



Governor's Office of  
**Economic Development**

Centers of Excellence

**Gary R. Herbert**  
**Governor**

**ANNUAL REPORT**  
**Centers of Excellence Program**  
**(renamed)**  
**Technology Commercialization and**  
**Innovation Program**

**Spencer P. Eccles- EXECUTIVE DIRECTOR**  
**Governor's Office of Economic Development**

**Gary Harter - MANAGING DIRECTOR**  
**Governor's Office of Economic Development**

**Nicole Toomey Davis – DIRECTOR**  
**Centers of Excellence Program**

**Sharon Cox - Program Coordinator**  
**Centers of Excellence Program**

**Fiscal Year: July 2010 – June 2011**

**Fiscal Year 2010-11**  
**GOED Centers of Excellence Program becomes the**  
**Technology Commercialization and Innovation Program**

**“Smaller, Lighter, Faster”**

The Utah Centers of Excellence program, now renamed the Technology Commercialization and Innovation Program, is a state-funded grant program developed by the Utah Legislature in 1986 to accelerate the commercialization of promising technologies that have strategic value for Utah. The end goal of the COE Program, now TCIP, is to help drive economic development and job creation by supporting the transition of the valuable technologies out of the lab and into industry.

The state of the startup and technology commercialization markets has changed significantly over the past 3-5 years, both nationally and in Utah. In response to these changes, including changes in regulatory environments and challenges in the capital markets for new technology ventures, the COE Program Director and GOED management felt that a review of the program’s effectiveness was needed. GOED convened a wide array of colleagues from the community to discuss the program and identify opportunities for continuing improvement. This program transition led the legislature to rename the program to the Technology Commercialization and Innovation Program, in March of 2011.

Under the review process, GOED adopted the following Vision Concept:

**Improving the velocity and quality of university/college-related startup deal flow.**

The following items were identified as needed to foster success:

- Capital
- Human Capital
- Collaboration

The following items were identified as Key Trends in the private startup economy:

- ⤴ Invest in Entrepreneurial Talent
  - Training and Mentoring startups
  - Key trend around the country in for-profit and government groups
- ⤴ Funding Programs
  - Small, Light, Fast
- ⤴ A Broad Embrace of university driven technologies

From this vision and insights from the private sector, the following principles were identified as a framework for evaluating the COE program:

- Smaller funding amounts than existing COE program
- Lighter overhead than existing COE process
- Faster turnaround with multiple grant opportunities each year
- Broad embrace of university/college driven technologies
  - Ranging from professors with technologies preparing to emerge from lab, to licensees of a university developed technology, to companies with an affiliation with a university or regional institution of higher education.

The vision for the updated program included an “affiliate” program, and this was piloted during the both reviews of the 2010-11 fiscal year. However, after the pilot testing of the affiliate program, it was decided that better statutory clarification would strengthen that portion of the program and it was put “on hold” for the 2011-12 fiscal year.

The final plan for 2010-11 fiscal year for the updated program, which emerged from broad consensus about these principles, was to offer smaller, shorter solicitations three times during each fiscal year (July 1 to June 30th). In order to facilitate the selection of more teams, more often, the COE program is no longer an open solicitation. Instead, there is now a prescreening mechanism to the application process which is performed by the following entities:

- ✦ PhD granting colleges and universities (Utah State University, U of U, and Brigham Young University) which have commercialization offices (TTO/TCO)
- ✦ Utah Science Technology and Research (USTAR) Technology Outreach and Innovation program (TOIP)

These organizations pre-screen applicants and recommend those that they believe are prepared to take maximum advantage of the COE program.

Other changes in the 2010-2011 solicitation include:

- ✦ Simplified application form for quicker submission and review
- ✦ Maximum grant funding for each proposal is \$40,000. If successful, a team may apply for future funding one additional time (maximum of \$80,000 total)

The frequency of the solicitations combined with the smaller total funding amounts constituted a significant change for the program, but these reflect the successes in the private sector of “smaller, lighter, faster” entrepreneurial support programs. In addition, the vision for the program includes an “entrepreneur in residence” program that will

provide for entrepreneurs with significant experience in raising funds and successfully building companies around sophisticated technologies to assist grant recipients. This “EIR” portion of the new program was not implemented in 2010-11 due to staffing constraints, but is expected to be implemented in 2011-12.

The measuring stick for the TCI program is still quality jobs, with an emphasis on both the value and pay of jobs created and the number of jobs created in Utah. Many of the teams that are applying for COE/TCIP funding either are or will lead to startup companies. The intention of the program is that these startups will begin and stay in Utah and this is also a key measure of the success of the program.

These changes were launched on a pilot basis in the fall of 2010. During the 2011 Legislative session, the Legislature formally changed the name of the COE Program to the Technology Commercialization and Innovation Program, which better represents the vision and focus of the program.

### **Awardee Review**

The TCI Program offered 2 grant opportunities in FY 2010-11, referred to as “round 1” in November of 2010 and “round 2” in April of 2011.

#### **Round 1**

The first round of the 2010-11 funding reviews was conducted during fall of 2010. The deadline for proposals for this round of funding was Monday, November 22, 2010. The review process was conducted in early December.

For this round of funding, 45 applications were received, for a total funding request of over \$1.7 million. Of these 45 applications, 21 were awarded a TCIP grant. Recipients included 12 Licensee companies, 5 Affiliate companies, 2 University of Utah teams, and 2 Utah State University teams. 10 Awardees are from the Cluster category of Manufacturing, Materials, Energy and Environmental (MMEE) technologies, with 7 in Life Sciences and 4 in the Information Technology Cluster. Five technologies emerged from Brigham Young University, eleven from the University of Utah and five from Utah State University. Total funding awarded during this round was approximately \$787,500.

#### **Round 2**

The second round of the 2010-11 funding reviews was conducted during early summer of 2011. The deadline for proposals for this round of funding was Monday, May 30, 2011. The review process was conducted in early June.

