

USU-Related Success Stories In Tech. Commercialization/Economic Development

Economic Development

More than 60 businesses have ties to Utah State University through faculty or alumni, including about a dozen startup companies that have emerged from USU in the past two years. USU-related companies have had an enormous impact on Utah's economy, with the top 22 companies employing more than 1,300 workers, paying \$61.3 million in annual salaries, and generating more than \$315 million in annual revenues.

Selected USU-Related Companies

HyClone Laboratories

<http://www.hyclone.com>

925 West 1800 South
Logan, Utah 84321
(435) 792-8000

Rex Spendlove, a USU microbiology professor, founded HyClone to produce and market fetal bovine serum (FBS), a substance used in culturing organic material. HyClone established the standard in the industry and has become the world leader in FBS production. HyClone also has developed core competencies in bioprocess container systems, which are high quality, disposable containers for various biological substances. HyClone serves customers worldwide from its sites in the United Kingdom, Belgium, China, and New Zealand, but its headquarters and primary manufacturing sites are in Logan, Utah. HyClone employs about 500 people at its five facilities in Cache Valley.

Campbell Scientific, Inc.

<http://www.campbellsci.com>

815 West 1800 North
Logan, Utah 84321-1784
(435) 753-2342

Utah State University students Eric and Evan Campbell founded Campbell Scientific in 1974 as an outgrowth of their USU research in soil physics. The company manufactures dataloggers, data acquisition systems, and measurement and control products used worldwide in research and industry, and it recently expanded its development of data retrieval peripherals, sensors, and systems. Campbell Scientific instrumentation is especially known for its reliability and precision. The company has stayed in the Campbell family, with CEO Paul Campbell, and has grown to more than 200 employees with affiliate companies in England, Canada, Brazil, South Africa and Australia. In 1996, Campbell Scientific moved its manufacturing, service, and support activities into a new 17,000-square-foot facility in Logan, Utah.

Wescor, Inc.

<http://www.wescor.com/>

459 South Main Street

Logan, Utah 84321

(435) 752-6011

In 1970, a group of USU faculty members founded Wescor, a company that develops, manufactures, and markets high-quality instrumentation and other products for medicine, science, and industry. Wescor recently acquired Omnidata International, which will allow greater diversification and expansion. Wescor has three divisions—biomedical products, information products, and environmental products—each specializing in providing innovative product solutions for their respective markets. Company operations include 90 employees at two locations in Logan, Utah.

Juniper Systems, Inc.

<http://www.junipersys.com>

1132 West 1700 North

Logan, Utah 84321

(435) 753-1881

Juniper Systems, Inc., formerly known as HarvestMaster, grew out of Campbell Scientific and provides high-quality, ruggedized computing equipment. In the field of natural resources, Juniper Systems provides computing for forestry management, log-yard data collection, fisheries, wildlife resources, and rangeland management. Juniper also provides data acquisition for the agriculture market in seed research, bulk crop monitoring, and electronic field note taking. These products have resulted in superior customer satisfaction while providing growth and prosperity for employees, investors, and the community. The 50-person company celebrated its ten-year anniversary in 2003 and moved into new company headquarters in Logan, Utah, in 2004.

Autonomous Solutions, Inc.

<http://www.autonomoussolutions.com/>

1946 South 1600 West

Wellsville, Utah 84339

(435) 755-2980

Autonomous Solutions, Inc. (ASI) began as a spin-off company from the Center for Self Organizing and Intelligent Systems (CSOIS) at Utah State University. A 40-person company located in Logan, Utah, ASI was founded by Mel Torrie, a USU grad and manager at the CSOIS, to develop autonomous technologies robust enough for commercial applications. ASI has extensive experience in the automation of large-scale vehicles and machinery with an emphasis on path planning, sensor fusion, precision vehicle control, and point-and-click ease of use. ASI has created automated vehicles for the U.S. Departments of Energy, Defense, and Education; Northrop Grumman/Remotec; Goodyear; Lockheed Martin; and John Deere.

Frontier Scientific, Inc.

