Governor's Office of
Economic Development
Centers of Excellence

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ANNUAL REPORT

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2006-2007
Centers of Excellence
Annual Report

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Executive Summary

Executive Summary

The 2006-07 year was an excellent year for the Centers of Excellence Program. The highlight of the year included 8 companies (spinouts) started this year which licensed technology from Centers supported by this program. These spinouts include 6 companies emerging from the University of Utah and one each from Utah State University and Brigham Young University. In the Life Sciences sector, Larada Sciences, Navigen, and Philotek are all new companies in our landscape. Nano-Oxides is a startup in the material sciences industry, with an obvious emphasis in nanomaterials, and in the IT sector, Vistrails, Dynamic Screening Solutions, Apollo Acoustics and State of RT are all companies that are licensing technologies supported by Centers of Excellence funding.

An important element of all of these emerging companies is the key role that the Centers of Excellence Business Teams played in their formation and early accomplishments. This pairing of seasoned technology business executives and serial entrepreneurs with some of the best university developed technology in the State has proven very effective in enhancing the success of the early stage company development. Our professors frequently mention the high caliber of individuals that we have attracted and the tremendous value that these business team members contribute to the success of the program.

The Centers of Excellence Program celebrated two decades of supporting economic growth in Utah with the publication of a 20th Anniversary report, available online. Over the first 20 years of the program, technologies supported by the Centers of Excellence Program have resulted in more than 200 license agreements, and at least 126 Utah-based companies have been created to license and market technology fostered by the program. 55 of these spinouts are still "alive" in Utah, three are alive out of State, and another 11 have been acquired and moved out of state. As of February 2007, these Utah companies directly employed over 2035 persons in the state, at an average salary of over $65,000. Some well-known firms that have been assisted by the Centers of Excellence Program include Myriad Genetics, Inc. (MYGN), Sonic Innovations, Inc. (SNCI), Moxtek, Cimetrix, and Autonomous Solutions Emerging successes include InfoWest, Live Wire, Andigen and Rocky Mountain Composites. Startups just emerging from the Centers program in the past two years include Flying Sensors, Wasatch Microfluidics, and Glycosan BioSystems. These firms are among the many companies strengthening Utah's economy through technologies developed at Utah's colleges and universities.

The Centers of Excellence Program has undergone significant enhancements in the 2006-07 fiscal year to prepare it for the next two decades of success. During the past year, the program evaluated the feasibility of the concept of making grants to Licensees in order to make the transition out of the lab and into a successful venture more likely. A Licensee is a company which licenses a university developed technology in

order to take it to market. The program provided small grants to two licensees, Flying Sensors and Glycosan BioSystems on an evaluation basis for 2006-07. During the 2007 Legislative session, GOED approached the Legislature to make permanent changes to the COE statute in order to permit this type of program on an ongoing basis based on the tremendous success that these funds supported at both companies. Both CEOs testified to the legislature of the value of these grants to their businesses, which allowed them to quickly secure additional capital and sales and to move their businesses rapidly forward. Their success helped the Legislature support these statutory changes.

Because of these excellent results, House Bill 125 was sponsored by Rep. Bradley Daw, with Senate sponsor Senator Sheldon Killpack, to permit grants to licensees of University developed technologies. In addition, the statute was clarified to more fully instantiate the Business Team program, which has proven so important to the success of the process of launching these technologies into the marketplace.

Also new this year, based on changes to statute in the 2005-06 Legislative session (SB 112), which permitted more flexible matching funds requirements for non-doctoral granting schools, the program received proposals from 3 non-doctoral granting institutions and two proposals received funding, Southern Utah University and the College of Eastern Utah.

With these changes in hand, the annual selection process for the 2007-08 fiscal year was expanded to include Licensees. There were 41 university proposals, and 23 Licensee proposals, including the 9 "companion" Licensees, where both the university team and the Licensee were requesting funds as part of the bridge between university and company. The funding requests of proposals received this year totaled $10,050,656. This is more than 3 times the COE budget of approximately $3 million.

After completing 55 separate review meetings, the final recommendations for funding include 9 Licensees, 3 of which had companion Centers which were also recommended for funding. Another 8 standalone University Centers were recommended for funding, for a total of 11 university Centers, and a final 8 university teams were recommended to receive Business Team support, which is intended to develop a better understanding of the market before further grants are made. This totals 28 teams, and 25 different technologies, selected from the Centers of Excellence Program, with 20 selected for significant development funding.

2006-2007
Funded Centers

Acoustics Research

BRIGHAM YOUNG UNIVERSITY

DEFINITION OF CENTER

The Center for Acoustics Research works with Utah industry partners to commercialize audio technologies. Applications for active sound control systems include active noise cancellation, which relies on the Center's specialized advanced adaptive digital signal processing.

TECHNOLOGY

The Center is developing several technologies aimed at improving noise control, including: active noise control in helicopter cabins and electronic fan noise cancellation.

The Center's unique signal processing systems can self detect frequencies and amplitudes of a particular noise and produce a counter signal to cancel the amplitude of the noise. The Center shows effective results up to 9dB. The Center still continues its research in the development of energy-based technologies for equalization of audio systems.

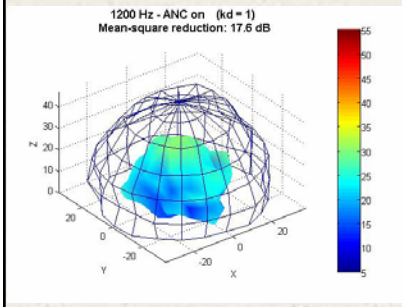
PROGRESS

Recent accomplishments and advancements of technology related to energy-based equalization of audio systems have led this Center to establish ties with an early-stage Utah Company, Apollo Acoustics. Apollo Acoustics has teamed with TechnoFirst, a French active noise control company, to establish Techno-First America, headquartered in Utah. Together they plan to create sophisticated audio equalization technologies.

During this year they created an effective 1-D equalization demonstration using simulations and live systems. The team's future plans moves towards making these systems automatic along with expanding the equalization to higher frequency and more complicated sounds.

Currently the 3-D probe is being tested and validated which is a step towards cancelling these more complicated sounds.

Imagine...



Technology that could cancel noise at specific frequencies creating safer more productive work environments around machinery or equipment.

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Advanced Communications Technology

BRIGHAM YOUNG UNIVERSITY

DEFINITION OF CENTER

The Center for Advanced Communications develops multi-antenna technologies for air-to-ground communication systems. The Center specifically has produced unique technology applicable to air-to-ground wireless links.

TECHNOLOGY

Multi-antenna technology for air-to-ground wireless links have application on airplanes and unmanned aerial vehicles (UAV's).

The technology places several antennas on the airframe and uses advanced signal processing to coordinate communications for any aircraft at any altitude. Aircraft performing complex maneuvers, helicopters communicating with satellites and UAV's are ideal candidates for this technology because of the ability for the multi antenna technology to enable a low-power, energy efficient communication system during these maneuvers.

Traditional wireless communications links often lose communications during these maneuvers, or, in the case of helicopters, when the blades pass between the transmitter and the satellite. Using the Center's sophisticated algorithms, multiple antennas compensate for these interruptions, with the algorithms reassembling the information automatically.

PROGRESS

The prototype air-to-ground communications system is currently scheduled for testing in a flight at Edwards Air Force Base. The technology has been successfully extended to all sizes of UAV's, including small wing span UAV's which are well known for having complications with communication.

Along with UAV's the Center has found implementations in terrestrial wireless communications such as cellular communications or local area networks. The US Department of Defense along with other commercial partners are evaluating the Center's technology for use in their communication systems.

Imagine...

A way to always maintain communication with an aircraft during aerial maneuvers.

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Advanced Imaging LADAR

U T A H S T A T E U N I V E R S I T Y

DEFINITION OF CENTER

The Center for Advanced Imaging LADAR works to commercialize its development of a patented camera. This camera combines laser distance measurement with digital color imagery.

TECHNOLOGY

The technology allows the ability to capture detailed, three dimensional images of scenes in real-time. Its use of digital imagery results in full color high definition digital formats. The color and global positioning data can be manipulated and stored for analysis. Users can view replicas in virtual reality environments which apply to various military and commercial uses in surveying and imagery.

PROGRESS

In 2006-2007 The Center developed a brand new patent application for rendering Texel Imagery Data. The vehicle mounted versions of this technology are being used by Intelisum, while web-centric applications are being licensed to S2, Inc.

The Texel camera is crucial to these companies which specialize in 3-D mapping and imagery. 3-D imagery is key in the problem of being able to characterize natural objects. With the ability to capture and store digitally real life structures it has made analyzing simpler.

The camera has three basic technologies "Ladar", Digital Photography, and GPS. The camera uses all three in sync to produce computer environments. Technology like this could revolutionize the 3-D imaging market with its immense applications such as Criminal Forensics, Space Exploration, and Military. For example, the imaging system could be used to survey a battlefield and discern artillery beneath trees in hiding or possibly even ease many tasks for the entertainment industry by having its computer animators simply import real life sets into digital graphics for its animations.

Imagine...

Be able to map any environment in 3D and view it later on a computer from any location.

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Advanced Thermal Management Technologies

U T A H S T A T E U N I V E R S I T Y

DEFINITION OF CENTER

The Center is commercializing selected space-based thermal technologies for high-value civilian markets such as remote sensing, homeland security, national defense, classified surveillance, computers, electronics, transportation, communication, and the aerospace industry.

TECHNOLOGY

Flexible Thermal Links provide an effective heat path between two components while minimizing any mechanical interaction. This technology is used in applications wherever critical components require both extreme thermal isolation and mechanical stability as in a broad array of commercial imaging systems. Other applications include technologies suited for cooling electronics systems with fluid based channelization techniques.

PROGRESS

The Center has completed a significant milestone in the development of Chanel-Panels. Channel-Panels are a hermetically sealed, light-weight, sandwich-type panel. As the power density of electronic circuits increases, cooling problems are intensified. Computer designers must often rely on cooling fans that, in addition to being noisy, add to the heat load that must be dissipated. These panels have been demonstrated to transport heat orders of magnitude more effectively than much heavier solid metal plates of similar dimensions.

Imagine...

Thermally connect devices that cannot transmit motion to each other.

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Biomedical Microfluidics

U N I V E R S I T Y O F U T A H

DEFINITION OF CENTER

This Center works to commercialize a bio-molecular printing system based on a micro-spotter. The continuous flow micro-spotter is a patent-pending device which uses flow to deposit bio-molecules on sensor surfaces. In contrast to other systems which only deposit droplets of materials en masse onto a surface, this Centers technology allow the flow to uniformly deposit bio-molecules on an array surface.

TECHNOLOGY

The main features of this development include prints of bio-molecules in isolated micro-environments, massively parallel fluid delivery, and flow deposition. These key attributes give advantages by eliminating cross contamination as well as depositing high concentrations of bio-molecules. Their novel process works with large or small input volumes of samples.

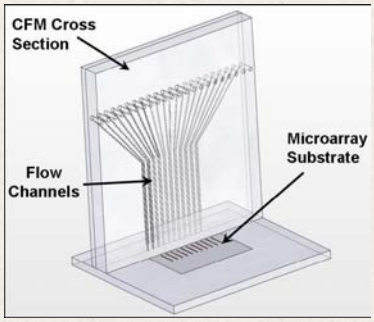
PROGRESS

This Center has successfully managed to create continuous micro fluidic spotters for proteins, nucleic acids, cells, lipids, and lipid bilayers. With technology licensing to Wasatch Microfluidics, work towards volume manufacturing is progressing with the goal of producing spot systems regularly.

With the capability of demonstrating a high quality of system spotting use, the Center has received publicity in *Nature Methods*. The team met key milestones including many application successes such as spot screening with crude hybridoma samples, drug screening, sugars, and cystic fibrosis genotyping.

With DNA melting license negotiations under way the Center will soon start DNA melting research with its technology.

Imagine...



A printer for biological samples that creates inexpensive, highly consistent micro-arrays.

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Control of Flows in Manufacturing

U T A H S T A T E U N I V E R S I T Y

DEFINITION OF CENTER

The Center for the Control of Flows in Manufacturing develops processes which implement flow-control methodologies applicable across a wide array of industries for both sorting and coating applications.

TECHNOLOGY

The aerospace industry has manufacturing techniques which solve many production line problems. The Center focuses on two specific technologies which they call (AVPS) and CSM.

AVPS is Aerodynamic Vectoring Particle Sorting which sorts different sized particles automatically based on different flow characteristics. This allows the AVPS system to never come in contact with the particles. This system has applications to the manufacturing behind many industries such as biotech, environmental, materials and cement. The Center has successfully made AVSP applicable to the manufacturing of inhaled drug powders as it can now assist with pathogen detection.

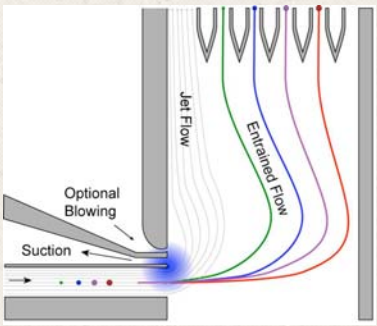
CSM which is the Coanda-assisted Spray Manipulation allows complete control and dexterity of the high precision jets and sprays used in manufacturing. The technology allows manufacturers to have complete control over thicknesses on large surfaces or mitigate the intensity of heat from flame sprays.

PROGRESS

The Center has improved the AVSP system by extending the vector angle to 90 degree. This will have a significant impact on sorting done in manufacturing. Along with this addition the Center has achieved sorting accuracy of two microns all demonstrated with no particle contact.

There have been three new patents filed and one issued for the AVSP and CSM techniques. License agreements have begun with CastleRock Engineering.

Imagine...



Successfully sort tiny, fragile particles, without deforming them, or easily coat the inside of a pipe with an even coating.

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Flying Sensors

B R I G H A M Y O U N G U N I V E R S I T Y

DEFINITION OF COMPANION LICENSEE

Flying Sensors, a licensee of the Center for Miniature Unmanned Air Vehicles provides industry and government agencies cost-effective, fully-integrated, unmanned aerial sensing solutions for commercial applications. Integrated sensors include photograph, video, infrared, chemical, meteorological, and particulate. The business model includes manufacturing, marketing and distribution of fully equipped planes, sensors and data acquisition software. Flying Sensors also maintains and provides a national full-service aerial sensing service, to customers that don't want to purchase and own their own equipment. Flying Sensors has customers currently utilizing both product sales and service revenue models.