42 applications were received for a total funding request of just under \$1.7 million . Of these, 22 were awarded a TCIP grant, of which 2 were 2nd time applicants - 14 Licensee companies, 5 Affiliate companies, 2 University of Utah teams, and 1 Utah State University team. 3 Awardees are from the Cluster category of Manufacturing, Materials, Energy and Environmental (MMEE) technologies, with 9 in Life Sciences and 10 in the Information Technology Cluster. The funding total in Round 2 was \$879,000

The technologies are emerging from the following universities:

12 of 22 from University of Utah  
5 of 7 from Brigham Young University  
3 of 9 from Utah State University  
1 of 2 from Salt Lake Community College  
1 of 1 from Utah Valley University  
0 of 1 from Weber State University

#### SUMMARY

With 87 grant applications totaling approximately \$3.4 million in funding requests, a budget and 43 grants awarded this year, providing a total of \$1,666,500 in funding, the TCI program is clearly filling a significant need in the process of converting college and university developed technologies into products, companies and jobs for Utah.

**Funding Recipients for the**  
**2010-11 Centers of Excellence Program – Round 1 Solicitation**  
**November - December 2010**

**Total proposals submitted: 45**

**Total awarded funding: 21**

**12 Licensees**  
**5 Affiliates**  
**2 Internal University of Utah teams**  
**2 Utah State University internal teams**

**The technologies are emerging from the following universities:**

**Brigham Young University – 5**  
**University of Utah – 11**  
**Utah State University - 5**

**LICENSEES**

**Anaerobic Digestion Technologies, Inc.**

**CEO/Principal:** Jason Miller

**University:** Brigham Young University

**Affiliate/Licensee/Univ.:** Licensee

**Award Amt.:** \$40,000 – Company

**Cluster:** Life Sciences

A patent-pending, low-cost, low-maintenance, scalable methane filtration solution. The system is comprised of multiple filter cylinders and gas routing hardware, with an automated electronic control system. The BCS is skid-mounted for easy delivery and installation. The System removes corrosive contaminants and impurities from well-produced and waste-generated methane gas streams at 1/10th to 1/15th the cost of currently marketed technologies. Hydrogen sulfide, water, and other destructive agents are extracted to negligible levels by the BCS, significantly prolonging the life of pipeline infrastructure and electrical generation equipment associated with gas resources. Ground-breaking innovation is manifest in the thermal management system of the BCS. Low levels of excess system heat are utilized to replenish the filter beds and release contaminants in a concentrated gas stream. Successful management of this process makes the system unique and industry-changing in character.

[Aviradyne Technologies, Inc.](#)

**CEO/Principal:** Ronald D. Jones

**University:** Utah State University

**Affiliate/Licensee/Univ.:** Licensee

**Award Amt.:** \$40,000 – University

**Cluster:** Materials, Manufacturing, Energy, Environment

Hybrid rockets are significantly safer than Liquid and Solid counterparts. Hybrid motors can be stored and operated without risk of explosion. This makes hybrids ideal for commercial spaceflight except for two significant short-comings attributable to current manufacturing processes: motor-to-motor variability that precludes motor clustering, and lack of a for volume production method to support the required flight rates for the growing commercial space launch industry. The proposed production method uses robotic manufacturing technologies to effectively remedy both of these deficiencies: Digital-Direct Manufacturing to fabricate hybrid rocket fuel grains that are uniformly produced, and Filament/Tape Winding systems to form the composite case and assemble the motor in a single process. Factory automation and application of advanced polymer materials will significantly reduce motor-to-motor performance variability, enable FAA certification, and cut production costs by more than 50%.

**Black Box Engineering, Inc.**

**CEO/Principal:** Zac Humes

**University:** Utah State University

**Affiliate/Licensee/Univ.:** Licensee

**Award Amt.:** \$40,000 – Company

**Cluster:** Materials, Manufacturing, Energy, Environment

Coanda Assisted Spray Manipulator (CSM) gives the user the ability to change the direction of the flow of flame and particles leaving existing flame spray guns. The CSM will be designed as an add-on to existing flame spray gun technology. These flame spray guns are used for coating the interior of pipes, cylinders, and other surfaces using different materials. The coatings are used to improve performance of the substrate and reduce maintenance costs. Current technology limits this process to being performed on large diameter pipes, usually greater than 48 inches in diameter, because it requires a person to be inside the pipe to control the direction of the flow. The CSM device will allow the process to be completed on smaller diameter pipes and surfaces without the need for human labor to control the direction of the flow. This process will also be completed more quickly, accurately, and affordably as it removes the need for such intensive manual labor as is currently necessary.

### **CAT-Credibility Assessment Technologies**

**CEO/Principal:** Donald R. Sanborn

**University:** University of Utah

**Affiliate/Licensee/Univ.:** Licensee

**Award Amt.:** \$40,000 – Company

**Cluster:** Information Technology

Oculomotor Deception Detection© (ODD) holds significant promise for numerous security screening and intelligence applications. This revolutionary technology, based on five years of scientific research, provides a powerful new methodology for detecting deception. The ODD measures cognitive responses to deception as detected by a highly accurate eye tracking system that records eye movements and pupil diameter changes as a subject reads true/false questions presented by a computer. The current standard for lie detection technology is the polygraph which takes up to 3 hours to administer, requires a highly skilled examiner, costs about \$970 and is 85% accurate. The ODD test takes only 25 minutes, is easily-administered by minimally trained examiners and costs a fraction of the polygraph with the same accuracy.

### **Crocker Spinal Technologies**

**CEO/Principal:** David Hawkes

**University:** Brigham Young University

**Affiliate/Licensee/Univ.:** Licensee

**Award Amt.:** \$40,000 - University

**Cluster:** Life Sciences

The FlexSuRe™ is a spinal implant developed at Brigham Young University and licensed by Crocker Spinal Technologies, Inc. The FlexSuRe™ was designed to restore stability to the spine after surgeries such as discectomy or laminectomy. It shares load with other spinal structures, maintaining healthy motion while providing mechanical resistance to painful, nonphysiologic motion. The existing FlexSuRe™ is already market-separated due to its unique compliant-mechanism design. However, based on recommendations by the surgeon advisor board advising Crocker Spinal Technologies, the implant can be improved to increase its market acceptance. The COE award will be used to change the existing design to decrease size, modify orientation, and restore height to the segment. As a result, the device will restore nutrient flow to the disc while biomechanically mimicking the motion of a healthy segment. These characteristics make the device forward-looking to complementary technologies for spinal disc regeneration.

