THE UNIVERSITY OF ALABAMA

Research in the Service of Teaching

RESEARCH

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COVER STORY:

A Chair Unlike Any Other

A unique Roto-Tilt Chair helps a UA researcher test portions of the inner ear to assist those suffering from dizziness and balance problems.

A Launching Pad for

Entrepreneurs

UA Start-Ups Top Statewide Business Plan Competition

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Photos by Zach Riggins and Laura Shill

With a switch of a lever, this device, co-developed by Wofsey, converts from removing salt from seawater to a rain capturing irrigation device.

Similarities abound between Donald Trump and The University of Alabama's Dr. William Gathings.

No, maybe not the hair, but each has demonstrated an entrepreneurial spirit, and both are ardent promoters of a business-based competition with a reality TV show feel. Ok, so with Trump, it's more than the feel of reality TV.

As executive producer and host of NBC's "The Apprentice," Trump, the billionaire with the oft-discussed coif, raked in millions of television viewers who tuned in to see who advanced to the competition's next round. As director of the Office for Technology Transfer at The University of Alabama and a working team member of the Alabama Launchpad business plan competition, Gathings encourages those in the University community to vie for the $175,000 in start-up capital awarded to winners of the statewide annual business plan competition.

"If you are a start-up company, it can be huge," Gathings says of the $100,000 awarded to the latest Alabama Launchpad winner, Cellulosix. Second place winner, SEA Desalination, also affiliated with UA, won $50,000.

"If you can get early-stage funding like this, without loss of equity, you build more value in your company," Gathings says. "Then, when you have to go to the angel investor or venture capitalist, you have increased the value of your company."

Alabama Launchpad is a non-profit organization formed by six of the state's leading research universities and Alabama's business community to support entrepreneurship in the state. The Economic Development Partnership of Alabama is also a founding member.

Dr. Dan Daly, director of UA's Alabama Institute for Manufacturing Excellence, known as AIME, serves on Launchpad's board of directors. AIME and UA's Office for Technology Transfer collaborate to select commercially promising UA technologies around which teams can be formed and business plans developed for the Launchpad competition.

The teams can be made up of faculty, staff and/or student "possibility thinkers," a term Gathings coined for UA inventors and entrepreneurs.

In this second season, more than 40 teams participated in the competition for technology and high-growth ideas. Eleven of the 12 teams with UA affiliation advanced to the semifinals. The first and second place winning teams and five of eight finalists had ties to UA.

"Launchpad has been tremendous because it provides a vetting process for early-stage technologies," Gathings says, and, the competition's independent expert evaluation supports and enhances UA's technology evaluation efforts.

Teams that make it past the second of the four-round competition are assigned mentors who have business and legal expertise. The mentors can assist in developing and writing business plans and offer additional advice in business operation.

"You may have the best technology in the world; it's your baby, and you think it is the reason a business is going to be successful, but it's not that simple," says Gathings, who launched two start-ups of his own. "A new technology may launch a business, but a successful venture requires sound management, planning and

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"We have to find a way to make more drinkable water or conserve the water we have."

Mike Wolfsey, co-developer of a solar-powered system that removes salt from seawater

execution."

In addition to UA, participating universities are Alabama A&M University, Alabama State University, Auburn University, the University of Alabama at Birmingham and the University of Alabama in Huntsville.

Plants offer convenience, potential help for diabetics

The grand-prize-winning Cellulosix team concentrates on ways to use forms of cellulose – found in the cell walls of trees and other plants – to deliver pharmaceuticals.

One goal, for example, is to develop a means for diabetics to take their insulin dosages orally, rather than through injections, says Dr. Richard Swatloski, a licensing associate in UA's Office for Technology Transfer, who co-leads the team.

"The main goal is slow release, or controlled delivery, of an active ingredient," Swatloski says. With many drugs taken daily, levels in the system initially spike, sometimes resulting in undesired side effects. Medicines entrapped within, or otherwise bonded to, cellulose and swallowed could diffuse gradually, maintaining more constant and effective levels, he says.

Why cellulose?

"Cellulose is nontoxic and safe to ingest," Swatloski says. "Encapsulating insulin within cellulose protects it from the extreme conditions of the stomach, allowing it to be delivered orally instead of through the traditional injection."

Overall, the team is investigating three specific areas in which cellulose could play a role in treatment and diagnostics: cancer drugs, therapeutic proteins, such as insulin, and in connection with imaging agents. "We will probably pick two compounds in each of those classes for further evaluation," Swatloski says.

As a doctoral student in UA's College of Arts and Sciences, Swatloski was part of a team recognized with the 2005 Environmental Protection Agency's Presidential Green Chemistry Challenge Award for its discovery of a new way to dissolve and use cellulose. UA licensed patented use of the cellulose technologies to BASF, and the two entities have a letter of agreement allowing the UA team to move forward with the technology for certain pharmaceutical and nutraceutical benefits.

Cellulosix hopes to advance the technology close to the clinical trial level before handing it off to another entity.

Water, Water Not Everywhere

Mike Wofsey, a doctoral student in UA's department of physics and astronomy, leads SEA Desalination Array. His team developed a solar-based technology that removes salt from seawater or removes high mineral concentrations from groundwater.