TECHNOLOGY

Flying sensors technology is focused on autonomous planes that don't need human intervention to fly. Other areas of focus are on remote control helicopters and various integrated sensors. The aircraft also hosts many different Integrated Sensors such as cameras, videos, IR, meteorological, and chemical. This allows for the collection multiple streams of data for analysis and studies. Some other technologies being developed are disposable balloons sensors, real-time air to ground sensor data, and low altitude & high maneuverability capabilities.

PROGRESS

Higher quality aircraft at lower costs is the goal of Flying Sensors. Flying Sensors has successfully grown since their inception. They look to continue to expand and increase their revenue and also expect to achieve annual profitability crossover in 2007/2008 from their funding. They are in the process of finalizing an international product and service distribution agreement into Africa. Flying Sensors has many different customers that are helping them expand and grow including real estate and construction companies, golf courses, as well as local mining companies, military divisions, and the Utah Division of Wildlife Resources.

Imagine...

A miniature plane that could be flown to gather data and information without the need to leave the office.

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Functionally Graded...
Cemented Tungsten Carbide...

U N I V E R S I T Y O F U T A H

DEFINITION OF CENTER

The Center for Functionally Graded and Designed Cemented Tungsten Carbide and Polycrystalline Diamond Composite Materials aims to develop advanced composite hard materials for applications in manufacturing tool materials. The composite materials are based on cemented tungsten carbide and polycrystalline diamond compounds.

TECHNOLOGY

The Center technologies are used to custom design microstructures of cemented tungsten carbide and polycrystalline diamond and achieve optimum performance of tools using these materials. Specifically, the composite is designed to improve impact resistance without sacrificing wear resistance of these materials. It is the uniquely designed microstructure of the composites that makes the improvement possible, which would not have been possible with homogeneous materials of the same composition.

The Center technology promises to improve the mechanical properties of materials and the performance of manufacturing tools, hence improve productivity and competitiveness of industries such as mining and tooling.

PROGRESS

The Center has identified a specific industrial product that can benefit from the Center technology, specifically the shear cutters on a petroleum drill bit. The goals of the Center for the first year are to identify an industrial product and develop specific processing techniques for fabricating the product. These goals for the first project year have been achieved.

Producing graded Tungsten Carbide components via the proprietary sintering process has also been achieved.

Imagine...

A composite material that won't degrade and remains sharp over a much longer period of time under intense conditions such as mining.

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Glycosan BioSystems

U N I V E R S I T Y O F U T A H

DEFINITION OF COMPANION LICENSEE

Glycosan BioSystems, a privately held life-sciences technology company, based in Salt Lake City, Utah, and is a Licensee of the Center for Therapeutic Biomaterials. Glycosan manufactures sells synthetic, defined, biodegradable hydrogels for biomedical research. The company was founded by Glenn Prestwich, William Tew, and Anna Scott in January 2006.

TECHNOLOGY

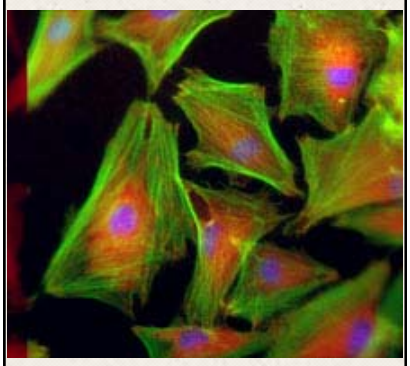
Glycosan is an early stage Utah-based company focused on the development, manufacture, and commercialization of Extracel, a patent pending biomaterial licensed from the University of Utah. Extracel is a synthetic extracellular matrix that has been extensively validated in laboratory and animal testing and is the subject of numerous published research papers. Extracel can be used for 3-D cell culture, tissue engineering, and human and animal therapeutics. This technology has been endorsed by the investment community with a $7.75 million investment in Carbylan BioSurgery, Inc. for human therapeutic uses, and by the founding of Sentrx Animal Care, Inc. for veterinary applications.

PROGRESS

Since its incorporation in January of 2006, Glycosan has successfully negotiated an exclusive license for the non-therapeutic uses of the Extracel technology from the University of Utah and completed the transfer of the technology from the University to the Company's research labs. Glycosan has completed the first phase of product development for the basic Extracel products and established standard operating procedures for manufacturing and quality control.

Glycosan has been in serious negotiations with two global cell culture companies. They anticipate obtaining a license to sell and market Glycosan's Extracel line of products in the field of general 3-D cell culture. In addition, Glycosan Biosystems has raised funding from a group of private investors. Also sales are steadily growing from website and distributor sales worldwide.

Imagine...



A way to plate cells in 3D so their growth will model more closely human growth.

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Homogeneous DNA Analysis

U N I V E R S I T Y O F U T A H

DEFINITION OF CENTER

Analyzing DNA is increasingly important in medicine. The Center moves to commercialize its DNA Melting technologies and make them more specific to genotyping, mutation scanning, sequence matching, infectious disease testing, biothreat detection, genetics, oncology, and forensics.

TECHNOLOGY

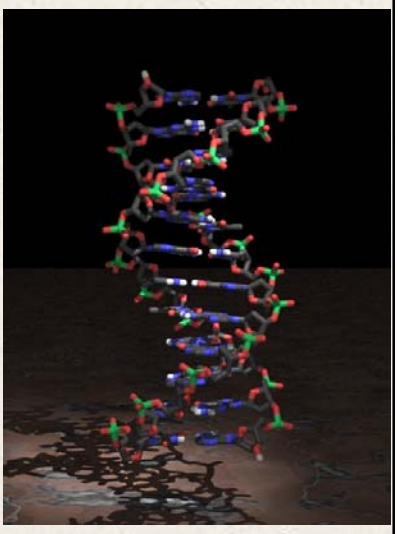
Simple DNA melting is the best technology for both mutation scanning and genotyping, together sometimes referred to as "resequencing". Instead of global sequencing (for example, sequencing the human genome), resequencing focuses on specific sequence changes of importance. Mutation scanning screens large stretches of DNA for any sequence change. Genotyping specifically identifies what change is present. Both are necessary for complete gene analysis and avoid the time, costs and special equipment required for sequencing.

The Technology focuses on resequencing which effectively eliminates 95-99% of high-cost conventional DNA sequencing. Melting analysis is a disruptive technology because of its simplicity and power. It is displacing older methods of DNA analysis that require separations, including sequencing, DHPLC and TGCE. The Center continues to find new applications and markets as news of the technology spreads.

PROGRESS

Many of The Center's innovations have already reached Product status through licensing and successful commercialization with Utah companies. One licensee has launched two instrument platforms for high-resolution melting which are finding success in the marketplace. Four prototypes of an additional instrument for 32 samples (the HR-AMP) that amplifies and melts at high-resolution have just been completed.

Imagine...



Being able to create a simple DNA assay to quickly analyze a particular disease or detect a possible threat.

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Interactive Ray-Tracing

U N I V E R S I T Y O F U T A H

DEFINITION OF CENTER

This new Center for Interactive Ray-Tracing & Photo-Realistic Visualization is developing technology for interactively visualizing 3D graphics based on large-scale models and datasets such as those in computer-aided design (CAD) and film animation that current graphics processing units (GPUs) cannot display in real time. The Center plans on improving and integrating their ray tracing programs for commercial use, which are better suited than current GPUs for large-scale applications.

TECHNOLOGY

Two primary software packages are the focus of the Center's commercialization efforts: Manta Interactive Ray-Tracing and Galileo High Quality Batch Rendering. Manta allows interactivity for large datasets with high image quality and Galileo creates high fidelity images such as those used in virtual prototypes or motion pictures.

Complex geometric models such as airplane designs are typically rendered on a screen by projecting each of the billions of 3D objects, a slow process. Ray tracing reverses the process by determining what is seen through each pixel on the screen, thereby dramatically increasing the speed of visualization. Essentially the technology "traces" each ray of light. By creating better algorithms, modern hardware can still be used to produce highly realistic rendering. The technology may be applied in CAD areas such as automobile and aircraft design as well as the computer animation industry.

PROGRESS

The Center generated interest in the Manta system after its demonstration at the 2005 SuperComputing conference in which a large aircraft model was presented as remote engineers collaborated on the model. In addition, the Manta software publication in an international conference was selected as one of the four best from the conference.

Currently, the Center is working on securing a relationship with an auto designer and will also pursue relationships with major film studios.

Imagine...

Visualize highly detailed 3D graphics on current hardware systems with the use of better algorithms.

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Microarray Technology

U N I V E R S I T Y O F U T A H

DEFINITION OF CENTER

The Center for Microarray Technology (CMT) is developing technology related to real-time microarrays. This technology includes a metallic microarray substrate in which the probe molecules are bound in nanocavities. The cavities serve as detection sites providing improved sensitivity and increased fluorescence yield. Target application areas include discovery and clinical diagnostics. The goals of the Center are to improve the speed and data quality over traditional microarray technologies and methodologies by increasing sensitivity and selectivity, and through the development of sophisticated analysis methods.

TECHNOLOGY

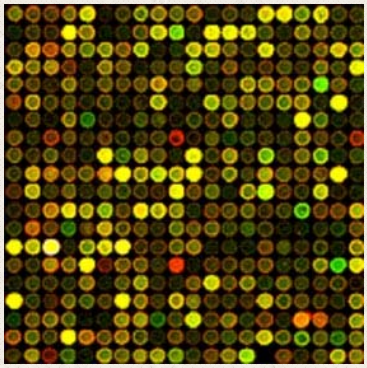
CMT is working on new methods and systems for acquiring real-time quantitative melt data by measuring temperature differences to signal when the melt occurs. They are also looking for new methods for nucleic acid amplification on a surface, nucleic acid detection, and methylation assessment. CMT is also developing a new photo-induced method to immobilize nucleic acids on solid supports. This is a method of photo-assistant attachment of DNA to microarray surfaces, allowing for precise addressability of different sequences.

PROGRESS

CMT has performed studies which have given insight into optimized nanocavity shape, size, and spacings. These results have been verified by experimental studies using single molecule detection methods. Using a real-time platform, CMT has preformed studies that show how single nucleotide polymorphisms interfere with nucleic acid surfaces and disrupt microarray analysis. One provisional patent has been filed based upon these studies.

CMT has also developed a number of microfluidic circuit designs and methods for rapid fabrication and rapid assembly. Also CMT has looked at various high temperature double-sided tape that would allow for a better seal. Along with this an apparatus for mounting has also been developed.

Imagine...



A more efficient way to detect gene regulation on a larger scale and with better technology.

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Miniature Unmanned Air Vehicles

B R I G H A M Y O U N G U N I V E R S I T Y

DEFINITION OF CENTER

The central focus of the Center for Miniature Unmanned Air Vehicles is the development of technologies to further the efficiency and capabilities of autonomous miniature air vehicles (AMAV's). Additional focus targets the commercialization of its novel software and technical devices.

TECHNOLOGY

The technologies developed through this Center enhance AMAV's used by military and commercial clients with Easy-to-use interfaces, vision controlled devices, chemical sensing MAV platform, unique vision processing algorithms, and on-board digital video storage.

PROGRESS

This Center has developed working prototypes for video stabilization, video mosaics, target tracking, target localization, and a state of the art precision landing/targeting prosecution which is all based on machine vision, essentially "auto-pilot". With Procerus Inc. and it's new companion spinout, Flying Sensors, licensing its technologies, two new Utah companies have emerged as leaders in the vision based control aspect of this field.

The Center has integrated over a half dozen very intricate systems such as the MAV/SAR system which resolves very specific geometric and dynamic constraints to allow solid communication between the auto-pilot and the unit. The Center's video sensor system has provided videography for 10 clients to date.

One of the most insightful developments is the innovation of "corridor-following methods". By using miniature optic-flow sensors small AMAV's can navigate through very complex terrains such as canyons and cities. These technology advancements to AMAV's will, hopefully, soon be seen in forest fire monitoring, surveillance, border patrol and an array of commercial applications.

Imagine...

A miniature plane that could be flown to monitor traffic, the border, or a forest fire without the need to leave the office.

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Modified Activated Carbons Technology

U N I V E R S I T Y O F U T A H

DEFINITION OF CENTER

The Center for Modified and Activated Carbons Technology (MAC) specializes in modifying existing activated carbon products to produce new, better quality environmental restoration solutions.

TECHNOLOGY

Using chemical and biological modification at a molecular level, MAC's unique processes enhances the sorption properties of activated carbon. MAC's technology results in activated carbon which has longer life, higher loading capacity, and faster sorption than traditional versions.

Activated carbons used in water treatment technologies are quicker, cheaper, and operate over a larger pH range when compared with alternative technologies such as osmosis methods or activated alumina.

These decontamination applications are crucial in many industries including mining, agriculture, and medicine.

PROGRESS

The Center's spin out company INOTEC has developed new coating materials for proteins that show promising contaminant removal applications.

An entirely new electrochemical wastewater treatment method is being prototyped. This would prove to be more reliable in arsenic removal.

INOTEC has exceeded its revenue goals of generating roughly $85k in revenue. The company has initiated discussions of licensing technology from the University of Utah and has completed one new patent.

The 2006-2007 was successful in reaching benchmarks such as marketing MAC products and negotiating licenses. The company will focus on marketing its novel As, Se, and NO3 removal technologies in several industries.

Imagine...

A material that could completely remove contaminants from water in just a couple of hours for a tenth of the cost that current treatments require.

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Nanosize Inorganic Material Powders

U N I V E R S I T Y O F U T A H

DEFINITION OF CENTER

This Center synthesizes nanosize powders by a patented process, which then are incorporated into value added products such as coatings and membranes. The Center's novelty comes from the uniqueness and relatively low cost of its fabrication process.

TECHNOLOGY

While other nano powder producing faculties can become expensive and yield less product, the processes developed at this Centers uses a patented molecular decomposition process to save cost on both product costs and equipment.

PROGRESS

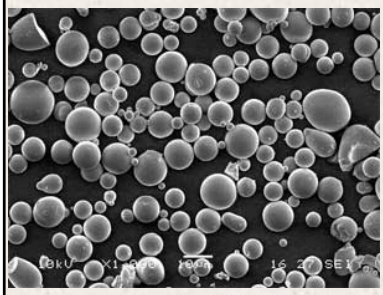
The Center's 2006-2007 accomplishments included a spin out business named Nano-Oxides Inc. which has an exclusive license with the University of Utah covering a number of its nanosize inorganic material powders.

It successfully obtained its 2006-2007 milestone of synthesizing Fe_2O_3, Fe_3O_4, metallic Fe, yttria-stabilized and unstabilized zirconia.

Progress now moves to fabrication of high temperature proton exchange fuel cells using these nano-size powders.

Nano-Oxides Inc. has already started marketing its powders via brochures as a direct customer contact. It's fully running website www.Nano-Oxides.com has already received orders through its purchasing applet and local companies have shown investment interest.