### **E-Sens (Formerly Sensicore China)**

**CEO/Principal:** Jack Buchanan

**University:** University of Utah

**Affiliate/Licensee/Univ.:** Licensee

**Award Amt.:** \$40,000 – Company

**Cluster:** Materials, Manufacturing, Energy, Environment

Sensicore has developed a silicon-based chemical sensing technology to address the world's water monitoring needs. The company's lab-on-a-chip sensors monitor multiple chemicals with an array of sensors selective to different analytes. The sensor array takes advantage of the mass fabrication manufacturing technology of the semiconductor industry to produce a low cost per test solution. The sensor array chip will be replaced periodically, eliminating the need for constant maintenance of the sensors. Its small size reduces the need for calibration solution, making it practical to produce small hand-held sensing systems, and to implement remote, unattended sensor network nodes.

### **HOT Water Global**

**CEO/Principal:** Brandon Lloyd

**University:** University of Utah

**Affiliate/Licensee/Univ.:** Licensee

**Award Amt.:** \$40,000 – University

**Cluster:** Materials, Manufacturing, Energy, Environment

This new technology involves repeated pressure cycles each consisting of a compression stage and a venting stage. The compression stage reaches 100-150 psi in the headspace of a closed vessel by use of a compressor, saturating the water being treated with an ozone/air mixture. The venting stage (to ambient pressure) produces rapidly expanding gas bubbles of all sizes from nano, micro, and centimeter sizes that provide abundant reactive interfacial ozone for ozone and contaminants. Repeated pressure cycles result in conversion of dispersed and dissolved oil into forms that can be removed by conventional sand filtration or biodegradable products. This project will use a pilot reactor (200 L) to demonstrate treatment of produced water and flow-back water from the oil and gas industry. The process represents an application of University Technology (U-3996).

## **Microsurgical Innovations**

**CEO/Principal:** Jay Agarwal

**University:** University of Utah

**Affiliate/Licensee/Univ.:** Licensee

**Award Amt.:** \$20,000 – Company;  
\$20,000 – University **Cluster:**

Life Sciences

An arterial anastomotic device, referred to as an arterial coupling device (ACD), which will replace the hand suturing technique currently used to connect arteries in microsurgery and macrovascular end-to-end arterial repair surgeries. This device would consist of a barbed cap that would be placed at the end of each artery and then connected together to attach the two arterial ends. This approach would reduce the time required in the surgery suite, reduce costs associated with surgery, and reduce the likelihood of failure of the anastomoses, by minimizing human error and stenting open the anastomosis. There are currently no arterial anastomotic devices available. This technology has the ability to simplify technically challenging microvascular repair and to expand the scope of microsurgery by facilitating these types of procedures in third world countries and in battlefield hospital settings.

## **TranquilMed**

**CEO/Principal:** Jared Edgel

**University:** Brigham Young University

**Affiliate/Licensee/Univ.:** Licensee

**Award Amt.:** \$40,000 - Company

**Cluster:** Life Sciences

RestEasy will be the only non-drug treatment for Restless Legs Syndrome (RLS) on the market. It uses patent pending treatment of near-infrared light that penetrates the skin deep into the tissue. Dr Mitchell's studies show 52% reduction in RLS symptoms in 12 treatments and give a p-value less than 0.001. Our device consists of a neoprene pad with adjustable straps. The back of the pad has an array of LEDs that when applied to the lower leg emits near-infrared light that penetrates the skin. This releases Nitric Oxide which then causes the blood vessels to dilate. Vasodilation in turn increases blood flow, satisfying the urge to move and mitigating RLS symptoms. Features for safe home-use and convenience include: a lithium-ion battery that allows free movement during treatment and a control interface that is simple to use. Additionally the device has thermocouples in place to shut the device down if the temperature of the leg gets too high.

## **Solan LLC**

**CEO/Principal:** Brandon Lloyd

**University:** University of Utah

**Affiliate/Licensee/Univ.:** Licensee

**Award Amt.:** \$40,000 – Univ

**Cluster:** Materials, Manufacturing, Energy, Environment

A technology that will fabricate solar cells based on lithographically defined graphite, so-called carbon nanoribbons (CNRs). The electronic properties of CNRs exhibit a dependence on the ribbon dimension. Reducing ribbon width to nanometer scale can turn graphite into a semiconductor, and with the proper selection of metal contacts with different work functions ( $\phi$ ), one can form Schottky barrier solar cells. Upon excitation of the incident light, free electrons and holes will be generated within CNRs. Due to device building-in potential, which equals to the difference in  $\phi$  between the two metal leads, free electrons and holes will be extracted to the electrodes, generating electricity. Due to the abundance of graphite material and convenience to tune the material bandgap, we expect to fabricate low-cost and high-efficiency solar cells. A patent, filed on this invention jointly by University of Utah and University of Wisconsin-Madison, has been allowed and licensed to Solan.

## **Veritract, LLC**

**CEO/Principal:** Arlo McGinn

**University:** University of Utah

**Affiliate/Licensee/Univ.:** Licensee

**Award Amt.:** \$40,000 - Company

**Cluster:** Life Sciences

Nasogastric feeding tubes are the most commonly placed gastrointestinal devices in hospitals today. Over 80% of ICU patients and many more patients in general hospital floors (1.25 million total US patients) receive nutrition via these tubes. Because most of these feeding tubes are placed blindly, without any guidance, many thousands of these tubes are misplaced to the lung causing serious injury and even death. To verify proper placement, most hospitals require X-ray confirmation of tube placement but incur significant extra expense as a result.

