Governor's Office of
Economic Development

Centers of Excellence

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ANNUAL REPORT

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2007-2008
Centers of Excellence
Annual Report

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Executive Summary

Executive Summary

The 2007-08 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. Fifty-five of these spinouts are still "alive" in Utah, three are alive out of state, and another eleven 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 for the next two decades of success. During the past year, the program evaluated the feasibility of the concept of making grants directly to Licensees. The goal of such a change would be 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 CEO's 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 to be 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 for 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.

2007-2008 Funded Centers

Cellular Therapy and Regenerative Medicine

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

DEFINITION OF CENTER

The Center for Cell Therapy and Regenerative Medicine (CCTRM) proposes to collect, manufacture, characterize, store, catalog and distribute stem and progenitor cells for research and therapeutic purposes with a particular emphasis on umbilical cord blood stem cells. Performing research on stem cells that can be linked to records of medical, demographic, epidemiologic and genetic information through several Utah-centric databases will greatly facilitate medical discovery. The Center has begun development on a unique method in which biosamples can be linked to such records for the purpose of providing extensive background screening. Using this method, the Center has focused on generating an algorithm for defining a "confidence interval" or index of suspicion for the presence or absence of a particular disease state in any given biosample. Such biosamples, LineaCells, will be marketed for sale and distribution to parties interested in studying a particular disease or developing a therapeutic cellular product with no genetic predisposition to a particular disease. It is anticipated that the CCTRM will be able to secure exclusive rights to these databases for specific fields of use in order to generate a de facto standard index for rating the likelihood that specific stem and progenitor cells will be useful for specific research and therapy.

TECHNOLOGY

The CCTRM Stem Cell Repository will be a unique resource for researchers in both academics and industry. As it appears, Utah is the only place simultaneously possessing vast, accessible medical and lineage data, and cGMP facilities, with supporting regulatory expertise, for the creation of such a resource, giving us a timely competitive advantage in the marketplace.

PROGRESS

The Center is currently funded as a no-cost extension of the grant awarded originally in July 2007. The collaboration with the original business team is now complete. The company is in the process of being established.

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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Clean Coke Technology

COLLEGE OF EASTERN UTAH

DEFINITION OF CENTER

The Center for Clean Coke Technology at the College of Eastern Utah's (CEU) Western Energy Training Center (WETC) is working in conjunction with Combustion Resources (CR) and Terra Systems, Inc. (Terra) 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 Center made great progress during this first year of funding and produced green briquettes for testing by end users. The results are promising and product should be delivered to industrial users for evaluation this quarter. Design of process control systems and algorithms for the Clean Coke process has been developed and will be patented by CEU in conjunction with their COE Business Team. Additional IP is being developed by CEU around establishing a site-based mobile learning and training simulator which would provide the training necessary to produce the required skilled labor force. This simulator can be used by industry to advance the development of labor pools of rural applied technicians for energy processing applications.

PROGRESS

Strong partnerships were established between CEU, WETC and industry partners to complete the funded year's objectives ahead of schedule. A consortium of key companies from all industry segments has been assembled. The involvement of energy companies, investment groups, business analysts and end users provides a positive input into the direction of the technology. Members of the Center and business team are: College of Eastern Utah, Western Energy Training Center, Combustion Resources, Inc., Terra Systems, Inc., Mountain Island Energy, LLC, Utah Valley State College, State of Utah, Manufacturing Extension Partnership, WestCAMP Inc., National Centers of Excellence, and Excellence to Market.

Imagine...

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

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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 Control of Flows in Manufacturing is focused on using flow control technologies to improve manufacturing processes. They are working on two technologies. The first, Aerodynamic Vectoring Particle Sorting (AVPS), classifies fine powders (near 10 microns) by size. The second, Coanda-assisted Spray Manipulation (CSM) provides direction and profile control to thermal spray devices.