Imagine...



A way to make highly responsive sensors from inexpensive nanosize powders.

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Organic Electronics

U N I V E R S I T Y O F U T A H

DEFINITION OF CENTER

COLAP (Center for Organic Lighting Applications) focuses on commercializing organic semiconductors in the form of polymers and oligomers that promise to significantly reduce manufacturing and operating costs, improve organic LED light quality, and open several new market applications for LED technology.

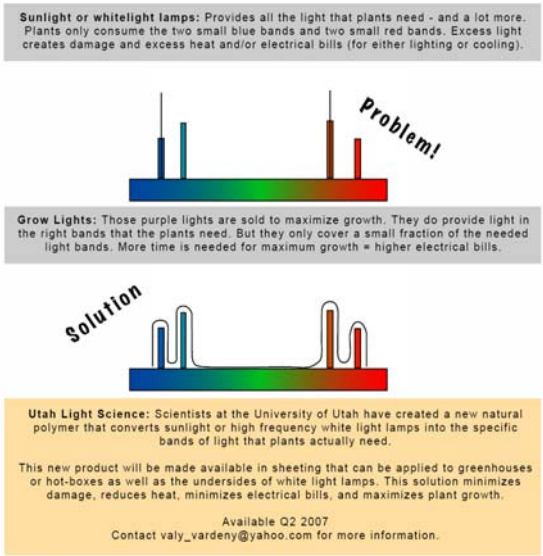
TECHNOLOGY

The COLAP laboratory is unique in fabrication, synthesizing its polymers with heavy atoms such as platinum. This enables high quality LED sources by efficiently shifting narrow LED emission bands. This technology allows COLAP to produce an array of colors from a simple two-colored LED source.

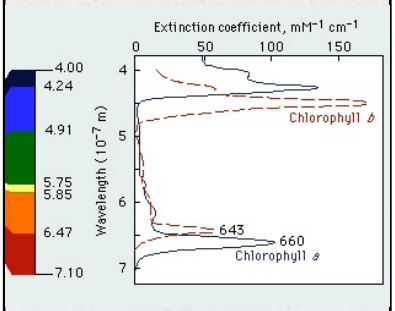
PROGRESS

COLAP has developed prototypes of its BROLED or Blue-Red LED. The expectation is that, as a manufactured product, the BROLED will provide lower cost products when compared to currently available inorganic LED solutions.

The few manufacturers which are in the market today only provide expensive products. COLAP's products serve as an inexpensive alternative in a market which has little economies of scale. Application of COLAP's solutions will benefit industries ranging from aerospace companies to crop farmers and hobbyists who need specific light frequencies for growing crops.



Imagine...



Significantly changing the framework of specialized lighting and opening the door to new markets.

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Therapeutic Biomaterials

U N I V E R S I T Y O F U T A H

DEFINITION OF CENTER

The Center for Therapeutic Biomaterials specializes in providing biomaterials for reparative medicine. The materials invented by the Center are also used to culture cells for toxicology models and veterinary care.

TECHNOLOGY

The Center has established three companies based on its synthetic extracellular matrix or sECM technology for research and application in toxicology, human device applications and veterinary sciences.

The Center for Therapeutic Biomaterials has an array of innovations which range from Chemical modifications of the sECM to provide specific products targeted to biomed research and human application, to 3-D cell cultures which have improved organ printing and centrifugal casting techniques, to tumor engineering based on research to provide further insights on side effects of cancer treatment and reparative sciences.

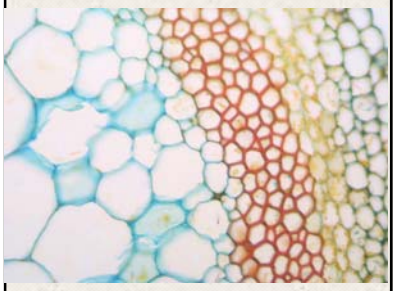
PROGRESS

The Center has progressed substantially in Bioprocessing and Biohybrid materials. New modified polymers were created and are being evaluated in cell culture applications and in animals for large protein production and tissue preservation. The Biohybrid research has led the Center to demonstrate liver regeneration in mice using human hepatocytes.

The significant milestone reached in the Center's Cancer drug screening branch was the furthering of personalized medicines and its approach to cancer chemotherapy. The technology uses a metastatic pancreatic cancer model to evaluate the efficiency and toxicity of new anti-cancer drugs.

With the spin-off of three companies Glycosan BioSystems, Inc., Sentrx Animal Care, Inc., and Carbylan BioSurgery, Inc., this Center is well on its way to commercialization of novel biomedical products.

Imagine...



A material that mimics natural tissue that can be used to treat chronic wounds and repair bone defects.

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Titanium Boride Surface Hardening

U N I V E R S I T Y O F U T A H

DEFINITION OF CENTER

The Center for Titanium Boride Surface Hardening focuses on three principal technologies utilizing boride for hardening titanium materials: 1. incorporation of titanium monoboride (TiB) crystals to harden the surfaces of titanium, 2. creation of nano-structured titanium boride bulk material and 3. functionally graded titanium boride materials for high performance components and devices.

TECHNOLOGY

The unique advantages of the TiB surface hardening technology include a stable surface layer, hardness and wear resistance coupled with electrical conductivity. The nano-structured bulk titanium boride and the functionally graded titanium boride are novel material technologies for innovative applications. The nano-structured titanium boride materials is a very high strength material that has higher reliability and lower cost of manufacturing compared to most conventional ceramics. Possible applications include armor and biomedical inserts.

PROGRESS

A major accomplishment in the report period is the successful manufacture of bearing balls out of nanostructured titanium boride material. The nanostructured TiB material was machined into blanks for ball manufacturing. An industrial partner manufactured Grade 25 balls out of these blanks based on the Center's guidelines. This is a major manufacturing accomplishment and provides strong proof for potential licensees.

The US patent application for titanium boride surface hardening technology has been approved and the patent has been issued. An option to license the technology has been signed by University of Utah Technology Commercialization Office with Ortho Development Corporation, Draper, UT, to develop prototypical biomedical devices in the orthopedic field of use that includes hip, knee and spine implants. Licensing of other applications of these technologies is still pending.

Imagine...

An inexpensive material with superior corrosion resistance that could be used in armor and medical devices.

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2006-2007 Business Team Recipients

Cellular Therapy

U N I V E R S I T Y O F U T A H

DEFINITION OF CENTER

The Center for Cellular Therapy and Regenerative Medicine aims at creating new technology and commercialization in the field of stem cell and progenitor cell application by serving as a source of high quality human stem cells and new innovative technology.

TECHNOLOGY

Cellular Therapy using stem cells and progenitor cells respectively is envisioned to be used to regenerate, replace, and even repair damages and injury to organs and tissue caused by aging and sickness. The Center helps researchers overcome barriers which prevent cellular therapy from becoming a mainstay of modern medicine by providing a unique research facility and a dependable source of cellular material. The Center works with identifying and maintaining stem cell sources with therapeutic potential, refining biopolymers, hydrogels and other scaffolds and matrices designed to support cellular activity.

The Center's existence is to serve as a superior bio-repository of stem cells and progenitor cells for research which will deliver biologics for diagnosis and therapy.

PROGRESS

This year, the Center focuses on commercialization of its cell product referred to as LineaCells. Ultimately, the Center will produce a unique high quality cell therapy product which can be licensed and/or sold in the public market. Behind this commercialization required the meeting of major milestones in harvest, manufacturing, processing, FDA approval for human use and storing of cellular materials. The Center has established the University Cord Blood Program and alliances with The University Department of OB/GYN and The Huntsman Cancer Institute to provide a source of high quality stem cells and an efficient interface for Bio-Sample tracking.

Imagine...

Harvesting umbilical cord blood stem cells and creating a repository of a variety of stem cells for researchers to access.

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Electronic Mathematics Education

U T A H S T A T E U N I V E R S I T Y

DEFINITION OF CENTER

This Center has developed a number of mathematical applications and software for teaching environments. Research suggests mathematics content knowledge of teachers is among the most predictive factors in student achievement and current legislative mandates have focused on increasing teacher content knowledge. The Center has developed and disseminated a collection of innovative mathematics educational software products to provide new technologies to enable teachers and students to model and apply mathematics concepts in ways never before possible with text-based or physical manipulatives and tools.

TECHNOLOGY

Utah State University has developed and distributed a collection of innovative mathematics educational software applications compiled into what is called the National Library of Virtual Manipulatives (NLVM). The NLVM currently comprises over 100 Java applications used in teaching K-12 mathematics. The software is currently targeted to math educators. MATTI Math, a Utah-based company founded by members of eMath@USU, plans to license the NLVM materials created at Utah State University. This stand-alone version of the NLVM website offers additional benefits including a non-Internet based access to the NLVM applications, printing and saving application capabilities. NLVM is available in English, Spanish, and French, additional versions are in development.

PROGRESS

The Center has developed a multi-tiered marketing plan that will help them to effectively distribute an existing CD-based product to teachers and students nationwide. In addition, they have obtained contacts with international distributors to market their materials in foreign countries, especially where Spanish or French is the national language.

Since USU's initial launch of NLVM online in 2000, this product has become the most widely recognized and used online set of resources for K-12 mathematics in the world. In addition the website records over 4 million hits every school day.

Imagine...

Have teachers instruct difficult subjects to younger aged children more effectively and with better success.

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MIMO Communications System

U N I V E R S I T Y O F U T A H

DEFINITION OF CENTER

Multiple-Input Multiple-Output communication systems (MIMO), focuses on detection algorithms and antenna designs that lead to feasible data transfer through multiple antennas while simplifying chip design. The developed algorithms offer low complexity and near optimal performance, and are adaptable to any wireless standard. The MIMO Center is located at the University of Utah wireless communications lab.

TECHNOLOGY

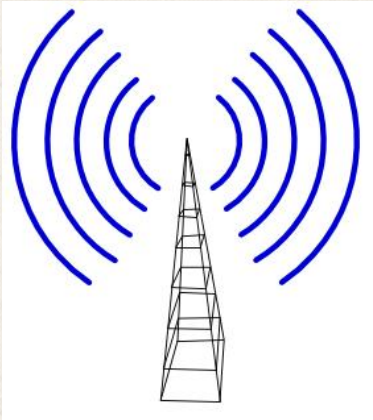
MIMO is the latest in wireless communications technology. The technology is able to increase transmission rates without any additional bandwidth and power. Currently multiple streams of data are transmitted concurrently through a number of antennas over the same frequency band.
The MIMO Center has developed a system and method that reduces the complexity of the MIMO receiver. Current methods increase the receiver complexity exponentially with the number of antennas, while the MIMO method increases only linearly with the number of antennas. This is a dramatic reduction in complexity and a crucial element of bringing large number of antennas to bear in the MIMO world.

MIMO technology is ideal for WiFi and WiMax systems. This technology outperforms the existing low complexity detectors such as Bell Lab Space-Time (BLAST) detector, by as much as 10 to 20 dB. The new technology uses low transmission power, a wider range, and less battery power for wireless devices making it ideal for the current growth of wireless technology.

PROGRESS

The MIMO team is currently working on a solid business plan for a full Center in 2008. The current PI has been able to structure his contacts to create a successful team for the development of the technology. The team has been able to file 2 patents based on the developed algorithms.

Imagine...



Send and receive ten or a hundred times more data through a multiple antenna system that uses the same power as a conventional antenna.

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Solar Biofuels Technology

U T A H S T A T E U N I V E R S I T Y

DEFINITION OF CENTER

This Center promotes achievement of domestic energy independence and rural economic development. They do this by efficiently utilizing abundant western sunshine and low valued land to produce ecologically viable and renewable biofuels such as methane, hydrogen and biodiesel.

TECHNOLOGY

The Center has developed a photo-bioreactor using light sheets and vertical algae films. This has been operational in the USU Engineering Lab Building since February 2007. The Center has also designed and constructed an anaerobic digester, which is scheduled for completion in September 2007.

Three new technologies are integrated to produce oil from microalgae in a unique bioreactor system using renewable resources. The design includes a two-axis tracking solar collector which concentrates visible sunlight and transports it via polymer fiber optics to provide the requisite solar energy throughout a bioreactor to grow microalgae on vertical membranes. An induced blanket reactor produces biogas from animal waste. Its byproducts are CO2 and a nutrient rich effluent sufficient to feed the microalgae which grow to create the biofuels. This enclosed system can yield a net 300-fold advantage of algae oil production per acre over soybean crops while consuming significantly less labor, capital equipment, water, pesticide, and fertilizer.

PROGRESS

The Center for Solar Biofuels Technology was leveraged into the USTAR Biofuels Initiative. The two business consultants were instrumental in helping the research team develop a strategic research plan that culminated in a proposal submitted to the USTAR Governing Authority that was funded beginning January 2007. Recent research goals are to design, optimize, and operate a total system that can readily be implemented in a broad variety of rural settings. Also the Center looks to demonstrate using the algal solar bioreactor, the production of biodiesel at market competitive prices by March 2009.

Imagine...

Reduce our dependence on foreign oil through biofuels that are produced from algae right here in the US.

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Universal Application System

U T A H S T A T E U N I V E R S I T Y

DEFINITION OF CENTER

Universal Application System (UAS) was born out of the Early Intervention Research Institute at Utah State University. This Institute specializes in investigating and improving policies and practices that support the well-being of at-risk children as well as those with special needs and their families.

The Center is moving forward the commercialization of a web-based system that processes applications for multiple agencies in the government services industry. This technology is at the basis of "UtahClicks", currently an application deployed by the State of Utah, and which is also in production in Oregon and Indiana. Plans to adapt this software for other industries are underway.

TECHNOLOGY

The UAS was originally developed for the Utah Department of Health, who is also the Center's largest customer. In Utah, the UAS – branded Utah Clicks – processes over 1,000 application submissions a month, and 10% of the state's Medicaid applications are submitted through Utah Clicks. Since launching Utah Clicks, other organizations who have installed the UAS include the State of Indiana as well as the Oregon Health Services University.

The UAS streamlines the paperwork process for organizations. It asks a series of questions that allows an applicant to fill out multiple applications without actually being asked the same question more than once. UAS then consolidates the information into clear reports for each program that the applicant applies for. This saves time and helps speed up the application process.

PROGRESS

In 2006, Utah Clicks/Universal Application System received an Innovation Award by the Council of State Governments. The project team intends to expand the core UAS question and document processing technology and adapt it, as requested by current clients for the following applications: human resources; online applications/renewals, tax forms and business materials; emergency preparedness/service acceleration.

Imagine...

Consolidate the application process for multiple state programs into one easy to access online form.