Veritract leverages the advancements made in endoscopic technology to allow these technologies to be built into an inexpensive disposable device. Our design integrates optics for vision, and steering for guidance, allowing feeding tubes to be guided and placed into the intestinal tract under direct visualization. This allows for a much quicker,

safer, and economical placement and improves patient care while streamlining hospital procedures.

## **AFFILIATE COMPANIES**

### **Cajun Archery**

**CEO/Principal:** David White

**University:** Utah State University

**Affiliate/Licensee/Univ.:** Affiliate

**Award Amt.:** \$12,500 – University

**Cluster:** Materials, Manufacturing, Energy, Environment

Through a market analysis, Cajun Archery, a manufacturer and supplier of bowfishing equipment, has identified a need for a bowfishing reel. Currently, there are two bowfishing reels that dominate the bowfishing market. One of these reels releases line very efficiently, while the other retrieves line well. Neither reel excels at performing both of these tasks. This project is to design a bowfishing reel that is able to both release and retrieve line efficiently, is easy to operate, requires minimal maintenance, and is cost effective to manufacture. Through the use of computer-aided design (CAD) rapid prototyping, and computer numerical control (CNC) machining the Research Group for Product Engineering and Prototyping at Utah State University is able to quickly design, test and develop products to meet market demands. Through the engineering design process we will be able to meet design criteria and reduce commercialization risks for Cajun Archery.

### **Domain Surgical, Inc.**

**CEO/Principal:** David J. McNally

**University:** University of Utah

**Affiliate/Licensee/Univ.:** Affiliate

**Award Amt.:** \$40,000 – Company

**Cluster:** Life Sciences

Surgery requires the cutting and coagulation of bleeding tissues and vessels, as well as the re-attachment of tissues or their destruction. Because of this, a large market has evolved based upon the promise of improved outcomes related to the excision, dissection, hemostasis, and healing of tissue. Many innovations have been introduced in recent years, but many surgeons are still dissatisfied that there is not a tool that meets all the criteria. Our patent-pending ferromagnetic inductive heating technology holds the promise of producing surface-only tissue effects with energy that does not pass through the patient; frictionless cutting with elimination of tissue distortion and sticking; on-demand rapid onset and offset of effect as various tissues or bleeding are

encountered; and easy cleaning and disposability. These attributes position our technology as an ideal energy modality for cardiothoracic surgical procedures.

## **Enerlyte, LLC**

**CEO/Principal:** Seth M Phillips

**University:** Brigham Young University

**Affiliate/Licensee/Univ.:** Affiliate

**Award Amt.:** \$40,000 - Univ

**Cluster:** Materials, Manufacturing, Energy, Environment or Information Technology

Enerlyte's intelligent, clean technology, energy conservation program is a revolutionary web-based software for tracking energy efficiency & conservation. The software tracks both user activity and results of utility conservation programs. Using system data, Enerlyte software makes recommendations to users and utilities for improving energy usage. Users get graphs and customized tips on their monthly utility bill. Utilities get an online dashboard providing usage analysis that maximizes utility ROI for each dollar spent on efficiency & conservation. Enerlyte groups users into peer groups (households with similar size/age of home, family size, location, etc.) and monitors changes in energy use when users take specific actions to conserve. Enerlyte's product uniquely addresses both user & utility demand for energy usage information that can lead to improved efficiencies in energy usage & conservation.

## **Euclid Timber Frames LLC**

**CEO/Principal:** Kip Apostal

**University:** University of Utah

**Affiliate/Licensee/Univ.:** Affiliate

**Award Amt.:** \$7,500 – Company;  
\$7,500 – University

**Cluster:** Materials, Manufacturing, Energy, Environment

Interlocking Cross Laminated Timber (ICLT) is a prefabricated cross-laminated solid wood wall and roof panel fabricated from 2-5 layers of alternating direction 3" x 6" to 3" x 8" pine stock milled from beetle kill trees. ICLT utilizes no fasteners and no adhesives, removing the reliance on volatile organic compound (toxic) adhesives, allowing the panel to be disassembled at end of life to be repurposed in the building material supply chain. Layering gives the panel strength, allowing low-grade wood to be used in a high value structural situation, estimated to last upwards of 100 years. ICLT can be built up to nine stories in some cases, efficient in speed of construction, and given the availability of material, potentially affordable for both production home building and large commercial structures. This proposal is for ICLT commercialization research between university and industry in preparation for market acceptance in the next two years.

## **Fusion Diagnostics**

**CEO/Principal:** Ben Rollins

**University:** University of Utah

**Affiliate/Licensee/Univ.:** Affiliate

**Award Amt.:** \$40,000 – Company

**Cluster:** Life Sciences

Developing glasses with a novel coating that blocks the light spectrum that triggers migraines and other neurological disorders such as blepharospasm. By wearing these coated glasses, migraine sufferers may experience significant reduction in the frequency and severity of their migraine attacks. These coatings can be applied to spectacle lenses, contact lenses, and various types of light sources.

## **Linear Signal, LLC**

**CEO/Principal:** Greg Mockett

**University:** Brigham Young University

**Affiliate/Licensee/Univ.:** Affiliate

**Award Amt.:** \$40,000 – University

**Cluster:** Information Technology

Traditional satellite dish antenna technology suffers from quality of service problems due to poor mount installation, wind loading, rain, roof sag, and satellite orbital wobble. Smart electronically steered phased array feed antennas adjust the antenna beam adaptively to maintain maximum signal quality. Linear Signal has developed a critical enabling part for smart antennas, an integrated beamformer chip, which will be combined with high efficiency, low noise phased array antenna technology developed for radio astronomy by Prof. Warnick at Brigham Young University to produce smart antenna feeds for commercial satellite antennas on buildings, aircraft, vehicles, and ships.