"Our water consumption

"A new technology may launch a business, but a successful venture requires sound management, planning and execution."

Dr. William Gathings, director of the Office for Technology Transfer

Gathings looks for "possibility thinkers" on UA's campus.

is doubling every 20 years, but that rate is twice the rate of the growth of the Earth's population," Wofsey says. "We have to find a way to make more drinkable water or conserve the water we have."

Wofsey, under the guidance of UA faculty and a mentor at Lawrence Livermore National Laboratory, began brainstorming an affordable way to convert seawater into drinking water.

"Until recently, I had been looking at desalination with electrostatic means. I had a Frankenstein-type machine set up, with sparks being generated. All through this, the sun's coming through the window, and I'm ignoring the obvious."

Wofsey realized he needed to simplify to make his product affordable for the user. Under Wofsey's team's proposal, the system's operating cost is 20 cents per thousand liters of water desalinated, one-fifth the operating cost of Tampa Bay's system, considered one of the world's most efficient. And construction costs between the two systems are so vast, they're practically incomparable.

Wofsey's system consists primarily of two thermoformed plastic panels – the material used to package fresh strawberries in grocery stores. The unit's top piece is transparent, and the bottom piece is black. "The intelligence of this is the way the plastic is molded," says the College of Arts and Sciences doctoral student.

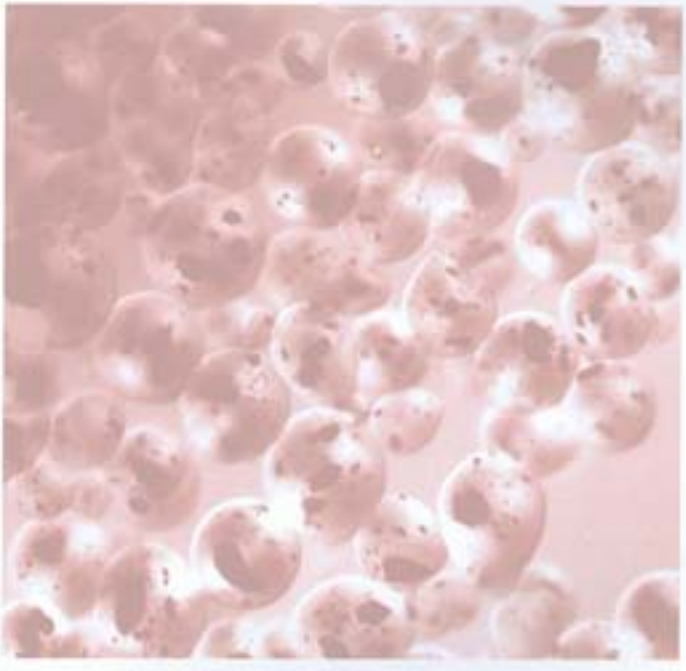
"Plastic is a wonderful material because it's cheap, the methods to manufacture it exist in developing countries, and you can make a panel for ten dollars as opposed to a thousand dollars," Wofsey says.

A small solar-driven pump moves the water into the unit, which is self-supporting and contains collection channels, evaporation channels, cooling channels and feed channels. Water fills into e-shaped channels and, through a series of serrations, drips down into other channels. Heat from the sun causes evaporation and condensation inside the top panel, and the water drips into collection channels. This feeds into the back of the unit and flows through the output into the collection container. Left behind in a collection hopper are the salt or other contaminants that can then be emptied from the unit. The unit is expandable. "The more water you need, the more plastic panels you connect," Wofsey says.

"The solar panel drives the pump, and the pump pumps the water right from the well collector or sea inlet. Then, gravity and sunlight do the rest."

A Program of Care Giving

This century, millions of sons and daughters struggle to provide care to elderly parents, while employers are progressively more troubled about what has become the number one human resource challenge — elder care.



These bio-friendly beads can potentially be used to entrap and protect orally administered drugs such as insulin. In this image, supplied by UA's Cellulosix team, the cellulose beads are opaque and the encapsulated material they contain is black.

Many Americans face a bureaucratic maze of complex decisions involving a long-term care industry that varies greatly by community. That's where another Launchpad finalist comes in.

The Parent Care Readiness Program uses 21st century technologies, the latest information, and expert resources to help imminent and active caregivers and their elderly relatives ready themselves for giving and receiving care.

"When a parent suffers a serious health event or the onset of dementia, the family is often overwhelmed by the complexity of the long-term care system and, unfortunately, the parent is often unable to participate in the decision-making process that affects them," says Dr. Michael Parker, associate professor of social work, John A. Hartford Foundation Geriatric Scholar, and executive member of UA's Center for Mental Health and Aging.

"Our company will offer the more than 44 million family caregivers in the United States and their employers access to Web-based tools and resources designed to reduce the financial and health related burdens associated with care giving," says Parker, who first addressed this problem as an Army officer while completing a National Institute on Aging post-doctoral fellowship.

Employing a proprietary, patent-pending assessment process for the parent and adult child, the Parent Care Readiness program creates a tailored intervention program that targets the

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