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2006-2007 Pre-Proposal Business Team

Biomolecular Nanophotonics

U N I V E R S I T Y O F U T A H

DEFINITION OF CENTER

Biomolecular Nanophotonics develops chemically engineered micro/nanosystems to dramatically improve the performance of Nucleic Acid Amplification and Detection. This is one of the key processes used in genetic engineering. The team expects that these improvements can radically improve diagnosis of gene disorders and development of gene therapies, including ribonucleic acid interference. This would allow for more efficient and quicker diagnosis and treatment of human diseases. The team includes chemical and electrical engineering professors, bioengineers and materials scientists collaborating with physicists, chemists and mechanical engineers.

TECHNOLOGY

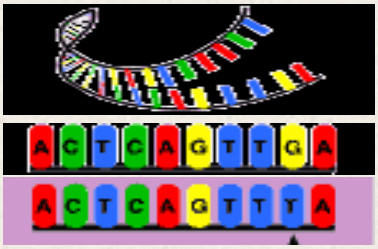
The Center for Nanophotonics in Biotechnology is based upon developing solutions for biomedical problems through the use of functional optical nanostructures and nanoparticles. The main project involves the use of metallic nanocavity structures as the basis for a new class of highly-sensitive and low-cost DNA hybridization arrays for rapid genetic analysis. The second project involves the use of functional metallic nanoparticles to increase detection sensitivity in real-time polymerase chain reaction and intracellular imaging. Both of these projects will result in unique and marketable solutions to a number of problems in molecular diagnostics, genomic analysis, and targeted therapies.

PROGRESS

Since its creation, the Center has been able to organize its business structure by identifying lead technologies and performing market analyses. The Center has also been able to increase pre-Center funding by several hundred thousand dollars. The Center has also completed two publications and 3 manuscripts.

Other milestones that the Center has been able to accomplish are; coupling electrons to visible light in a new way to destroy bacteria, and indentifying new ways to catalyze protein interactions faster and to detect viruses more sensitively using 3-D nano-antennae. The Center has also has been able to measure interaction rates of intact, infectious viruses.

Imagine...



Improving the detection and relative time of detection of specific genes with greater sensitivity and accuracy than current methods.

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Clean Coke Technology

C O L L E G E O F E A S T E R N U T A H

DEFINITION OF CENTER

The Center for Clean Coke Technology at the College of Eastern Utah is working in conjunction with Combustion Resources to design, build, and operate a modular pilot-scale facility to manufacture high-grade carbon (coke) briquettes developed from coal fines and other low-quality mining by-products. The briquetted product can be used by metallurgical and specialty carbon-reductant fuel users.

TECHNOLOGY

The technology that this Center has focused on is the development of component processes that upgrade low quality, carbon-based feedstock to produce carbon-containing clean coke solid products for industrial use in Utah and surrounding states. This technology development has been based on a solid fundamental research foundation from the Advanced Combustion Engineering Research Center.

The technology is very specific to the upgrading of carbonaceous feedstocks by calcining and briquetting into clean coke products. Coke is used all over the world in a wide variety of applications and commercial uses. Current supplies of high quality coke are being consumed by developing nations, making a U.S.-based source of quality coke a valuable proposition. The Clean Coke technology allows for the utilization of the raw materials often left at mining sites.

PROGRESS

Work has resulted in a Patent-Pending Application for the technology. Over 38 different carbon-based feedstocks have been evaluated and over 30 qualified formulations for prospective industrial uses have been developed. The feedstocks have come from all across the United States.

The Center is working with Combustion Resources, Inc, an ACERC spin-off and Provo-based high-tech company, for the commercialization of this technology. The emphasis of the Center is to build and operate a pilot plant facility to validate the process and quality, further developing process control systems. Eventually the Center plans to build a Large Scale Facility which will open as many as 70-150 jobs in rural Utah.

Imagine...

Lower the cost of current coke fuels and create a cleaner more efficient use of current coke.

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High End Pharmaceutical and Biomedical Process Optimization

S O U T H E R N U T A H U N I V E R S I T Y

DEFINITION OF CENTER

The purpose this Center is to provide high end computational fluid dynamics (CFD) models to new and existing small companies who do not have this expertise or hardware available in-house. These models are essential for surmounting complex technical problems that may slow or even obstruct product development. Design optimization through high end CFD simulations also results in enhanced competitiveness in market share and reduced time for product development.

TECHNOLOGY

Southern Utah University has recently acquired a 128-processor high performance supercomputing facility to enable high fidelity computer modeling of topics of importance to regional industry. This computing facility enables the innovative optimization of multiphase chemical production processes and collaterally fuel efficient combustion through computational fluid dynamics models that will be of significant potential benefit to Utah's chemical industry.

The Center is partnering with Deseret Laboratories, based in Southern Utah to develop a 3 dimensional model of a fluidized bed reactor to help optimize their multiphase production processes using CFD. Part of their research is to determine if such modeling could be expanded from a single partner to broader applications. It is anticipated that commercial applications will focus on topics related to the manufacturing of pharmaceuticals and bio-medical devices that involve fluid flow and heat/mass transport in the body. A study involving a novel fluidized bed (gas-solid) granulator for pharmaceuticals is currently underway. Anticipated studies involve devices used in angioplasty, thrombolytic catheters and in vitro drug dispensing systems.

PROGRESS

The Centers focus on computational product development services for local bio-tech firm DxNA is progressing well and will complete its sponsored work before July 2008. Initial partner Deseret Labs worked closely with affiliate DxNA to smoothly transfer SUU Center of Excellence focus from the original granulator modeling project to DxNA pathogen analysis product and related development challenges.

Imagine...

Use the accuracy and speed of fluid flow and 3D modeling to help businesses in rural Utah enhance their competitiveness.

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High-Speed Machining

U T A H S T A T E U N I V E R S I T Y

DEFINITION OF CENTER

This Center specializes in developing software applications which assist manufacturers in their use of high speed machinery. The application is based on a 15 year research effort by the Center's technical team to characterize various materials and the interaction of material characteristics with machine characteristics.

TECHNOLOGY

This Center's innovation relies on two novel technologies. The first is a U.S. Patent which is a method for modeling material behavior. It is a specific technique in material testing which is faster and more economical, allowing manufacturers to test for a suitable high strain rate material to match their applications.

The second is computer software the Center has named Vmachining. This development is capable of simulating the machining process and identify matching parameters among various materials to produce high-quality products and high yield, which is particularly valuable for expensive, high performance materials.

PROGRESS

The Center now moves towards commercialization hoping to soon to be seeing Vmachining in the manufacturing industry. The Center has also found an application in education resulting in a simple efficiency estimator for various training programs.

The Center's commercialization will potentially have positive affect in high speed machining companies, colleges and universities, computer aided design institutions, computer aided manufacturing, and software developers, all as stand-alone and internet based programs.

Imagine...

Model sophisticated high performance materials to improve machining performance.

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Intelligent Service Coordination

U T A H S T A T E U N I V E R S I T Y

DEFINITION OF CENTER
This Center develops techniques and architectures for intelligent on-demand coordination of service delivering and service receiving entities in assorted networks. The Center consists of sensing and communication technology deployed in wired and wireless configurations such as personal computing, telephony, internet controlled appliances, process controllers, security, and defense and space systems. Some of the Center's technologies will make their way to market in the agricultural segment under the name MorpH2O.

TECHNOLOGY
Several technologies highlight this Center's abilities including Pearl ™ Shell, Cognitive Antenna, and Fermentation/ Bioreactor Control. The Center's primary focus is in Water and soil management in agriculture.

The Pearl™ Shell technology will provide the customer with the most advanced solutions to irrigation problems at a lower cost of entry. It will also enable them to save in operating costs, reduce the requirements for the scarce resource of water, and realize improved yields from their crops.

PROGRESS
The Center plans to work with MorpH2O to deliver its technology in conjunction with MorpH2O's current products and channels.

Imagine...

Manage irrigation and water flow more efficiently and at a lower cost than ever before.

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Management of Exploratory Workflows

U N I V E R S I T Y O F U T A H

DEFINITION OF CENTER

The Center for the Management of Exploratory Workflows provides a user interface which tracks the history of exploratory computational functions such as data mining, simulations and visual computer constructions. By tracking the provenance of these activities, the Center helps improve the performance of all of these industries, allowing new practitioners to learn from experience talent, and experienced workers to perfectly repeat past successes. The Center plans to commercialize its technologies as high quality licensable software libraries and plug in systems, which it calls VisTrails.

TECHNOLOGY

By automatically filtering and manipulating provenance information of all the data involved in the exploratory process, VisTrails will allow users to avoid time consuming and tedious tasks involved in assembling complicated computational tasks and organizing data.

PROGRESS

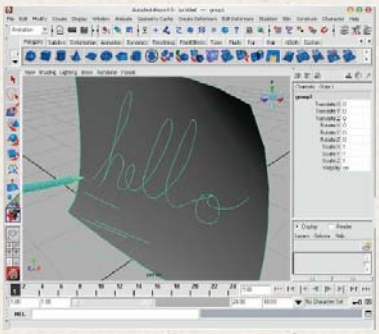
This Center has created a spin-off company VisTrails, Inc., based in Salt Lake City. VisTrails Inc. plans to move all innovations created and produced at the Center into the market.

The biggest step has been taken as VisTrails Inc. has reached its last points of progress towards completion of its software version 1.0 which has been debugged and tested extensively.

VisTrails had received an NSF SBIR phase-I grant and three new patents have been filed during the 06-07 fiscal year. Much publicity has come from its selection to be an NSF CISE highlight showcasing its innovations at Conferences and Workshops across the U.S.

In addition to ongoing Federal funding, VisTrails Inc. expects to generate substantial revenue with several data provenance plug-ins. The company is in early negotiations with the key design software providers in the industry.

Imagine...



Being able to track the creative process of a digital artist and use the software-based history to both replicate their work quickly and precisely and to train new artists.

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Nanopore Sensor Technologies

U N I V E R S I T Y O F U T A H

DEFINITION OF CENTER

The Center for Nanopore Sensor Technology is based on a discovery at the University of Utah called glass nanopore sensors (GNP). Commercializing of the technology would have great applications to DNA sequencing in biomedical and forensics, clinical chemistry, nano-particle analysis (viral diagnostics for homeland security), and pharmaceutical drug screening in blood analysis. The technology has been developed exclusively at University of Utah.

TECHNOLOGY

The Center has focused on DNA sequencing technology using glass nanopores as supports for ion channel recordings. They have greatly improved this technology by chemical means, resulting in the filing of a new provisional patent. The technology focuses on prototype devices for ion channels, particle counting, and ion selective electrode measurements which have all been developed.

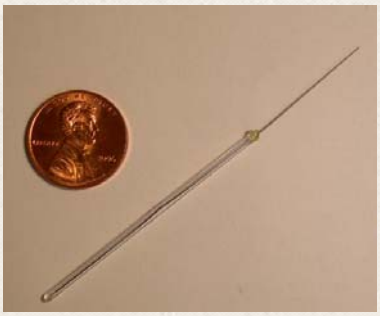
The Center has also developed methods of fabricating nanopores from diamond thin films, which allows scale up for mass production. A provisional patent was filed to protect this technology.

PROGRESS

The center has been able to acquire many different sources of funding and hopes to be able to form partnerships and research relationships with current corporate collaborators and establishing relationships with new companies. The center's plan focuses on our ability to produce high quality, reproducible, nanopore sensors for a variety of commercial applications.

GNP proposes the establishment of a family of products based on nanopore sensor technology. The manufacture and sale of nanopore sensors and instrumentation for collecting and analyzing data for academic and industrial uses is to be the first product from our center. The second product will be a nanoparticle analyzer for counting and shape analyses.

Imagine...



Detect and classify a virus or pathogen before it spreads on a large scale.

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Program Description

PROGRAM DESCRIPTION

BACKGROUND - "OUR JOB IS JOBS"

The Centers of Excellence Program is a grant program designed to stimulate Economic development by helping to transition technologies developed at Utah's colleges and universities out of the lab and into industry to create great jobs for Utah's citizens.

The program was created in 1986 by the Utah State Legislature, which recognized the challenges in the transition from the university lab to product. Up until 2006, the COE program directed its funding to university and college professors who were performing development work after the end of their research grants, which were primarily Federal grants. During the 2006-07 fiscal year, the COE program, under an evaluation program, funded two companion Licensees (spinouts) as well as the traditional university-based Centers of Excellence.

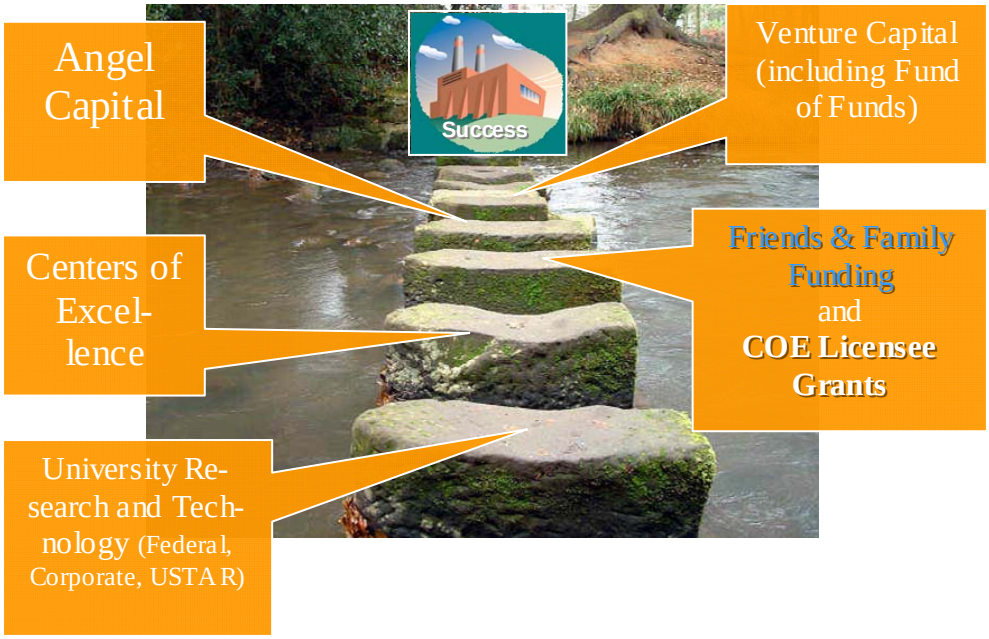
A challenge facing the vast majority of university developed technologies is that, when the Federal or other research funding runs out, what is left is a lump of technology, not a finished product. Because these technologies have been developed to solve high profile and high impact problems, they also have complex markets and large potential competitors. Traditional investors, such as venture and angel investors, see both high market risk and high technology risk in these technologies. Many in the industry call this the "valley of death".