## **UNIVERSITY TEAMS**

### **Large-Scale Semiconductor Nanocrystal Fabrication**

**CEO/Principal:** Michael H. Bartl

**University:** University of Utah

**Affiliate/Licensee/Univ.:** University of Utah

**Award Amt.:** \$40,000 – Univ

**Cluster:** Materials, Manufacturing, Energy, Environment or Information Technology

Nanocrystals (1 to 100 nm in size) are considered cornerstones of emerging energy, information, and biomedical technologies due to their unique size-dependent electronic and optical properties. However, their widespread use is severely limited by current high-cost and small-scale fabrication methods requiring high temperatures. In contrast to existing techniques, we have developed a novel synthesis method for high-quality nanocrystals that operates at low reaction temperatures (patents pending). Our method promises enormous impact for commercial applications, since low-temperature synthesis enables easier scale-up (high throughput fabrication) with reduced engineering requirements while keeping high product quality and reproducibility. Moreover, our method uses inexpensive, industry-tested and reusable reaction components (e.g. solvents) and therefore should not only result in significantly reduced manufacturing costs, but also in environmentally-friendlier "greener" fabrication.

### **Smart Antenna Technology**

**CEO/Principal:** Bedri A. Cetiner

**University:** Utah State University

**Affiliate/Licensee/Univ.:** Utah State University

**Award Amt.:** \$40,000 – Univ

**Cluster:** Information Technology

The technology developed at Utah State University is an adaptive smart antenna technology that enables a single antenna element to dynamically change its properties such as operation frequency, beam direction, and polarization. An adaptive antenna is an indispensable part of the next generation wireless communications systems such as upcoming 4G systems in order to achieve targeted system performances, i.e., higher data rate, capacity, etc. With the existing technologies for a system to provide dynamically adaptive features, a large number of antennas in conjunction with ancillary electronic components need to be used. The existing technology, therefore, is cost and size prohibitive for commercial wireless systems. On the other hand, our technology provides a superior performance with a single antenna element which can be realized at low cost and size. The microfabrication technology developed by the PI's research

group, which will be patented by the Utah State University TCO, is based on a novel microfluidic technology

### **Smart Occupancy**

**CEO/Principal:** Aravind Dasu

**University:** Utah State University

**Affiliate/Licensee/Univ.:** Utah State University **Award Amt.:** \$40,000 – Univ

**Cluster:** Information Technology

The Smart Occupancy Sensor is a dual mode hardware device (Passive IR + Video camera) that can be mounted on a ceiling in an office room, and expected to reliably and near-instantaneously turn lights on when occupied and turn them off when unoccupied. The unique features are: (a) Its response time is ~5 seconds compared to 15-20 minutes for motion sensors, (b) It can be configured and setup via software using a graphical user interface, (c) It does not suffer the infamous 'hand waving' problem that motion sensors do, and (d) It can be upgraded via software updates for daylight aware lighting control and task control.

### **Trace Explosives Detection**

**CEO/Principal:** Ling Zang

**University:** University of Utah

**Affiliate/Licensee/Univ.:** University of Utah **Award Amt.:** \$40,000 - Univ

**Cluster:** Materials, Manufacturing, Energy, Environment

Portable devices that are suited for in-field explosives detection. The sensory materials are composed of well-defined nanofibers fabricated from different building-block molecules. As covered in our five IPs, the nanofibers are highly efficient for vapor detection of explosives, via optoelectronic modulation upon interaction with the targeted explosives. Upon integration into a small chip, the entangled nanofibers form a mesh-like, highly porous film, providing maximal sampling of explosives, enabling expedient vapor detection with unprecedented efficiency (down to ppt range). This is superior to the common solid film-based sensory materials, for which the sampling of trace analytes remains difficult due to the limited surface area. Compared to conventional electronic detection systems like those based on MS or IMS, the nanofibers represent a class of simple, small and adaptable detection system.

**Funding Recipients for the**  
**2010-11 Technology Commercialization and Innovation Program**  
**Round 2 Solicitation - April – May 2011**

**Total proposals reviewed: 42**

**Total recommended for funding: 22**

**Licensees: 14**

**Affiliates: 5**

**University of Utah Internal teams: 2**

**Utah State University internal teams: 1**

**The technologies are emerging from the following universities:**

**12 of 22 from University of Utah**

**5 of 7 from Brigham Young University**

**3 of 9 from Utah State University**

**1 of 2 from Salt Lake Community College**

**1 of 1 from Utah Valley University**

**0 of 1 from Weber State University**

**FUNDED**

**Licensees**

**Aciont**

**CEO/Principal:** John Higuchi

**University:** University of Utah

**Affiliate/Licensee/University:** Licensee

**Award Amt.:** \$40,000

**Cluster:** Life Sciences

The project is a preclinical proof of concept research plan as a premise to create the ultimate achievement in ophthalmic therapy: to treat non-invasively, age related macular degeneration (AMD) and diabetic retinopathy. The project intends to develop a safe and an effective, an approximate 20 minute iontophoresis treatment for the delivery of macromolecules such as Avastin® to the posterior section of the eye, which can be administered by a nurse or paraprofessional or potentially, patients themselves. This Visulex® system is a combination novel ocular iontophoresis device - an eye applicator resembling a scleral lens - and enhancement formulation capable of delivering large, antibody agents to the posterior segment of the eye. Iontophoresis is a method of delivering drugs through body tissue using the aid of a mild electrical current. Visulex offers a customized, localized controlled release therapy designed to minimize unnecessary patient exposure to the drug.

## **Akadi Technologies**

**CEO/Principal:** Wes Christiansen

**University:** University of Utah

**Affiliate/Licensee/University:** Licensee

**Award Amt.: \$40,000**

**Cluster:** Information Technology

Akadi digital signage is unique in that it creates a network of displays, organized by time, geographic location and demographic audience which can be managed by any user from any web enabled device. Value in the network increases as the reach of the network grows, enabling advertisers and diverse interest groups to target unique audiences with specific and relevant information. For advertisers to be successful today they have to stand out! Success in business today is less about advertising and more about connecting through social media, viral messaging and other meaningful interactions. Targeted messaging and information that is personalized and relevant is the only way to reach through the clutter of messages we are bombarded with on a daily basis. Akadi Technologies is perfectly positioned to be able to leverage a number of technologies, existing and currently under development, to redefine digital signage and targeted and interactive messaging.