<http://www.frontiersci.com/>

P.O. Box 31

Logan, Utah 84323-0031

(435) 753-1901

Frontier Scientific, Inc. (FSI) was started as Porphyrin Products, Inc. in 1975 by former USU professor Bruce Burnham. In 1999, it became Frontier Scientific, and today three of the 26-person company's four shareholders (Jerry Bommer, Bert Israelsen and Wayne Watkins) are USU alumni. Frontier Scientific develops new and novel chemicals for research and discovery. With over 600 catalog items and thousands of other compounds custom synthesized, FSI's expertise is well known in many product categories—from all types of boronic acids to porphyrin compounds, and more. Used for drug discovery and materials science, these unique compounds offer researchers an extremely versatile and powerful synthetic tool for constructing complex and highly functionalized molecules.

Sorenson Communications

<http://www.sorenson.com/>

4393 South Riverboat Road, Suite 300

Salt Lake City, Utah 84123

(801) 287-9400

USU professors Scott Budge, Paul Israelsen, and Richard Harris licensed their image-compression technology to Jim Sorenson to start his Salt Lake City company, Sorenson Vision, in 1996. Israelsen worked as chief technology officer for Sorenson Vision from 1996 to 2002. In mid-2005, the company split into Sorenson Communications and Sorenson Media. Sorenson Communications is a provider of industry-leading communication offerings, including the Sorenson Video Relay Service (VRS), Sorenson IP Relay (siprelay), and Sorenson videophones. Sorenson VRS enables deaf and hard-of-hearing callers to conduct video relay conversations through a qualified American Sign Language (ASL) interpreter. Sorenson IP Relay allows users to place text-based relay calls from either a mobile device or a computer to any telephone user. The company's line of Sorenson videophones are the only customized videophones with auto-updating technology, which includes the latest video communication features for the deaf and hard-of-hearing community.

New Startup Companies, 2004-2005**Alaero Design, Inc.**

Graduate student Nick Alley founded Alaero Design, Inc., while studying aerospace engineering at USU. Alaero has submitted an SBIR grant application to the U.S. Department of Defense to build a small, unmanned aerial vehicle using USU's Twisteron technology, an invention by USU's Warren Phillips that modifies the air flow over an aircraft's wing to produce a reduction in induced drag without a reduction in lift. This technology has applications for commercial, military and private aircrafts and watercrafts, and it could offer 5-10 percent savings on fuel costs; less expensive, but more effective, wing designs; and better maneuverability for high-performance aircraft.

Andigen

<http://www.andigen.com/>
Logan, UT
(435) 770-3766

One of USU's startup companies, Andigen, continues to rapidly land new customers and build anaerobic digester facilities. This technology, established by the Utah Center of Excellence under the direction of Conly Hansen and Ed Watts, generates electricity and provides for the rapid and efficient transformation of animal waste, allowing greater land productivity and reduced air, ground, and water contamination. Andigen's technology is good news for farmers considering typical 1,000-cow dairy farm or 6,000-pig farm using an IBR can produce enough electricity for more than 100 homes. Three new facilities have been constructed in the last few months.

CastleRock Engineering, Inc.

<http://www.castlerockengineering.com/>

CastleRock, a new startup company in Logan, Utah, has licensed USU technology called aerodynamic vectoring particle separation, which has the ability to sort tiny particles by size without ever coming in contact with them. Particle sorting is an important task in many areas, including bioprocessing, powder material processing, sample concentration, cell sorting, and air quality monitoring, so the commercial applications are very broad. Compared to current methods of particle sorting, CastleRock's technology improves accuracy and throughput, thus significantly reducing the cost of sorting operations. CastleRock has recently secured an STTR grant from the National Science Foundation to further develop this technology.

Gemini

1740 N. Research Park Way
North Logan, UT 84341
(435) 750-6400

Started by USU professor John Carman, Gemini was awarded a \$2 million federal grant in 2005 to further develop its seed technology. The process, called apomixis, creates base crops—such as sorghum, wheat, and rice—that clone themselves. It has the potential to significantly increase crop yields, thus lowering domestic feed/food production costs and helping developing countries increase their food supplies.