The COE program funded the two companion spinouts, which were licensees of a current or former Center of Excellence, in order to evaluate whether it is possible for the COE program to help fill this funding gap and to encourage private sector investors to invest alongside the state's funding. These spinouts were required to provide 1:1 matching funds, one dollar in private sector non-loan funds, for each dollar of Centers of Excellence grant funding. Both companies had exceptional years and were able to attract investment capital as well as clients in their first year of operation. Both quickly began employing Utah residents in their companies and both continue to grow.

This evaluation process led the COE Director to work with the Utah State Legislature

to make changes to the Centers of Excellence statute to specify this process of making grants to Licensees, to help them cross this valley of death, mobilize private sector investment, and improve the transition of university developed technologies into industry. The Legislature passed House Bill 125, sponsored by Rep. Bradley Daw and sponsored in the Senate by Senator Sheldon Killpack, which specifies the program's involvement in granting funds to companies which are licensees of college or university developed technologies.

The COE program is a state grant program, and the state does not take or hold an equity position in the licensees, nor require any return of the grant, unless the recipient does not stay in the state for a minimum of 5 years. The state's return on investment comes when promising technologies become great products which create high quality jobs here in Utah.

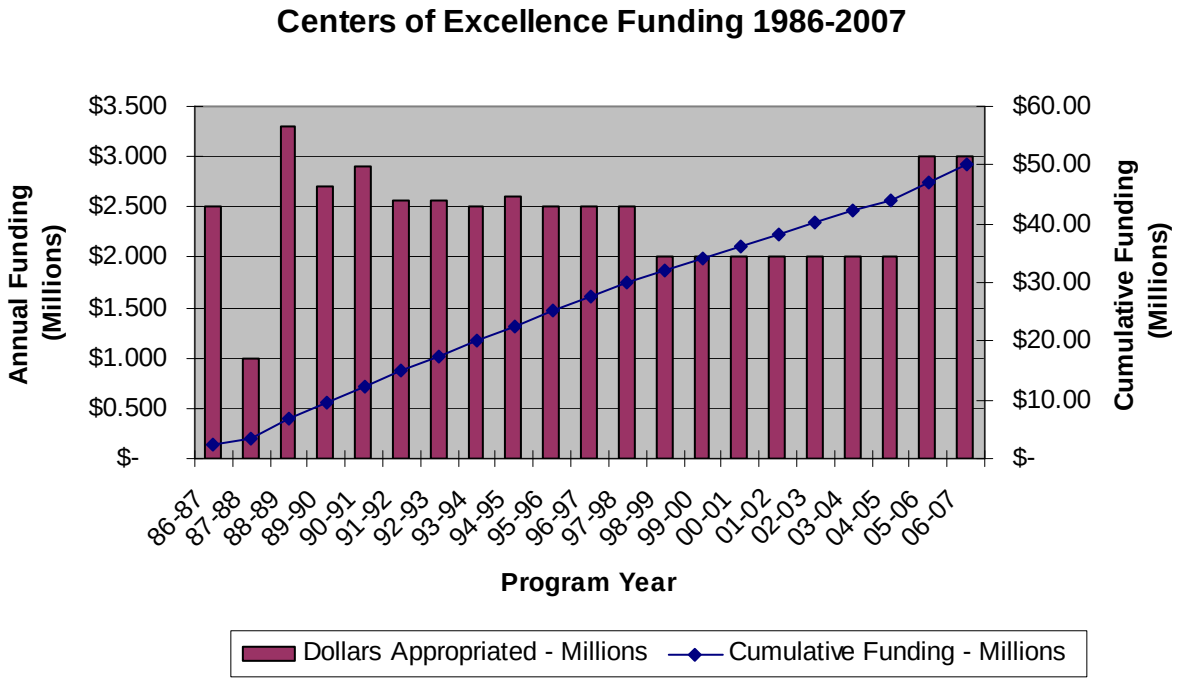


The Stepping Stones to Job - Creating Companies

This is a graphic that demonstrates the appropriate role of the COE Licensee grants. These are not intended to replace private capital, but to augment it and to fill the gap in the so-called "valley of death" between leaving the university and receiving significant private investment capital.

HISTORICAL SUCCESS AND FUNDING

Funding for the Centers of Excellence Program is granted on an annual basis by the Utah State Legislature and has varied over the past two-plus decades from year to year. Initial funding, granted in 1986 for the 1986-87 fiscal year was $2.5 million, increasing to $3.3 million to be granted during the 88-89 fiscal year and declining to between $2 and $2.5 million for much of the program's history. Funds budgeted during the 2005 legislative session for the 2005-06 fiscal year were increased from $2 million to $3 million, and during the 2006 Legislative session, COE funding was set to $3 million. However, during the 2007 Legislative session, funding for COE declined for the 2007-08 fiscal year to $2.75 million. The historical annual and cumulative totals, standing at just over $50 million at the end of the 2006-07 fiscal year, are shown in the graph below.



FUNDING ONGOING SUCCESS

The Centers of Excellence Program plays a unique role in helping to grow sophisticated technology based companies in our state. By filling funding gaps and providing experienced business team success, this program is crucial to effectively commercialize technology from these institutions. Two CEOs of Licensees are quoted below and provide insights into the benefits provided to our economy by the Centers of Excellence program.

MedQuest/Worldheart

"I recently sold the company that I co-founded (MedQuest Products Inc.) to a publicly-traded company, WorldHeart. My company was a spin-off of the Center for Artificial Hearts at the University of Utah, which is a Distinguished Center of Excellence and has obtained COE funding/support since 1988 for both Artificial Hearts ('88-'92) and Ventricular Assist Devices (1 yr in the mid-90s). This early support has played a role in our success so far: from Mar-June 2006 we had our first successful patient experience with our revolutionary VAD…"

-- Pratap Khanwilkar, PhD, MBA, VP: Rotary Systems & Business Development
Worldheart, Inc.

Flying Sensors

"The Centers of Excellence (COE) Program has been one of the key stepping stones to launching Flying Sensors... Most UAV work was focused on the military and this left a great opportunity to integrate existing technology into a new vertical market. …I have been an entrepreneur of many different startups. I see COE providing the essential bridge to motivate people to take the necessary risk to spin research technologies out into industry. I am proud to be associated with this program and lead the way for other future companies. "

--Bob Carter, CEO, Flying Sensors

CENTER SELECTION PROCESS

The purpose of the Centers of Excellence Program is to accelerate the commercialization of promising technologies that have strategic value for Utah. The end goal of the COE Program is to help drive economic development and job creation.

"Our Job is Jobs"

For 2006-07 selection year, the COE Program updated our selection process in order to be able to scale the Program while maintaining the high quality that has characterized the review process.

The COE Advisory Council is a group of experienced, seasoned technology industry executives, CEOs and CTOs, VPs and Senior Directors, who are interested in helping Utah and the Centers of Excellence Program. This year there were 31 reviewers, 18 of them new to the Program this year. Together the Advisory Council contributed over 800 hours of volunteer time to the selection process. After completing reviews of 35 proposing teams, the reviewers met in 3 sub-committees. These are:

- Materials / Manufacturing / Environmental / Energy
- Information Technology/Software / IT/Hardware / Communications / Aerospace/Defense / Electronics/Electrical Devices
- Life Sciences / Other

Each sub-committee met to review those Centers in their collective area of expertise, in a 5-6 hour meeting. Long-time Council members told me this was an excellent process and allowed them to go even more deeply into the review for each Center.

Each sub-committee reviewed their Centers and then ranked them. The top 3 in each group were identified as "strongly recommended for funding", some were identified as "not recommended for funding", and then there was the middle "should be considered for funding". With these three categories in hand, the full Council met on May 12th offsite for the final review and selection process.

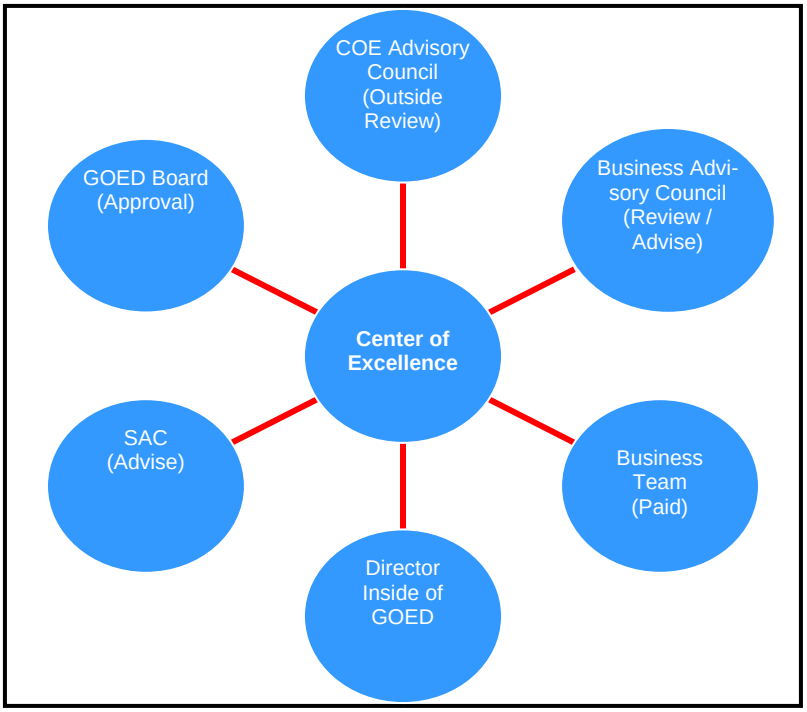
At this point, the COE Advisory Council met as a group to review the entire slate of potential Centers and make the final funding recommendations. The Council reviewed the "top 9" recommendations from the sub-committees, 3 from each group. This also included the 2 companion licensees which were selected for funding. Next the Council reviewed the recommendations for Business Teams and selected 3 of the 5 put forward by the sub-committees. Next, the Council reviewed, in detail, each of the remaining proposals that had been recommended for consideration by the sub-

committees. This is one of the most difficult decisions to make as the Council has to weigh many good choices and select among them.

Finally, the Council reviewed those which had not been recommended for funding. For one of these proposals, the reviewers requested that it be reconsidered for a business team, which was accepted by the Council. The others were not recommended for funding.

This process was widely approved by our experienced Advisory Council members as very effective and successful. It allowed reviewers to go deep on technical and market issues within the sub-committee, while still allowing the entire Council to provide the "give and take" of the collective perspective for all recommendations.

The bar was high for any Center to receive a recommendation for funding, and difficult decisions were made, including 6 existing Centers that did not receive renewal of their funding, generally because it was felt that additional funding would not significantly change the economic impact of the Center, or because it was felt that they had reached maturity as a Center and were ready to "be graduated".



The diagram above summarizes the COE community – the web of influencers committed to assisting in accomplishing the mission of the COEP. It is this rich resource of people that is so valuable to this Program.

Companion Licensees

During the 06-07 year, one of the questions being evaluated within the program is how to improve the program's support during the delicate phase of getting into the marketplace. In particular, when a spinout is the best vehicle for a Center-supported technology to go to market, how do we help launch spinouts successfully? Currently in Utah, we still have a very challenging "seed" and "very early stage" capital environment. The State has seen progress with the work of the Fund of Funds as well as a number of Angel investment groups springing up and organizing around the State. However, for a Utah technology company, we still estimate that raising outside funding will take approximately 1 year, whereas in other, larger, markets, it might only take 3-6 months. Centers spinouts are not immune to these market dynamics and yet the State has already spent hundreds of thousands of dollars and several years supporting the technology. To have this technology stall during fundraising does not accelerate job creation. And so a crucial question was posed this year:

CAN THE CENTERS OF EXCELLENCE PROGRAM HELP?

During the past year, one of the ideas that has emerged as a way that the COE Program could help would be to provide a specific grant to a "Companion Spinout" or Companion Licensee. After extensive conversations inside of GOED, with interested members of the legislature and various members of the university community, it seemed appropriate this year to evaluate whether such a "Spinout Grant" or "Licensee Grant" could be feasible under the Centers of Excellence Program.

Some questions that need to be answered, and that will be shared with the Legislature, include: Whether the current review process could accommodate such grants (Yes, quite readily) and whether this is an appropriate use of taxpayer funds (again, Yes). Of the 7 spinouts evaluated, the Council felt that, in two cases, it was a very appropriate use of funds, and that these modest grants, $60,000 and $75,000 respectively, could definitely significantly accelerate job creation in these spinouts.

New Concept for Next Year - Pre-Proposal Business Teams

After reviewing 35 proposals, it was felt by the COE Advisory that every New Center Proposal could have benefited from a business team in advance of the proposal process. Some seasoned business advice could have helped clarify the business strategy and well as the job creation potential. In addition, the best use of the volunteer time of our reviewers is in reviewing proposals that were well thought out and have a sound commercial strategy. A "Pre-Proposal Business Team" Concept, was proposed that would permit teams to apply for a limited amount of business team funding to help prepare for their COE proposal. For 2006-07, 7 teams were selected for $10,000 of business team support to assist them in developing their proposal for the 2007-08 fiscal year.

2006-2007 Selection Process

Some statistics on the applicants and awardees for funding during the 2006-07 fiscal year.

Total Number of Proposals to COEP for 2006-2007 **Total Number of REVIEWS for 06-07**	**38** **35**
Existing Centers Seeking Renewal Proposals for New Centers	**18** **17**
Proposals from BYU Funded from BYU Proposals from U of U Funded from U of U Proposals from USU Funded from USU	**4** **3** **22** **10** **9** **3**
Centers Funded	**16**
Existing Centers Renewed	**12**
New Centers Funded Companion Spinouts Funded	**4** **2**
Centers with Business Team Grants	**5**
Total of Centers Supported for 2006-07	**21**
Graduating Centers from 2005-2006 year Existing (05-06) Centers not renewed for 06-07	**2** **6**
Centers by Technology Area	
Materials	3
Manufacturing	1
Environmental	1
Energy	1
Total of MMEE Sub-Committee	**6**
IT/Software	1
IT/Hardware/Communications	2
Aerospace/Defense	1
Electronics/Electrical Devices	2
Total of IT Sub-Committee	**6**
Life Sciences	4
Total of Life Sciences/Other Sub-Committee	**4**
Total Recommended for Funding	**16**

Business Team Enhancement to Accelerate Time to Market
The first year of the COE Program's Business Team concept has been very successful. Last July, the Program issued an RFP (request for proposal) to identify seasoned entrepreneurs and technology executives to consult with the Centers and to help them in developing sound "go to market" strategies and to begin execution on those strategies.