## **AnalySwift**

**CEO/Principal:** Allan Wood

**University:** Utah State University

**Affiliate/Licensee/University:** Licensee

**Award Amt.: \$40,000**

**Cluster:** Materials, Manufacturing, Energy, Environment/Information Technology

VABS is a unique technology capable of rigorously modeling 3D slender solids with complex microstructures, such as wind turbine blades, helicopter rotor blades, bridges, and other beam-shaped structures. VABS has been consistently demonstrated to be much better than other technologies regarding accuracy, efficiency, and versatility. This technology can save several orders of magnitude in computing time with little loss of accuracy and is gaining an international reputation in rotorcraft and wind power industries. Major companies such as Boeing, Siemens, AeroVironment have licensed VABS. All the other competitive technologies have a very limited set of capabilities and few of them can treat composites which are extensively used now. Furthermore, none of the existing tools have a strong endorsement from the research-oriented community as

VABS has. We strongly believe that VABS will become a very competitive product and the tool of choice for modeling composite beam structures.

### **Credibility Assessment Technologies**

**CEO/Principal:** Donald R. Sanborn

**University:** University of Utah

**Affiliate/Licensee/University:** Licensee

**Award Amt.:** \$40,000

**Cluster:** Information Technology

Ocular-motor Deception Test (ODT) is the first major breakthrough in deception detection technology in 20 years, with numerous security screening and intelligence applications. This revolutionary technology provides a powerful new methodology for detecting deception. The ODT measures cognitive consequences of deception with a highly sensitive eye tracking system that records eye movements and pupil diameter changes as the subject reads true/false questions presented by a computer. The ODT compared with other technologies like the polygraph, it is more competitive: It is easily-administered, takes only 25 minutes, is cost effective, achieves the same accuracy (85%), can be administered in multiple languages and settings, facilitates high volume testing, and is customizable to different needs. In conclusion, the ODT reduces the need for time-consuming and expensive polygraph examinations and brings simplicity, speed, and convenience to screening process.

### **Epitel**

**CEO/Principal:** Mark Lehmkuhle

**University:** University of Utah

**Affiliate/Licensee/University:** Licensee

**Award Amt.:** \$40,000

**Cluster:** Information Technology/Life Sciences

A small, user friendly, wireless device for human EEG monitoring is currently lacking. We propose an individual-use patch-type telemetry device for simplified EEG recording from human patients. This device will enable user-friendly application of the EEG electrode and real-time recording of the EEG signal either in the ICU, in an out-of-hospital setting (e.g., the home or work environment), or for research (e.g., antiepileptic drug testing). The device will consist of a small EEG electrode/transmitter unit that both wirelessly transmits EEG signals to a receiver and “logs” EEG data for later retrieval. The only component placed on the patient will be a small unit that is roughly the size of a Band-Aid™ and will have the look and feel of a “patch.” Our primary objective is to create a user-friendly, unobtrusive device that can be used to reliably record acute

and/or chronic electrographic seizures under conditions where traditional ambulatory EEG is not feasible or practical.

## H2O TECH

**CEO/Principal:** Timothy Nelson

**University:** Brigham Young University

**Affiliate/Licensee/University:** Licensee

**Award Amt.: \$40,000**

**Cluster:** Life Sciences/Materials, Manufacturing, Energy, Environment

The Neptune Water Drill provides a scientifically engineered jet stream of water that is less than the thickness of a piece of paper, mixed with tiny particles of abrasive that removes dental caries. It is the most precise cutting device in the dental industry (the Neptune water drill stream diameter is 1/7 the thickness of the most used dental drill bits), which improves the art of dentistry and increases patient satisfaction.

It is a patented invention of Dr. Robert Todd, Professor of Mechanical Engineering at Brigham Young University and Scott C. Hansen. Major benefits include: (1) precision-cutting dentistry, (2) no heat from friction, (3) natural matte finish eliminates phosphoric acid etchings in the drilled out cavity, (4) no drilling sound or vibrations, (5) less irritation of the nerves, (6) reduced need for anesthesia, (7) less post operative pain, discomfort and chance for infection, (8) and lower risk of reoccurring dental caries.

## Knudra Transgenics

**CEO/Principal:** Chris Hopkins

**University:** Salt Lake Community College

**Affiliate/Licensee/University:** Licensee

**Award Amt.: \$20,000 – Company;  
\$20,000 – University Cluster:**

Life Sciences

Knudra makes biosensors detecting toxicities in our environment, food, and medicines. The nematode worm's capacity to detect toxins is harnessed by genetic engineering the worm to turn green upon exposure to toxin. The observation of turning green is a biosensor of toxicity. We make many types of worm biosensors to detect different types of toxins. We arrange the worm biosensors into arrays where every array well contains a different type of biosensor. Different toxins create different patterns of biosensor activation. A digital readout of toxicity is achieved. This simplifies data interpretation. Data sets are inherently normalized allowing the most important toxic mechanism to be easily identified. Our competition has a wide variety of methods with very little standardization between tests, which leads to confusion in data interpretation. Our method is faster, cheaper, and more reliable than current methods and it uniquely reveals which toxicity mechanism is of highest concern.

## **Linear Signal**

**CEO/Principal:** Greg Mockett

**University:** Brigham Young University

**Affiliate/Licensee/University:** Licensee

**Award Amt.: \$40,000**

**Cluster:** Information Technology

Traditional satellite dish antenna technology suffers from quality of service problems due to poor mount installation, wind loading, rain, roof sag, and satellite orbital wobble. Smart electronically steered phased array feed antennas adjust the antenna beam adaptively to maintain maximum signal quality. Linear Signal has developed a critical enabling part for smart antennas, an integrated beamformer chip, which will be combined with high efficiency, low noise phased array antenna technology developed for radio astronomy by Prof. Warnick at Brigham Young University to produce smart antenna feeds for commercial satellite antennas on buildings, aircraft, vehicles, and ships.

