



by Steve Kruse and Barbara Fox
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Venture Fair Winners: Patriot, HMGene and TreadStone



Gerald DeCuollo, (right) President of TreadStone Technologies receives the award for "Best Clean Technology Company"

At the NJTC Venture Fair, held at the Palace in Somerset last Friday, close to five dozen emerging companies had the opportunity to make brief presentations in a room full of potential investors, and to have more in-depth discussions at booths in the exhibitor area. More than 600 people attended, and 16 prize-winners emerged. Of the half-dozen Princeton-area entrepreneurs participating, three were among those singled out in the closing ceremonies. Patriot Defense Systems, based on Lenox Drive, won the award for "Best Consumer Technology Company," while TreadStone Technologies, now located in Sarnoff's building, notched the "Best Clean Tech Company" award. HMGene, which has space at the New Jersey Technology Center in North Brunswick (see page 45), won Best Biotechnology Company.

TreadStone Technologies

TreadStone has a corrosion resistant metal plate technology, used in fuel cell stacks, which are a component of fuel cell power sources. Fuel cells can be used in big systems, such as a utility power station, and in small ones, as small as a laptop computer. Fuel cells qualify as "clean energy" because they produce minimum amounts of greenhouse gases and they don't pollute. If fuel cells use pure hydrogen, only water and heat are the byproducts. They make electricity by combining oxygen with hydrogen (or hydrogen-rich fuel).

Such is the background to what is being touted as the Hydrogen Revolution. The U.S. Environmental Protection Agency has cleared the way for automakers to produce hydrogen-powered fuel cell cars to meet zero-emission vehicle requirements in New Jersey and 10 other states. According to the trade newsletter Fuel Cell Today, published in the United Kingdom, the fuel cell market experienced an impressive 67 percent growth rate in new units during 2006.

Treadstone offers a way to cut the weight of the most-often used fuel cell type, Polymer Electrolyte Membrane (PEM), which shares the fuel-cell market with Direct Methanol Fuel Cells (DMFCs). PEM units are the leading type of fuel cell being developed for transportation applications. Due to their fast startup time and favorable power-to-weight ratio, PEM fuel cells would be ideally suited for use in passenger vehicles. However Honda, GM, and other leaders in fuel cell research have struggled to bring cost-effective fuel cells to the automotive market.

PEM fuel cells have a weight problem. Typical fuel cell designs link together many individual cells to form a "stack" to produce a usable voltage. The largest and heaviest components of any stack are the separator plates, which provide the electrical series connections between cells and physically separate the oxidant flow of one cell from the fuel flow of the adjacent cell. The cost and weight of the separator plate, it could be said, is what separates the PEM fuel cells of today from widespread commercial acceptance. Working as a research scientist at Sarnoff, Conghua "C.H." Wang discovered a way to use off-the-shelf metal as the basis for a corrosion-resistant separator plate. His key innovation is an inorganic layer, protecting the surface of the metal plate from the corrosive environment in the fuel cell.

Wang's invention has stirred excitement among experts from the fuel cell industry, due to its substantial weight/volume/cost advantages over graphite composites, currently the best available technology. The weight of a 900-pound graphite-based stack might be reduced by as much as 40 percent.

A new company was formed around the patent-pending technology, with Wang as VP and chief technology officer, and Gerald DeCuollo as CEO. With an undergraduate degree in chemistry and a masters degree in business, DeCuollo is a veteran of another alternative energy company, Hydrocarbon Technologies, a company involved in hydrocarbon processing and energy conversion. He was a part owner and vice president of business development there. Based on New York Avenue, that firm is now known as Headwaters Technology Innovation. At Sarnoff DeCuollo had been responsible for business development activities in fuel cells and other alternative energy related technologies.

Wang has a doctorate from the University of Science and Technology Beijing (USTB), noted for its study of metallurgy and material science. When he came to the United States in the early 1990s, he worked as a research associate in the Department of Materials Science and Engineering at University of Pennsylvania. He joined Sarnoff in 2000.

Treadstone is still operating out of offices in the Sarnoff building on Washington Road, but will become a tenant of the ACIN Technology Center on the Camden Waterfront. The company anticipates between \$500,000 and \$1 million in revenue this year. As for the name of his new enterprise, DeCuollo explains that treadstone is an old English word defined as "destined for a great future".

-Steve Kruse and Barbara Fox

TreadStone Technologies Inc., 201 Washington Road, CN 5300, Princeton 08543-5300; 609-734-2368; fax, 609-734-2967. Gerald DeCuollo, CEO.

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