In particular, where it is an appropriate strategy for a spinout to result from a Center, it is hoped that business team members may choose to participate in the spinout, or to help identify teams of high quality individuals who can participate in the startup process. Seasoned entrepreneurs and those who have already been the startup route are most likely able to foster this process.

Of the spinouts this year, 3 were in process at the beginning of this fiscal year, and of the 4 that are currently spinning out, 2 are being led by business team members recruited through the RFP process and one is being led by a seasoned entrepreneur who is being significantly helped by the business team member recruited through the RFP process. This year the Program budgeted, on average, $25,000 per Center and this additional funding (compared with roughly $8000 in previous years) has had a very positive impact on the ability of the business teams to create and execute on actionable business strategies.

Current Commercialization Status of 2005-06 Centers (18 Total)	**Number**
Spinouts (established)	3
Spinout (in process)	4

During last year's approval process, the Program listed the following goals of the Centers of Excellence Program for 2005-2006:

> Successful spinout of 3 current "in process" companies with <u>seasoned management</u>
> Additional 10 spinouts or licenses (to Utah companies) by end of fiscal year.

The new Business Team program was able to strongly assist 2 of the emerging startups (the 3rd was for a graduated Center that was not eligible for a business team, although the Director worked with the team to provide assistance). This has been very successful for these emerging companies. In addition, it is exciting to note that, although we did not reach the lofty goal of 10 spinouts, we are on track for at least 7 this year, with a few more which should emerge in the near future and the Business Team program has significantly assisted these Centers and spinouts.

FUNDING SUMMARY

For the 2006-07 fiscal year, of the funds allocated by the legislature, 12 existing Centers and 4 new Centers received Direct Center Funding, which went to make technical progress in moving technology from the lab into products that can go to market. These Centers also received a Business Team. In addition, two spinouts were recommended to receive an additional combined $135,000 in funding (but Centers with a licensee grant will NOT receive a business team). Five (5) Proposing teams were selected to be assigned a Business Team to help further refine the "go to market" strategies for their technologies. Therefore, there will be 19 business teams this year (16 Centers + 5 Business Team Grants– 2 Companion Spinouts) at an average budget of 25,000 each, with one Center recommended to receive $40k in Business Team funding, for a total of $490,000. The remaining funds, just under $75,000 went to fund the "pre-proposal business teams" which were designed to feed into the selection process for the 07-08 fiscal year.

Funds Allocated by the Legislature	$3,000,000
Direct Center Funding (Technical Funding to Centers)	$2,300,069
Companion Licensee (Spinout) Funding	$135,000
Business Team Funding*	$490,000
Funding for 2007-08 pre-proposal Business Teams	$74,931
* Average estimated funding of approx. $25,000 per Center customized based on Center needs. Paid and Managed by COEP	

COMMERCIALIZATION PROCESS

During the 2006-07 Fiscal year, the COE Business Team program continued, with a wealth of experienced executives and entrepreneurs consulting for the various Centers and assisting them in establishing management teams, developing business plans and navigating the startup process. The depth of expertise available to our Centers of Excellence was of significant value, as many COE professors had lamented in the past that they just didn't know the kind of people on the business side who had the experience that they needed. In particular the CEOs of both Flying Sensors and Glycosan had come to the Centers of Excellence Program as business team members, and, as envisioned, had partnered with the professors to launch successful spinout companies. This program will continue during the 2007-08 program.

2006-2007 Financial Summary

The Financial Summary is a summary of the information provided by each Center in their annual report to the program and the funding summary is based on the funds granted during the fiscal year. For reference, “Total Funding” means COE funding since starting with the program, “Patents Pend. 06-07” means patents newly filed during the fiscal year, “New Patents (Issued)” refers to those issued during the fiscal year and “Spin-Offs/ Licensees” refers to companies which have been formed to “spin-off” technology from the Center while “Licensees” refers to companies which already existed which have licensed the technology.

University	Center	06-07 Funding	Total Funding	06-07 Matching	Patents Pend. 06-07	New Patents (Issued)	Spin-Offs/ Licensees
BYU	Acoustics Research	25,000	140,000	312,368	4	0	2
BYU	Advanced Communications Technology	150,000	380,203	557,796	1	0	0
USU	Advanced Imaging LADAR	180,000	593,724	1,300,000	1	1	2
USU	Advanced Thermal Management Technologies	150,392	150,392	309,655	3	0	0
UU	Biomedical Microfluidics	200,000	455,000	415,700	2	0	1
USU	Control of Flow in Manufacturing	155,308	155,308	476,344	2	1	1
BYU	Companion Licensee — Flying Sensors	75,000	75,000	250,000	0	0	0
UU	Cemented Tungsten Carbide	125,000	125,000	336,803	2	0	0
UU	Companion Licensee — Glyco-san BioSystems	60,000	60,000	316,945	0	0	0
UU	Homogeneous DNA Analysis	150,000	620,000	775,000	2	3	1
UU	Interactive Ray-Tracing & Photo-Realistic Visualization	145,000	288,700	1,322,695	2	0	1
UU	Microarray Technology	100,000	200,000	256,975	4	0	1
BYU	Miniature Unmanned Air Vehicles	166,385	406,385	729,930	1	0	2
UU	Modified Activated Carbons Technology	140,000	280,000	444,000	1	1	0
UU	Nanosize Inorganic Material Powders	152,984	349,684	650,000	1	1	1
UU	Organic Electronics	150,000	150,000	320,000	0	0	0
UU	Therapeutic Biomaterials	210,000	500,000	892,107	2	0	0
UU	Titanium Boride Surface Hardening	100,000	372,000	304,000	1	1	0

University	Business Team Recipients	06-07 Funding	Total Funding	06-07 Matching	Patents Pend. 06-07	New Patents (Issued)	Spin-Offs/ Licensees
UU	Cellular Therapy	Business team N/A	N/A	N/A	0	0	0
USU	Electronic Mathematics Education	Business team N/A	N/A	N/A	0	0	1
UU	MIMO Communications Systems	Business team N/A	N/A	N/A	2	0	0
USU	Solar Biofuels Technology	Business team N/A	N/A	N/A	2	0	0
USU	Universal Application System	Business team N/A	N/A	N/A	0	0	1
University	**Pre-Proposal Business Team Recipients**	**06-07 Funding**	**Total Funding**	**06-07 Matching**	**Patents Pend. 06-07**	**New Patents (Issued)**	**Spin-Offs/ Licensees**
UU	Bimolecular Nanophotonics	Business team N/A	N/A	N/A	2	0	0
CEU	Clean Coke Technology	Business team N/A	N/A	N/A	0	0	0
SUU	High End Pharmaceutical and Biomedical Process Optimization	Business team N/A	N/A	N/A	0	0	0
USU	High-Speed Machining	Business team N/A	N/A	N/A	0	1	0
USU	Intelligent Service Coordination	Business team N/A	N/A	N/A	1	0	1
UU	Management of Exploratory Workflows	Business team N/A	N/A	N/A	3	0	1
UU	Nanopore Sensor Technologies	Business team N/A	N/A	N/A	4	0	0

2007-2008 Funded Centers

Funding Recipients for the 2007-08 Centers of Excellence Program

Funding Recipients which are Licensees (Companies) of Center Supported, University Developed Technologies

Licensee / Center (University)	Years Funded to Date	Award Amount

Dynamic Screening Solutions (Formerly Universal Application System) (USU)
NEW **$150,000**

Commercialization of a web-based system that processes applications for multiple agencies in the government services industry. This technology is at the basis of "UtahClicks" and is also in production in Oregon and Indiana. Plans to adapt this software for other industries are underway.

Flying Sensors (Licensee of Miniature Unmanned Air Vehicles) (BYU)
1 **$125,000**

Developing commercial (non-military) applications for miniature unmanned air vehicles (UAVs) including Real Estate, Insurance Industry, EPA - Multi-Source Air Quality Sampling, Random Testing, Pipeline/Remote Facility Surveillance and Emergency Response/Fire Monitoring – Forest & Commercial.

Glycosan BioSystems, Inc. (Licensee of Therapeutic Biomaterials) (U/U)
1 **$75,000**

Commercializing the compounds from Therapeutic Biomaterials for 3-D Cell Culture, Tissue Engineering, Drug Toxicity Testing, & Skin Care.

Larada Sciences (Licensee of Alternate Strategies of Parasite Removal) (U/U)
NEW **$170,000**

Preparing to commercialize a safe, nontoxic and rapid treatment for Pediculosis (head lice), a multibillion-dollar, increasingly resistant problem afflicting some 25% of children by the time they're teenagers.

Philotek (Licensee of Microarray Technology) (U/U) **NEW** **$100,000**

Developing a superior microarray platform for the molecular diagnostics and research markets with improved sensitivity, specificity and throughput.

Navigen, Inc. (Licensee of Center For Vascular Biotherapeutics) (U/U)
NEW **$190,000**

Proof of concept in animal models of stabilizing vasculature in macular degeneration and acute lung injury based on a new signaling pathway that regulates the balance between vascular regeneration and stabilization.

Licensee / Center (University) **Years Funded to Date** **Award Amount** **(cont.)**

Nano-Oxides (Licensee of Nanosize Inorganic Material Powders By Molecular Decomposition) (UU) **NEW** **$150,000**
Commercializing a novel, cost-effective process (molecular decomposition) for the manufacturing of nanosize powders, the building blocks for myriad nanotechnology applications, as well as nanostructured ceramic membranes and other devices.

State of RT (Licensee of Interactive Ray-Tracing & Photo-Realistic Visualization) (U/U)
NEW **$175,000**
Commercializing a software module to deliver real time ray tracing to existing graphics modeling tools and to deliver next generation game development tools based on ray tracing to the market.

VisualShare (Licensee of Center of Excellence for Electronic Medical Education (CEME) (U/U) **NEW** **$150,000**
Commercializing multi-user real-time image conferencing using the Software as a Service (SaaS) Model. This technology provides the remote convergence of images & text for distributed user populations and permits knowledge capture for legal and compliance purposes. First application is for child abuse situations in rural/remote areas to involve specialists in diagnosis of consequences.

University Centers of Excellence

Center (University) **Years Funded to Date** **Award Amount**

Center for Cellular Therapy and Regenerative Medicine (UU)
NEW **$100,000**
Capabilities to build a "bank" for stem cells derived from umbilical cord blood (so-called "cord blood") which can be used for many clinical applications in regenerative medicine and tissue engineering. Providing GMP and regulatory support for processing, development and commercialization of cord-derived stem cells, biologics and combinational products.

Center for Clean Coke Technology (CEU) **NEW** **$125,000**
This team, led by the College of Eastern Utah's Western Energy Training Center, aims to commercialize research to create Clean Coke from coke fines and waste products and to develop process control expertise by developing a pilot scale facility. This Center also intends to use the pilot plant and related expertise to enhance the training and expertise of employees throughout the area served by CEU.

Center for Control of Flows in Manufacturing (USU)
1 **$ 175,182**
Applying Computational Fluid Dynamics to improve manufacturing processes including particle sorting and Electrical Discharge Machining (EDM). This Center was assigned a business team in 2005-06.

Center (University)	Years Funded to Date	Award Amount (cont.)

Functionally Graded and Designed Cemented Tungsten Carbide and Polycrystalline Diamond Composite Materials (U/U) **1** **$125,000**
Developing advanced composite materials with predictable wear and failure characteristics designed for demanding applications such as mining, drilling, and grinding.

Center for High End Pharmaceutical and Biomedical Process Optimization (SUU)
NEW **$ 59,760**
Southern Utah University has established a high performance supercomputing facility to enable high fidelity computer modeling of topics of importance to regional industry. The goal of this Center is to partner with a regional pharmaceutical business to develop a 3-dimensional model of a fluidized bed reactor to help optimize their multiphase production processes using computational fluid dynamics. Obviously of interest is to determine if such modeling could be expanded from a single partner to broader applications.

Center for Hybrid & Adaptive Multimedia Processors (CHAMP) (USU)
NEW **$50,000**
Commercializing tools and software systems to accelerate time to market of new features for multimedia consumer devices.

Center for Microarray Technology (U/U) **2** **$50,000**
Companion Licensee Philotek also Funded
Developing a superior microarray platform for the molecular diagnostics and research markets with improved sensitivity, specificity and throughput.

Center for Miniature Unmanned Air Vehicles (BYU) **3** **$75,000**
Companion Licensee Flying Sensors also Funded
Rapid design of airframes and miniaturized autopilot and guidance systems for tiny UAVs that can be operated by novices have earned the attention of both military and civilian agencies. An autopilot design has been licensed to Procerus, Inc. in Utah.

Center for Nanopore Sensor Technologies (UU) **NEW** **$125,000**
A nanopore sensor relies on molecule and particle transport through a single conical-shaped pore that is synthesized in glass. The glass surfaces of the pore interior and exterior can be modified by numerous chemical methods to impart molecular selectivity and high sensitivity in designing sensors for different applications. These tiny sensors can detect extremely small numbers of molecules of specific compounds which is extremely useful in such applications as DNA sequencing, drug screening, nanoparticle counting and sizing.

Center for Therapeutic Biomaterials (U/U) **3** **$70,000**
Developing applications of biopolymers and hydrogels for clinical use in wound repair, prevention of surgical adhesions, and extending the life of donated organs. Three companies, 1 in California (Carbylan) and 2 in Utah (Sentrx Animal Care and Glycosan BioSystems) have been spun out of the Center to date.

Center (University)	Years Funded to Date	Award Amount (cont.)
Center for Thermal Management Technologies (USU)	**1**	**$154,376**

Technologies for extremely high performance thermal management in the context of physical and vibration isolation, in collaboration with Utah State University's Space Dynamics Lab.

Business Team Centers (Assigned a Business Team Only) for 2007-08

A Business Team is an investment of approximately $25k each unless otherwise noted

Biomolecular Nanophotonics (U/U)
Develops chemically engineered micro/nanosystems to dramatically improve the performance of Nucleic Acid Amplification and Detection, one of the key processes used in genetic engineering. The team expects that these improvements can radically improve diagnosis of gene disorders and development of gene therapies, including ribonucleic acid interference (RNAi).

Center for Management of Provenance & Exploratory Workflows (U/U) ($50k)
VisTrails is a new "workflow management system" that provides support for data exploration and visualization for tasks that have very little repetition. Some example tasks that are suitable for this new system include: calibrating simulations for hedge funds, for locating oil wells and radiation treatment planning.

MIMO Communication System (U/U)
New algorithms for signal detection and reception that significantly improve the performance and throughput of MIMO (Multiple-Input Multiple-Output) wireless communication systems. The developed algorithms offer low complexity and near optimal performance, and are adaptable to any standard.