## **Sera Prognostics**

**CEO/Principal:** Andrew Sauter

**University:** Brigham Young University

**Affiliate/Licensee/University:** Licensee

**Award Amt.: \$40,000**

**Cluster:** Life Sciences

Sera has licensed from Brigham Young University and UofU the development and commercial rights to newly discovered biomarkers for multiple pregnancy complications that are measurable in blood samples. Sera is currently developing a commercial test for biomarkers to predict preterm birth that were identified using this proteomic discovery technology. Sera and Brigham Young University believe this approach could be used to identify proteomic biomarkers for Endometriosis and would like to pursue a New Project to develop a commercially useful test that would be an alternative to laparoscopies.

## **SMEDiagnostics**

**CEO/Principal:** Brad Bertoch

**University:** Brigham Young University

**Affiliate/Licensee/University:** Licensee

**Award Amt.:** \$40,000

**Cluster:** Information Technology

HSG allows a new venture's effectiveness at commercializing products to be graphically captured by integrating with a New Venture Template™ ("NVT") analysis of 15 quantifiable attributes and a database of hundreds of successful ventures. HSG statistically analyzes large amounts of industry/performance data and a large number of variables (multi-variate analysis) and graphically represents all of the objects, data points and correlations on a single screen. The NVT determines the likelihood of venture success based on 15 specific business attributes and a comprehensive database of NAICS coded companies that have been analyzed for venture success. The output delivers a comprehensive analysis of clients' resource capacity and how they compare with success within their industry. Only large consulting firms use sophisticated analytical tools and manpower to generate the results of HSG, which brings the power of an Accenture-type analysis to SMEs at a fraction of the cost.

## **SpeakWorks**

**CEO/Principal:** Ken Meyers

**University:** Brigham Young University

**Affiliate/Licensee/University:** Licensee

**Award Amt.:** \$40,000

**Cluster:** Information Technology

Web-based presentation feedback management software. In general, the software allows for live web recording of an oral presentation of any kind, and captures feedback synchronized to the video. The software also provides management for the recordings and feedback, including participants, groups, sessions, and feedback providers.

## **TheraTarget**

**CEO/Principal:** Darwin L. Cheney

**University:** University of Utah

**Affiliate/Licensee/University:** Licensee

**Award Amt.: \$20,000 – Company;  
\$20,000 – University Cluster:**

Life Sciences

Therataarget plans to develop a water-soluble, biodegradable co-polymer that combats cancer. The technology will target solid-cancer tumors (through antibody technology) and release anti-cancer drugs specifically to the cancer site. The attached drug is inert and non-toxic while it circulates through the blood stream, but once the polymer attaches to the solid tumor it becomes engulfed and the anti-cancer drugs become activated thus killing the tumor. The drug carrier when degraded is small enough to be cleared by the kidneys, yet large enough in a non-degraded form to remain in circulation for a sufficient time to be concentrated at the solid tumor site.

## **ViroPan**

**CEO/Principal:** Tyler McCabe

**University:** University of Utah

**Affiliate/Licensee/University:** Licensee

**Award Amt.: \$40,000**

**Cluster:** Life Sciences

Aqua-Ring is a novel medical grade polyurethane intravaginal ring (IVR) that steadily delivers ~5 mL of natural vaginal-like fluid over 5 days to treat vaginal dryness in peri- and post-menopausal women. It is a “smart” device that is self-inserted weekly and has the ability to sense the moisture need in the vagina and release fluid on-demand to supplement the lubricating fluids of the vaginal mucosa. Since women experience very different levels of vaginal dryness, Aqua-Ring has a truly unique design and is woman-specific personalized therapy that will not under treat or over treat the vaginal dryness symptoms. There is no other product that can provide this natural and personalized remedy. This product addresses all of the negatives of current estrogen replacement therapies, with their risk of cancer and heart disease, and OTC gels, with their messiness and short duration. The regulatory strategy is to seek market clearance through the Premarket Notification 510(k) pathway in 2013.

## Vutara

**CEO/Principal:** Stan Kanarowski

**University:** University of Utah

**Affiliate/Licensee/University:** Licensee

**Award Amt.:** \$40,000

**Cluster:** Information Technology/Life Sciences

Vutara has coupled cutting-edge breakthroughs in photophysics and computation to create a new super-resolution microscope, the SR-200. The SR-200 microscope is a super-resolution fluorescence microscope that combines new hardware (microscope and peripherals) and software (operational and analytical tools). Vutara SR-200 Bi-plane Technology - For over a century the work defining light microscopy resolution limits has stood to affirm that resolutions below the diffraction would be inherently out of reach, relegating science to postulate as to the localization of small objects. Today, however, we find ourselves in the midst of an optical revolution, with the introduction of several new lens based, light microscopes capable of smashing the diffraction limit, approaching single molecule resolutions. These systems have redefined light microscopy and been termed "Super-Resolution" or "Sub-diffraction" microscopes, with recent commercial introduction to the global scientific market.

## Affiliate Teams

### Distal Access

**CEO/Principal:** Shawn P. Fojtik

**University:** University of Utah

**Affiliate/Licensee/University:** Affiliate

**Award Amt.:** \$40,000

**Cluster:** Life Sciences/Materials, Manufacturing, Energy, Environment

Doctors spin needles, catheters, and wires to access deep inside organs or clear catheters and vessels. Spinning by hand gives surgeons feel & control but lack power & speed. Electrical powered 'drill-like' devices give power & speed, but are bulky, expensive, and lack feel & control. Clinicians need a device that combines power & speed with feel & control. The SPINR is a hand-held, mechanical, cost-effective device that spins needles, catheters, and wires when the doctor squeezes their hand. SPINR's simple 6-piece molded design includes a helical gear that converts the squeeze of the handles into axial rotation. Gearing can be adjusted for high-rotation or high-torque applications. Connecting guidewires to the SPINR helps wires vibrate and advance through narrowings or blockages. Oscillating shaped wires and catheter with the SPINR

creates a powerful device to macerate blockages in catheters and vessels. SPINR: the speed of a motor with the feel of the hand.