InteliSum

<http://www.intelisum.com/>
265 E. 100 S. Ste. 265
Salt Lake City, UT 84111
(801) 924-0660

USU researcher Robert Pack has created a Texel (text-element) camera using a tripod based instrument to make 3-D photography possible. Utah State's Center of Excellence (Center for Advanced Imaging Ladar) licensed its 3-D camera technology to a Salt Lake City-based company, RappidMapper, Inc., which recently became InteliSum, Inc. The technology can be compared to computer hardware and software. The camera is the

hardware, while LIDAR is the software. The camera technology captures a 3-D view of a scene using LIDAR (which stands for light detection and ranging.) With LIDAR, it is possible to measure distance, speed, rotation and chemical composition and concentration. When the digital camera is “married” into the LIDAR system, a 3-D image is produced.

Kuchera

<http://www.kuchera.com/>
345 Hillside Dr.
Windber, PA 15963
(814) 467-9779

Kuchera defense, a Pennsylvania corporation, signed a license agreement with USU for manufacturing and sale of USU-developed ODIS (Omni-Directional Inspection System) robots. Deployed in Iraq, Afghanistan and Washington, D.C., the ODIS robots are credited with saving lives and are planned for expanded use in the war against terror. ODIS robots are low profile, high mobility robots that employ a camera enabling a fast and complete inspection of the underside of vehicles for contraband materials. Twenty are deployed in Iraq and Afghanistan, and the robots are also being used in key Washinton, D.C. parking garages.

LiveWire

LiveWire Test Labs, Inc. creates technology that locates intermittent faults on live aging electrical wiring for safety, reduced down time, and reduced maintenance costs. Virtually every system in use today relies on electrical wiring for power and control, including those in transportation equipment, communication infrastructure, consumer products, nuclear power plants, and large industrial machinery. When this wiring ages, it may become brittle, crack, and break. Failures in these systems can be costly or catastrophic. LiveWire technology uses Spread Spectrum Time Domain Reflectometry (SSTDTR) to locate intermittent faults, which are among the most challenging to detect and fix in large systems, because their failures can only be detected at certain times. A very tiny pulse is sent down the wire, where it reflects off of the faults and returns to the test sensor, which can determine where the fault is occurring.

Plasma Containment

Plasma Containment is a Logan-based startup formed to fund foreign patent filings for USU professor Farrell Edwards' fusion system designs and market these technologies overseas. Inspired by modeling of naturally occurring plasma systems in the ionosphere of Venus, a new design criteria for fusion systems was developed that can provide compact neutron sources for security systems or potentially economically viable fusion energy sources. A \$1 million grant from the U.S. Department of Homeland Security has been awarded to Dr. Edwards and USU to continue to develop this technology into a small prototype demonstration.

SP Communications

SP Communications, a Utah-based startup company, is licensing USU technology that eliminates the echo that is created on a speaker phone or cell phone when two people

talk at the same time. SP Communications is working to produce a speaker phone and cell phone that do not have these double-talk problems. This same technology can also make it possible for a person with hearing aids to hear someone he is talking to when there is background noise, and this avenue is being explored by another large, Utah-based company.

Utah Centers of Excellence

Center for Advanced Satellite Manufacturing

The Center for Advanced Satellite Manufacturing leverages the capabilities of USU's Space Dynamics Laboratory to develop and manufacture low-cost, modular small satellites. These satellites are used for commercial, research and military missions into space.

Center for Advanced Imaging Ladar

The Center for Advanced Imaging Ladar (CAIL) has created a technology platform that combines laser distance measurement with digital color imagery. The technology enables users to quickly capture detailed, 3-D images of scenes in real-time and in a full-color, digital format. The Center has licensed its technology to IntelliSum, a USU startup company.

Center for High Speed Information Processing

USU's Center for High Speed Information Processing (CHIP) has partnered with USU's Design and Development Center to produce a speaker phone prototype utilizing CHIP's echo cancellation technology. This prototype is being used by a new USU spin-off company to obtain venture capital funding for commercialization of the new product.

Center for Profitable Uses of Agricultural Byproducts (Graduated)

The Center for Profitable Uses of Agriculture advances technology called an anaerobic induced blanket bioreactor (IBR). The IBR produces energy in the form of biogas that is like natural gas and can be burned to produce heat and/or electricity. Technology for the IBR was developed at Utah State University, and there are various agreements in place between USU and private industry to commercialize the technology. The goal of the center is to find profitable uses of organic materials that presently have little or no value. Finding profitable uses for organic materials helps the agricultural production and processing industries increase profitability and meet environmental regulations.