Center for Nanomedicine Applications in Cancer (U/U)
The Center has designed and developed novel biomaterials with precisely defined molecular architecture for targeted delivery of image probes and therapeutics. These novel nanomaterials based imaging agents and therapeutics have many advantages as compared to other available drug delivery technologies because of their well-defined structure.

Center for The Production of Nanometer Sized Metals, Alloys, Metal Oxides & Mixed-Metal Oxide Powders (BYU)
A unique solid-state method of synthesizing metal oxide and metal nanoparticles has been discovered which is simple, requires comparatively little energy and is easily scalable for production. It produces products up to 99.9999% pure, as small as 1 nm, with size distributions of typically ±10% and can be used for particle or coating production.

Center for Resveratrol Technology (BYU)
Resveratrol is a compound that occurs in red wine, leading to the "French Paradox" where moderate alcohol consumption has been consistently associated with 20-30% reductions in coronary heart disease. The compound is well-absorbed in humans when taken orally, but it is not very stable. The Center proposes to commercialize stable analogs of resveratrol in order to commercialize novel applications such as topical (skin and hair), nutritional supplements and pharmaceutical products.

Business Team Centers (Assigned a Business Team Only) for 2007-08 (Cont.)

Center for Water Treatment Technology (U/U) (formerly Tero Technologies)
Developing robust, low cost ways to remove common pollutants such as nitrates from lagoon wastewater treatment systems. The core prototype product, the "poo-gloo" is simple to build, easy to install and maintain and very effective. This may dramatically enhance the effectiveness of lagoon systems around the world.

Web IDEA*SIS (USU)
The web-based solution will assist educators in tracking, serving, organizing, and evaluating children with disabilities while being compliant with state and federal regulations. The system will include: WYSIWYG web pages; content wizards; legal compliance review tools; customized organizational, procedural, and student progress reports; tools for tracking and allocating resources; communication tools for parents and educators; and tools for technical and content support.

Graduating Centers June 30, 2007 (Completed)

Advanced Imaging LADAR (USU) 4
Commercializing land-based and airborne high-resolution, laser-based 3D color-imaging platforms for both military and civilian use. One license to RappidMapper, Inc. (now Intelisum), a Utah company.

Homogeneous DNA Analysis (U/U) 4
Developing a simple and inexpensive method for genotyping DNA samples from patients or disease organisms right in a doctor's office. One application licensed to Idaho Technologies, Inc. (a Utah company).

Titanium Boride Surface Hardening (U/U) 4
Commercializing harder, longer-lived components and devices – ranging from armor to bearings and orthopedic implants - for the military, biomedical and industrial markets.

Legislation Governing 2006-07 Effective July 1, 2006

Centers of Excellence Legislation Passed in 2006 Session-Effective July 1, 2006

During the 2006 Legislative session, the Legislature passed a bill known as SB 112, sponsored by Senator Thomas V. Hatch and co-sponsored in the House by Representative Peggy Wallace. This bill was designed to enhance the strength and value of the Centers of Excellence Program by demonstrating the accountability of the program and its participants to the Legislature and to the taxpayers of Utah and by making the Centers of Excellence Program more accessible to universities which do not grant doctoral degrees (referred to as "non-doctoral granting institutions").

This legislation has two main sections. The first section modifies the matching funds requirements so that Utah institutions that do not issue doctoral degrees, the "non-doctoral granting schools" would no longer have to meet the 2:1 matching funds requirement. This was intended to enable schools that did not have doctoral programs, and therefore were less frequently involved in ongoing Federal research, to have the opportunity to participate in the Centers of Excellence Program.

Instead of the 2:1 matching funds requirement, non-doctoral schools are required, through policy (see section on new Policies) to meet a 1:1 matching funds requirement. This change was greeted with great enthusiasm by the relevant schools and was supported by the doctoral granting institutions as well.

The concept of greater accountability to the Legislature in the COE program was added in the second section of the bill by introducing a concept called the "return of grant". This provision asks the universities to track licensees of those technologies which have been supported by Centers of Excellence Program funds as part of the licensing process. If such licensees are either out of state firms or leave the state within five years of the issuance of the License, the statute asks that the affected college or university will share back with the Centers of Excellence Program a portion of the proceeds of the license.

This proposal was presented to the Senate Workforce Services and Community and Economic Development Committee, chaired by Senator Carlene Walker, and passed out of committee with 5 Yea votes, 0 Nay Votes, and 2 absences. The bill was subsequently presented to the full Senate, and passed the Senate with 24 Yeas, 0 Nays with 5 Absent. From the Senate, the bill went to the House Workforce Services and Community and Economic Development Committee, where it was unanimously supported by a vote of 7 yea votes, 0 nay votes and no absences. The bill then went to the House of Representatives and passed with 69 yea votes, 0 nay votes and 6 absences.

More details about how this is administered were developed by the Governor's Office of Economic Development as part of the program's policies and procedures.

S.B. 112 Enrolled

1

CENTERS OF EXCELLENCE AMENDMENTS

2

2006 GENERAL SESSION

3

STATE OF UTAH

4

Chief Sponsor: Thomas V. Hatch

5

House Sponsor: Peggy Wallace

6
7 **LONG TITLE**
8 **General Description:**
9 This bill modifies provisions related to the Centers of Excellence Act.
10 **Highlighted Provisions:**
11 This bill:
12 . recommends that the governor consider the allocation of economic development
13 funds for Centers of Excellence to be matched by industry and federal grants on at
14 least a two-for-one basis for colleges and universities in the state that offer any
15 doctoral degrees;
16 . requires the Governor's Office of Economic Development to develop a process to
17 determine whether to require the return of economic development Centers of
18 Excellence grant moneys from a higher education institution if the technology that
19 is developed from grant proceeds is licensed to a licensee that does not maintain a
20 manufacturing or service location in the state from which the technology is
21 exploited or transfers the manufacturing or service location out of state within a
22 five-year period after the issuance of the license; and
23 . makes certain technical changes.
24 **Monies Appropriated in this Bill:**
25 None
26 **Other Special Clauses:**
27 None
28 **Utah Code Sections Affected:**
29 AMENDS:
30 **63-38f-701**, as renumbered and amended by Chapter 148, Laws of Utah 2005
31 **63-38f-704**, as renumbered and amended by Chapter 148, Laws of Utah 2005
32
33 *Be it enacted by the Legislature of the state of Utah:*

34 Section 1. Section **63-38f-701** is amended to read:
35 **63-38f-701. Purpose.**
36 (1) (a) The Legislature recognizes that the growth of new industry and expansion of
37 existing industry requires a strong technology base, new ideas, concepts, innovations, and
38 prototypes.
39 (b) These generally come from strong research colleges and universities.
40 (c) Technical research in Utah's colleges and universities should be enhanced and
41 expanded, particularly in those areas targeted by the state for economic development.
42 (d) Most states are enhancing their research base by direct funding, usually on a
43 matching basis.
44 (e) The purpose of this part is to catalyze and enhance the growth of these technologies
45 by encouraging interdisciplinary research activities in targeted areas.
46 (f) The Legislature recognizes that one source of funding is in matching state funds
47 with federal funds and industrial support to provide the needed new technologies.
48 (2) The Legislature recommends that the governor consider the allocation of economic
49 development funds for Centers of Excellence to be matched by industry and federal grants on at
50 least a two-for-one basis *for colleges and universities in the state that offer any doctoral*
51 *degrees*.
52 (3) (a) The Legislature recommends that the funds be allocated on a competitive basis
53 to the various colleges and universities in the state.
54 (b) The funds made available should be used to support interdisciplinary research in
55 specialized Centers of Excellence in technologies that are considered to have potential for
56 economic development in this state.
57 Section 2. Section **63-38f-704** is amended to read:

58 **63-38f-704. Administration -- Grants.**
59 (1) [This part shall be administered by the] *The* Governor's Office of Economic
60 Development *shall administer this part*.
61 (2) *(a)* The office may award grants to the various colleges and universities in the state
62 for the purposes of this part.

63 *(b) The governor's Office of Economic Development shall develop a process to*
64 *determine whether a college or university that receives a grant under this part must return the*
65 *grant proceeds if the technology that is developed with the grant proceeds is licensed to a*
66 *licensee that:*
67 *(i) does not maintain a manufacturing or service location in the state from which the*
68 *licensee or a sublicensee exploits the technology; or*
69 *(ii) initially maintains a manufacturing or service location in the state from which the*
70 *licensee or a sublicensee exploits the technology, but within five years after issuance of the*
71 *license the licensee or sublicensee transfers the manufacturing or service location for the*
72 *technology to a location out of the state.*
73 (3) (a) Funding allocations shall be made by the office with the advice of the State
74 Advisory Council for Science and Technology and the board.

75 (b) Each proposal shall receive the best available outside review.
76 (4) (a) In considering each proposal, the office shall weigh technical merit, the level of
77 matching funds from private and federal sources, and the potential for job creation and
78 economic development.
79 (b) Proposals or consortia that combine and coordinate related research at two or more
80 colleges and universities shall be encouraged.
81 (5) The State Advisory Council on Science and Technology shall review the activities
82 and progress of individual centers on a regular basis and assist the office in preparing an annual
83 report on the accomplishments and direction of the Centers of Excellence Program.

Policies relating to SB 112 Implemented December, 2006

Policies and Procedures Update for the Centers of Excellence Program
Addressing Changes to Statute from Senate Bill 112
during the 2006 Legislative Session

The 2006 legislature passed a bill updating the Centers of Excellence Statute (SB 112) which called for GOED (The Governor's Office of Economic Development) to develop policies and procedures to determine whether a return of grant would be required under certain circumstances. This document excerpts the relevant statutory language and the policies and procedures called for.

Background and Statute Excerpts

Below is cited the section of the statute most impacted by the 2006 SB 112.

63-38f-704.

58 63-38f-704. Administration -- Grants.

59 (1) The Governor's Office of Economic

60 Development shall administer this part.

61 (2) (a) The office may award grants to the various colleges and universities in the state

62 for the purposes of this part.

63 (b) The governor's Office of Economic Development shall develop a process to

64 determine whether a college or university that receives a grant under this part must return the

65 grant proceeds if the technology that is developed with the grant proceeds is licensed to a

66 licensee that:

67 (i) does not maintain a manufacturing or service location in the state from which the

68 licensee or a sublicensee exploits the technology; or

69 (ii) initially maintains a manufacturing or service location in the state from which the

70 licensee or a sublicensee exploits the technology, but within five years after issuance of the

71 license the licensee or sublicensee transfers the manufacturing or service location for the

72 technology to a location out of the state.

The process referred to in 63-38f-704 part 2(b), outlined in this document, will apply to all colleges and universities that receive a grant for the commercialization of a specific technology through the Centers of Excellence program **and** that receive proceeds from the licensing of that same technology supported by the Centers of Excellence program. Proceeds include royalties, proceeds from equity participation in the spinout/licensee, milestone payments and other proceeds as a result of the license.

Should a company or business receive a direct grant to advance the commercialization of a technology developed at a Utah college or university, the same policies of pro-rata payback based on time in the state will apply, but there will be no other deductions. The company will be solely responsible for the grant funds they received directly.

The intent of the legislature in passing SB 112 in the 2006 legislative session and thereby authorizing these policies and procedures is to reinforce the Centers of Excellence's objective to strengthen Utah's economy. These changes intend to accomplish this by recycling back into economic development those revenues that stem from licenses of technologies supported by the Centers of Excellence program and, by extension, the taxpayer, when, for whatever reason, those licenses do not result in meaningful job creation and economic development in the state of Utah.

It is important to note that the "return of grant" from Universities is not intended to come directly from the University's existing budget or resources, nor directly from the licensee (company), nor to interfere in business decisions of either the university or licensee, but will be paid by the licensing university out of licensing proceeds received from the licensee over the course of the term of the license. It is also important to note that the intention is for the State to receive a share of these proceeds over time, after certain expenses incurred by the university are reimbursed.

Policies and Procedures for the Centers of Excellence Program when a COE supported technology is licensed or moved out of state and a "return of grant" is to be evaluated.

Definitions

1. Business Team and Business Team Member Consultants– Seasoned business executives and entrepreneurs who are recruited by the Centers of Excellence program on a program-wide basis to provide insight and business assistance to a Center under direct contract from the COE program.
2. Center (or Center of Excellence) – a university team including a Center Director (the "P.I." or "Principal Investigator") and other researchers and students as appropriate, which has applied to the state Centers of Excellence program and has received outside funding, such as corporate or Federal funding, for specific research deemed to be of commercial value and which is undergoing the transition from university research towards commercially viable product with the support of the Centers of Excellence program.
3. COE Contract – The contract that is enacted between the Centers of Excellence program of Utah's Governor's office of Economic Development and the university for the purpose of advancing the technical maturity of the technology proposed by a Center of Excellence

team.

4. COE Review Committee – A committee consisting of a quorum of the non-University affiliated members of the State Advisory Council on Science and Technology (SAC) and a quorum of the non-University affiliated members of the GOED Board convened for the purpose of reviewing any questions or concerns related to these policies and procedures.
5. Certain Direct Costs of the Universities – Costs which are specific to the commercialization Center in question and which include: Patent development and prosecution costs for the Center in question – but will not include costs of the TCO itself, but will include payments to outside law firms to conduct this work and other direct investments into developing the technology in question such as the direct cash costs, but not in-kind expenses, of a VIP or Technology commercialization grant or similar program.
6. Exclusive license – a License to a university-developed technology that IS exclusive to one licensee and is NOT available other potential licensees.
7. GOED Board – Governor's Office of Economic Development Board – a group of appointed volunteer Utah citizens who advise the Governor and GOED on economic development issues.
8. Grant – funds allocated to a Center, under a contract with the university that houses that Center, to mature technology invented in the Center and help it prepare to go to market.
9. Licensing Proceeds – the proceeds that are paid to the university as a result of the license and which includes, but is not limited to: royalties and other ongoing licensing fees, milestone fees paid by the licensee, value of any equity stake in the licensee that is held by the university as a result of the license and related licensing activities.
10. Manufacturing or service location in the state from which the licensee or a sublicensee exploits the technology – This includes any facility, office or group of employees (example, telecommuters) in the state with the objective of developing, using, selling or otherwise "exploiting" the technology. The intent of this description is that the technology is generating a substantial portion of the overall jobs within Utah. A company that is acquired but maintains a substantive manufacturing or service location in Utah will not be deemed to have moved out of state.
11. NON-exclusive license – a license to a university-developed technology that is not exclusive to one licensee and is also available on fair terms to other potential licensees.
12. State Advisory Council on Science and Technology (SAC) – A group of appointed volunteer citizens who advise the Governor and the State Science Advisor on matters of science and technology in the State of Utah.

Return of Grant Conditions if the Technology is licensed out of state OR if the licensee is moving the technology and jobs out of state less than 5 years from the license issuance.