## **Domain Surgical**

**CEO/Principal:** David J. McNally

**University:** University of Utah

**Affiliate/Licensee/University:** Affiliate

**Award Amt.:** \$40,000

**Cluster:** Life Sciences

Surgery often requires the cutting and coagulation of vascularized tissues and blood vessels, including the sealing of individual large arteries, veins, and lymphatics. A large market has evolved based upon the promise of improved outcomes related to the sealing and cutting of blood vessels. Innovations intended to improve the speed and integrity of sealing vessels have been introduced in recent years, but many surgeons are still dissatisfied with the performance and security of those devices. Our patent-pending ferromagnetic inductive heating technology holds the promise of producing surface-only tissue effects with energy that does not pass through the patient; uniform sealing with elimination of tissue distortion and sticking; minimizing of collateral or adjacent tissue injury or thermal damage; on-demand rapid onset and offset of effect as various tissues or bleeding are encountered; and easy cleaning and disposability. These attributes position our technology as an ideal energy modality for surgical procedures requiring the sealing of blood vessels of a wide range of sizes.

## **Holorad**

**CEO/Principal:** Stephen J Hart

**University:** Utah Valley University

**Affiliate/Licensee/University:** Affiliate

**Award Amt.:** \$39,000

**Cluster:** Information Technology

Holorad's technology prints animated interactive color holograms from Computer Graphics scenes designed in animation programs such as Autodesk Maya. This provides glasses-free 3D holograms for entertainment, advertising, and medical applications. These are holographic prints, projecting out in front of the observer with true depth. No other technology provides this rich combination of visual stimuli, and the resulting holograms are very compelling. Hologram production and replay requires custom optical systems, and for cost-effective commercial applications these need to use highly-divergent beams which inherently produce highly distorted holograms. To correct this, Holorad pre-distorts the printed data so that the distortions cancel, producing an undistorted result. The general mathematical basis for this is known in the geometrical optics literature, but has not been extended to the required 3D formulation and implementation, so Holorad currently uses a slow iterative fine-tuning.

### **Natural Asphalt Solutions**

**CEO/Principal:** Kimball Young

**University:** University of Utah

**Affiliate/Licensee/University:** Affiliate

**Award Amt.:** \$40,000

**Cluster:** Materials, Manufacturing, Energy, Environment

Today's commercial/conventional asphalt products represent the tail end of the crude oil refining process. Simply, they are what's left after the best parts of the crude are dedicated to other uses. Naturally occurring Utah oil sands are crude oil before refining. Utah oil sands, based on anecdotal and scientific review, are much better performing road surfacing material in durability and resilience. This technology replaces commercial/conventional asphalt in road surfacing hot mixes with oil sands based on a UDOT specification now in the final stages of development.

### **Thermal Management Technology**

**CEO/Principal:** J. Clair Batty

**University:** Utah State University

**Affiliate/Licensee/University:** Affiliate

**Award Amt.:** \$40,000

**Cluster:** Materials, Manufacturing, Energy, Environment

Water flow metering is being mandated in more applications including secondary water use. Needed are low-cost/durable flow and “excessive-use” meters (as alarms for breakage) that tolerate sedimentary flow. Modern flow meters are expensive, complex, easily fouled, and impractical for silt-laden secondary water. The proposed non-obtrusive flow meter (NFM) is low cost, has no moving parts, no fouling potential. Small thermal/optical sensors strategically placed within the circumference of and nearly flush with the internal walls of NFM react to flow across and around their surfaces. Convective heat transfer and optical diffusion algorithms, combined with lab calibrations yield volumetric flow. Because NFM flow is determined from brief pulses of power without attaining steady state, a smaller power source—low voltage AC/DC—is required. Compact, solar and battery-assisted options exist. External logic modules provide continuous or intermittent data uploads to Bluetooth or wireless devices

## University Teams

### DBS Electrode Array

**CEO/Principal:** Alan Dale Dorval II

**University:** University of Utah

**Affiliate/Licensee/University:** University of Utah

**Award Amt.: \$40,000**

**Cluster:** Information Technology/Life Sciences

Massive-Multielectrode, Cross-Hatched Planar Arrays for Deep Brain Stimulation. This device will allow the user to control the direction and shape of the electric field.

The proposed device will allow for complete control over the electric field including its shape and direction. No longer will the field center be limited to the electrode contact, and no longer will it be limited to a spherical shape. By using a unique cross shaped electrode with approximately 10,000 contacts, this device will be able to shape the field to fit the particular region of the brain that requires stimulation, without crossing over into undesired regions. DBS treatment with this device will be more effective and safe, and more flexible, as different regions of the brain would not require specially shaped electrodes.

### Motion Sensor Suit

**CEO/Principal:** Carlos Mastrangelo

**University:** University of Utah

**Affiliate/Licensee/University:** University of Utah

**Award Amt.: \$40,000**

**Cluster:** Information Technology

We are developing a wireless sensor “suit” that measures the exact movement of the body. This is a superior method to the industry standard motion capture cameras and can be used in 3D animation, life sciences, and sports science. Our sensor system is will be the first of its kind and will overcome the major drawbacks of cameras which require a direct line-of-site and a studio. It is based on state-of-the art MEMS inertial sensors and a local wireless network.

## **Synthetic Spider Silk Fibers**

**CEO/Principal:** Randolph V. Lewis

**University:** Utah State University

**Affiliate/Licensee/University:** Utah State University **Award Amt.:** \$40,000

**Cluster:** Life Sciences

There are over 100,000 anterior cruciate ligament and 75,000 rotator cuff repair/replacements in the US costing over \$3 billion. Hence, there is a critical need for new repair strategies that provide effective mechanical reinforcement of ligament tears and rotator cuff repair as well as to stimulate and enhance the patient's own intrinsic healing potential. Our goal is to develop spider silk protein fibers for the repair/replacement of ligaments and tendons. The specific aim is to identify the best fiber processing methods to achieve the necessary mechanical properties. The innovation is the use of different "synthetic" spider silk proteins whose properties can be tuned to the planned biomedical application both by the sequence of the protein and the fiber processing methods. The expected outcome is developing materials with superior in vitro characteristics for use as tendon and ligament repair/replacement.