Center for Smart Sensors (Graduated)

The Center for Smart Sensors commercializes products that stem from two core technologies: measurement circuits and imbedded antennas for communication and sensing. This center has expertise in four essential support technologies, including complex 3-D simulation, sensor interfaces, numerical optimization and wireless communication. These disciplines apply to many areas, including: maintenance of aging aircraft, medicine, geophysical prospecting, precision agriculture, water management, manufacturing and personal safety.

Utah Centers of Excellence Applicants, 2006-07

Center for Solar Biofuels Technology

- Byard Wood, Mechanical & Aerospace Engineering
- Conly Hansen, Nutrition & Food Sciences
- Ron Sims, Utah Water Research Lab
- Cathy Hartman, Business Administration
- Edwin Stafford, Business Administration

Center for Electronic Mathematics Education

- E. Robert Heal, Mathematics & Statistics
- Jim Dorward, Office of Research Services
- Joel Duffin, Mathematics & Statistics
- Lawrence Cannon, Mathematics & Statistics

Center for Control of Flow in Manufacturing

- Barton L. Smith, Mechanical & Aerospace Engineering
- Robert Spall, Mechanical & Aerospace Engineering
- Brent Stucker, Mechanical & Aerospace Engineering

Center for Ice & Snow Biotechnologies

- Jon Takemoto, Biology
- Bradley Kropp, Biology
- Henry Nowak, Tech. Commercialization Office

Center for Renewable Energy

- Carl Hansen, Nutrition & Food Sciences
- Conly Hansen, Nutrition & Food Sciences

Center for Antioxidant Identification and Testing

- Daren Cornforth, Nutrition & Food Sciences

Center for Advanced Satellite Manufacturing

- Brent Stucker, Mechanical & Aerospace Engineering
- Charles Swenson, Electrical & Computer Engineering
- Pat Patterson, Space Dynamics Lab

Center for Thermal Management Technologies

- J. Clair Batty, Mechanical & Aerospace Engineering
- Scott M. Jensen, Space Dynamics Lab
- Dean Garlick, Space Dynamics Lab
- J. Steven Hansen, Space Dynamics Lab
- Leijun Li, Mechanical & Aerospace Engineering

Center for Advanced Imaging LADAR

- Robert Pack, Civil & Environmental Engineering
- Paul Israelsen, Civil & Environmental Engineering
- Scott Budge, Electrical & Computer Engineering
- Rees Fullmer, Mechanical & Aerospace Engineering
- Christopher Neale, Biologic

Center for University Application System

- Richard N. Roberts, Early Intervention Research

USU Technology Commercialization (TCO)

Utah State University has dramatically reenergized its technology commercialization process over the last three years to address key economic development needs. The office is now staffed by tech-savvy business people with more than 80 years of combined business experience in technical companies. Each professional has served in a senior management role in one or more large companies and at least one start-up company.

A number of initiatives have been put in place to help provide researchers with the resources they need to develop technologies with commercial promise:

1. Seed funding has been provided to help advance basic research into robust technology.
2. A Design & Development Center has been established to build prototypes for cost and market verification.
3. Over the last several years, USU has supported embedding business entrepreneurs in its Utah Centers of Excellence centers. By partnering with the other research universities' technology commercialization offices, state economic development offices, our business network, and venture capital firms, USU has broadened its ability to locate such talent.
4. TCO has strengthened relationships with the Entrepreneurial Program in the USU College of Business to help develop entrepreneurial talent for new start-ups.
5. TCO has established an internal bridging fund and resources to help obtain federal SBA, SBIR, and STTR grants. These grants are targeted at helping small businesses develop new technically-based products.
6. TCO founded the Cache Valley Venture Accelerator Club (VAC) in 2005. The VAC is composed of prominent local business people who are interested in mentoring and funding promising new businesses in northern Utah.

Tech Commercialization Results

- Revenues doubled in each of last 2 years
- Licenses more than doubled each of last 2 years
- 7 startup companies in last 2 years