A. No Grant Return is Required - Conditions under which NO return of the grant is required even if the technology is moved out of state in less than 5 years.

- The licensee that is located out of state or is moving out of state has a NON-exclusive license to the technologies from the Center because a Utah-based company could have the opportunity to license the technology.
- The Technology from the Center was licensed in multiple fields of use and at least a "substantive" portion of the value of the Center's technology was licensed in Utah. If there

is a disagreement about "substantive", then the Director, in partnership with the University, will review this with the COE Review Committee and make a determination.

B. Pro-Rata Return of the Grant out of License Proceeds:

Conditions under which only a portion of the grant may be required to be returned.

- The licensee that is located out of state or is moving out of state has an exclusive license, but has operated in good faith with genuine positive economic impact in Utah for at least 12 months based on the criteria below.
    - The Grant return by the university should be pro-rated based on the number of years in state. The percentage of the Grant to be returned would be calculated as follows: Subtract the "number of years in state" from 5 years and then divide by 5 = pro-rata percentage.
    - In addition, if the licensee had created a high number of "quality jobs" during the preceding year(s) in the state, the Review Committee can further reduce the required pro-rata payback at their discretion. The Review Committee should assume that if the company had created approx 140 job-years (1 employee for 1 year), they will have approximately returned "dollar for dollar" back to the state on a $500,000 investment from the COE program. Quality jobs are those that, on average, pay at least double the average county annual wage (approximately $65k/year in Salt Lake County for 2006 which is approximately the current average of a COE job).

Calculation of Grant Return

C. The method for calculating the grant return, for ANY grant repayment or pro-rata repayment, will proceed as follows

- The COE program will determine the total amount of funding allocated to the Center in question, which will include the total of
    - Funding granted and paid directly to the University for the Center under a COE contract
    - The pro-rata calculations set forth in B. will be applied to determine the total grant or pro-rata grant repayment.
- The University will identify the total licensing revenue stream for the Center in question, separately identifying "past, current and expected future licensing proceeds". These streams will include the total of:
    - Up front fees paid by the licensee and expected to be paid by the licensee
    - Milestone fees paid by the licensee and expected to be paid by the licensee
    - Royalties and other ongoing and future licensing fees paid by the licensee and expected to be paid by the licensee
    - Value of any equity at liquidation or exit (note that if the grant repayment begins before equity liquidation or exit, then the equity will be identified, but the value will be confirmed for the purposes of grant repayment only at liquidation or exit)
- The University will identify certain "current and past direct costs" that are specific to the

Center in question which include:

- Patent development and prosecution costs for the Center in question – these will not include costs of the TCO itself, but do include payments to outside law firms to conduct this work.
- Other direct investments into developing the technology in question such as the direct cash costs of a VIP or Technology commercialization grant or similar university grant program

- The return of the grant or a portion of the grant will be based on the following formula:
  - The university will keep all proceeds of the license until the current and past direct costs are repaid
  - Once the current and past direct costs have been repaid by the proceeds of the license, then the university will "share back" with the State Centers of Excellence Program, as a default rate, 50% of the licensing proceeds received by the university, as they are delivered to the university.
    - If, however, a university has invested substantially more funds in the development of the technology than the COE grant has contributed, the university can present information documenting this investment to the Review Committee, which will then adjust the state's repayment share commensurate with the relative investment size.
    - As an example: If the university, out of university assets, non-State contributions and resources, had invested $4 million in the development of the technology, and the COE Grant was $450,000, then the State's "share-back" of the ongoing licensing proceeds would be approximately 10% of the proceeds as they are received by the university..
    - Items that are appropriate to include in evaluating the university's investment in the technology include:
      - Deferred overhead charges, where overhead is permitted to be charged, but is voluntarily waived when participating in the COE program.
      - Physical space, lab space and equipment and other Property Plant and equipment that contributed to the development of the technology that are developed solely by the university (such as through capital campaigns, donations, tuition etc).
      - P.I. Salary that is paid by the university that is not covered by a grant or contract.
      - Compensation to other team members that is paid by the university that is not covered by a grant or contract.
      - Industry or Corporate grants and contracts that are sponsored research contracts that fund in whole or in part the development of the technology subject to these provisions.
    - Items that are not appropriate to include in evaluating the university's investment in the technology include :
      - Federal grants and contracts that help pay for the development of the technology (this is Federal investment, not university nor state investment).

        - No payment will be required if the university does not actually receive the expected proceeds. These repayments to the state are due annually.
        - The repayment is only for future received payments after the move that triggers these procedures. Any previously received payments are not considered in the repayment process.
    - These payments to the state will continue until the earlier of:
        - The total of the COE funding into the technology from part C.1. has been repaid OR
        - The Total of the pro-rated portion of the COE investment in the technology from part C.1. has been repaid (if applicable) OR
        - The payments to the University have been exhausted and no more licensing proceeds will be received by the university AND the university's equity position has been liquidated and the appropriate percentage of the proceeds has been paid to the State.
- If a license is terminated by the University, such as for default or violation of other license terms, then no future repayment of grant proceeds to the State is required. If the technology is then licensed to another out of state licensee, that license is subject to the return of grant terms that had been approved under these policies and procedures.
- Review Committee Function:
    - The COE Review Committee's responsibility is to verify the accuracy of the information that they evaluate under these policies and procedures, to interview relevant individuals as needed and to otherwise independently calculate and determine the elements of the return of grant, in conjunction with the Center Director and the university.

Contract Administration

D. Policies and Procedures become part of University/State Contract: When a new Center is approved and a new contract is created, a copy of the then-approved policies and procedures shall be included in the contract in an appendix (or shall be deemed to have been so included). The policies and procedures governing that Center of Excellence will be those approved and included at the time of the initial Center grant. If policies and procedures of the program change during the life of a Center (often up to 4 years in length), only those at the initial grant will be in effect for that Center and its technologies.

E. "Grandfathering of Existing Centers of Excellence" - Centers of Excellence whose contracts were initially executed on or before the 2005-06 fiscal year (that is, before the 2006 Legislative session that passed the statutory changes calling for these policies and procedures), will not be subject to the return of grant provisions, as these provisions were not in statute when the contracts for the 2005-06 fiscal year (or earlier) were executed.

1. Centers which are ongoing in the program have their contracts amended only for contract duration and total value and the terms of the contract are not generally changed during the life of the Center, up to 4 years.

2. This provision provides consistency for all universities so that they know the terms and conditions under which they apply to and enter into the Centers of Excellence program.

F. Return of Grant Mechanism: If a repayment under these policies and procedures is made, it will be deemed a refund of grant proceeds under the contract originally executed between the COE program and the university. Funds so received will be then managed by the COE program under then current policies and procedures.

Legislation Passed in 2007 Session (Effective July 1, 2007)

Centers of Excellence Legislation Passed in 2007 Session-Effective July 1, 2007

During the 2007 Legislative session, the COE Director worked with Rep. Bradley Daw to incorporate into the Centers of Excellence statute, changes that would encourage the granting of funds to Licensees of technologies developed at Utah's Colleges and Universities. The goal of these changes was to help such licensees cross the so-called "Valley of Death" that often faces companies starting up with a technology from a university in hand. These companies face significant funding hurdles, the and goal of the COE program is to help mobilize private sector investment in these technologies.

Representative Daw sponsored House Bill 125 with Senate sponsor Senator Sheldon Killpack, to permit grants to licensees of University developed technologies. In addition, the statute was clarified to more fully instantiate the Business Team program.

The selection process for the 2007-08 fiscal year included grants to "companion licensees", based on these statutory changes.

Enrolled Copy H.B. 125

1 **CENTERS OF EXCELLENCE AMENDMENTS**

2 2007 GENERAL SESSION

3 STATE OF UTAH

4 **Chief Sponsor: Bradley M. Daw**

5 Senate Sponsor: Sheldon L. Killpack

6

7 **LONG TITLE**

8 **General Description:**

9 This bill modifies the Centers of Excellence Act by creating a commercialization grant
10 component to more readily link companies with college and university researchers in
11 transitioning their research developed technologies into industry.

12 **Highlighted Provisions:**

13 This bill:

14 < modifies the recognized purposes of the Centers of Excellence Act to include
15 facilitating the transition of research generated technologies from the state's colleges
16 and universities into industry to grow and expand the state's economy;

17 < provides that, in addition to state colleges and universities, Centers of Excellence
18 grants may be awarded to companies that are working in partnership with colleges
19 and universities and their researchers to transition their research generated
20 technologies into industry for economic development;

21 < provides that a repayment by a college or university of grant proceeds or a portion
22 of grant proceeds shall come only from the proceeds of a license established between
23 the company and the college or university, or in the case of a company that receives
24 a grant, from the proceeds of the license to that company; and

25 < provides that the Governor's Office of Economic Development may enter into work
26 agreements with business team consultants, who would assist colleges and
27 universities in facilitating the transition of technology into industry.

28 **Monies Appropriated in this Bill:**

29 None

H.B. 125 Enrolled Copy

30 **Other Special Clauses:**

31 None

32 **Utah Code Sections Affected:**

33 AMENDS:

34 **63-38f-701**, as last amended by Chapter 356, Laws of Utah 2006

35 **63-38f-703**, as enacted by Chapter 148, Laws of Utah 2005
36 **63-38f-704**, as last amended by Chapter 356, Laws of Utah 2006
37 ENACTS:
38 **63-38f-705**, Utah Code Annotated 1953
39
40 *Be it enacted by the Legislature of the state of Utah:*
41 Section 1. Section **63-38f-701** is amended to read:
42 **63-38f-701. Purpose.**
43 (1) (a) The Legislature recognizes that the growth of new industry and expansion of
44 existing industry requires a strong technology base, new ideas, concepts, innovations, and
45 prototypes.
46 (b) These generally come from strong research colleges and universities.
47 (c) Technical research in Utah's colleges and universities should be enhanced and
48 expanded, particularly in those areas targeted by the state for economic development.
49 (d) Most states are enhancing their research base by direct funding, usually on a
50 matching basis.
51 (e) The purpose of this part is to catalyze and enhance the growth of these technologies
52 by encouraging interdisciplinary research activities in targeted areas and by facilitating the
53 transition of these technologies out of the university environment into industry where the
54 technologies can be used to enhance job creation.
55 (f) The Legislature recognizes that one source of funding is in matching state funds with
56 federal funds and industrial support to provide the needed new technologies.
57 (2) The Legislature recommends that the governor consider the allocation of economic
58 development funds for Centers of Excellence to be matched by industry and federal grants on at
59 least a two-for-one basis for colleges and universities in the state that offer any doctoral
60 degrees.
61 (3) (a) The Legislature recommends that the funds be allocated on a competitive basis
62 to the various colleges and universities in the state[.] and to companies working in partnership
63 with colleges and universities to commercialize their technologies.
64 (b) The funds made available should be used to support interdisciplinary research in
65 specialized Centers of Excellence in technologies that are considered to have potential for
66 economic development in this state and to help transition these technologies out of the colleges
67 and universities into industry.

68 Section 2. Section **63-38f-703** is amended to read:

69 **63-38f-703. Definitions.**
70 As used in this part[, "centers]:
71 (1) "Business team consultant" means an experienced technology executive,
72 entrepreneur, or business person who:
73 (a) is recruited by the office through a request for proposal process to work directly
74 with a college or university in the Centers for Excellence program; and
75 (b) works with the institution to facilitate the transition of its technology into industry
76 by assisting the institution in developing strategies, including spin out strategies when
77 appropriate, and go-to-market plans, and identifying and working with potential customers and
78 partners.
79 (2) "Centers of excellence" means university-based, federal and industry-supported,
80 cooperative research and development programs.
81 (3) "Direct license" means the licensing between a company and a Utah college or
82 university of technology developed at the college or university for the intent of commercializing
83 the technology or facilitating its transition into industry.
84 (4) "Licensee" means:
85 (a) a company that executes or is in the process of executing a direct license; or
86 (b) a sublicensee of the technology from a direct license.
87 Section 3. Section **63-38f-704** is amended to read:

88 **63-38f-704. Administration -- Grants.**
89 (1) The Governor's Office of Economic Development shall administer this part.
90 (2) (a) The office may award Centers of Excellence grants to the various colleges [and],
91 universities, and licensees in the state for the purposes of this part.
92 (b) The governor's Office of Economic Development shall develop a process to
93 determine whether a college or university that receives a grant under this part must return the
94 grant proceeds or a portion of the grant proceeds if the technology that is developed with the
95 grant proceeds is licensed to a licensee that:
96 (i) does not maintain a manufacturing or service location in the state from which the
97 licensee or a sublicensee exploits the technology; or
98 (ii) initially maintains a manufacturing or service location in the state from which the
99 licensee or a sublicensee exploits the technology, but within five years after issuance of the
100 license the licensee or sublicensee transfers the manufacturing or service location for the

101 technology to a location out of the state.
102 (c) A repayment by a college or university of grant proceeds or a portion of the grant

103 proceeds shall come only from the proceeds of the license established between the licensee and
104 the college or university.
105 (d) (i) A licensee that receives a grant under this part shall return the grant proceeds or
106 a portion of the grant proceeds to the office if the licensee:
107 (A) does not maintain a manufacturing or service location in the state from which the
108 licensee exploits the technology; or
109 (B) initially maintains a manufacturing or service location in the state from which the
110 licensee exploits the technology, but within five years after issuance of the grant the licensee
111 transfers the manufacturing or service location for the technology to an out of state location.
112 (ii) A repayment by a licensee that receives a grant shall come only from the proceeds
113 of the license to that licensee.
114 (iii) A repayment by a licensee shall be prorated based only on the number of full years
115 the licensee operated in the state from the date of the awarded grant.
116 (3) (a) Funding allocations shall be made by the office with the advice of the State
117 Advisory Council for Science and Technology and the board.
118 (b) Each proposal shall receive the best available outside review.
119 (4) (a) In considering each proposal, the office shall weigh technical merit, the level of
120 matching funds from private and federal sources, and the potential for job creation and
121 economic development.
122 (b) Proposals or consortia that combine and coordinate related research at two or more
123 colleges and universities shall be encouraged.
124 (5) The State Advisory Council on Science and Technology shall review the activities
125 and progress of [individual centers] grant recipients on a regular basis and assist the office in

126 preparing an annual report on the accomplishments and direction of the Centers of Excellence
127 Program.
128 Section 4. Section **63-38f-705** is enacted to read:

129 **63-38f-705. Business team consultants.**
130 (1) The office may enter into work agreements with business team consultants through
131 a request for proposal process to participate in the Centers for Excellence program.
132 (2) Under a work agreement, a business team consultant shall assist a college or
133 university in facilitating the transition of its technology into industry.