viable food-based pigments. SFAz, established in 2006 as a nonprofit, private/public partnership, helps strengthen the state's research infrastructure to spur new technology-sector growth. In the past year, the organization has made 59 grants and attracted \$43.8 million in outside capital to Arizona.

"Estimates show that fossil fuels are likely to run out in less than 40 years," says Hu. "While conversion of algae to fuel is proven, the end-to-end process to create the energy as an affordable commodity utilizing cost-effective process technologies requires further innovation that we are pursuing with the SFAz grant."

"The benefit of algae is clear as there is

no carbon emission and zero environmental footprint," adds William C. Harris, SFAz president and CEO. "We are supporting the scalable production process phase of this research to bring a commodity to market to benefit Arizona. *Time* magazine's endorsement of the research shows others recognize the importance of this work."

Hu and Sommerfeld both have been involved with algae for more than 20 years. Turning green goo to green crude has not been easy. They have had to select from the more than 65,000 strains of algae to experiment extensively with a few hundred whose oil content was favorable and compatible for jet fuel. The research lab where they harvest multiple strains of algae is a kaleidoscope of color with batches of green and multicolored algae.

The laboratory's research activities in biofuels have attracted the interest and collaboration of numerous national and international companies and laboratories. While other entities worldwide are pursuing this market, Gary B. Greenburg, SFAz scientific program officer, says the pair's research is some of the most advanced.

"They address every major aspect of algae fuel production as a multidisciplinary effort – from algae selection to oil and chemical engineering to supply chain management," Greenburg says.

Both the SFAz grant and the *Time* magazine recognition come at time when President Obama is emphasizing the country's need to move toward energy independence. Hu and Sommerfeld believe their years of research finally may pay off as green algae turns green crude to gold. ■

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- William C. Harris, Science Foundation Arizona president and CEO