TECHNOLOGY

During the past year, the aerodynamic vectoring particle sorting device was scaled to a larger size and modified to operate at much higher flow speeds. As a result, the throughput of the device was improved by two orders of magnitude without loss in accuracy. This system has applications to the manufacturing processes of 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.

Coanda-assisted spray manipulation is well suited for spray coating the inside of pipes, among other applications. This method uses a new pneumatically-controlled device which was constructed and tested on a flame spray gun. This allowed arbitrary programming of the flame direction and spreading which will lead to improved control over the coating process. The technology allows complete control over thicknesses on large surfaces or to mitigate the intensity of heat from flame sprays.

PROGRESS

The Center has non-disclosure agreements in place with several companies, including Sulzer and Praxair. They are looking forward to an upcoming contract to provide a plasma spray nozzle and to test it in one partner's facilities. Meanwhile, other manufacturers attended a demonstration recently and one is considering a license of the technology.

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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Tungsten Carbide and Diamond Composite Materials

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 is engaged in commercialization of technologies related to new super-hard composite materials for use in industrial tools including drill bits and machining tools. The Center has developed new materials as well as processes for making these tools commercially. The composite materials are based on cemented tungsten carbide and polycrystalline diamond.

TECHNOLOGY

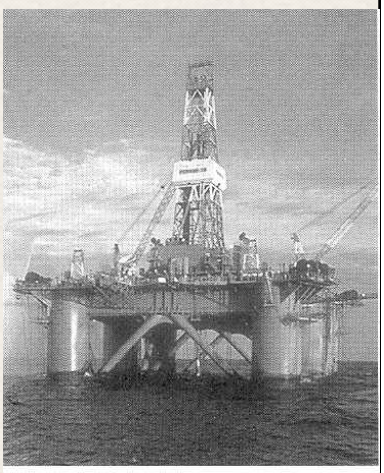
Compared to conventional cemented tungsten carbide or polycrystalline tools, the new technologies developed by the Center allow custom designs of the microstructure of these materials. The functionally designed materials will maximize its fracture toughness with minimum sacrifice of wear resistance. It is the unique and custom 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's technology promises to improve the mechanical properties of materials and the performance of manufacturing tools, hence improve productivity and competitiveness of manufacturing industries

PROGRESS

The Center has now completed the successful spin off of a start up technology company. The business team has continued with the company and is playing very critical roles in guiding the company toward commercialization.

Imagine...



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

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High End Pharmaceutical & 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 Center for High End Pharmaceutical and Biomedical Process Optimization aims to assist small to medium sized companies that may experience arrested development for lack of product or process innovation by helping to model highly complex technical problems. The Center provides modern, high end computational models to assist small companies in overcoming technical challenges obstructing design optimization and commercialization. The evolution of this Center led to an expanded scope that includes technologies related to renewable energy including biomass gasification and wind turbines.

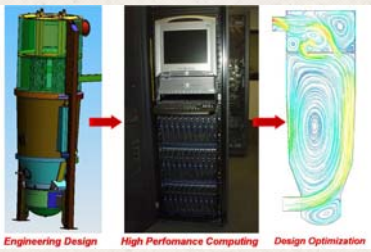
TECHNOLOGY

During the first fiscal year, the Center performed high end CFD modeling for three corporate partners that resulted in technology advances in three separate areas. The first project for Deseret Laboratories Inc. (DLI) resulted in the design optimization of the bed screen for DLI's BGP-7 granulator, a key component in DLI's process for the production of pharmaceuticals and nutraceuticals. A second project involved the thermal optimization of the DxNA GeneSTAT, a portable device for the rapid identification of the DNA of unknown, potentially infectious, biological pathogens. A third major project was initiated with Emery Energy Co., related to a novel biomass gasification process.

PROGRESS

The Business Team partnership was instrumental to the diversification of the Center to broader applications and partnerships. The Team initiated an important exploration with Ceramatec Corporation that eventually evolved into a joint collaborative project with Emery Energy Co. and Idaho National Laboratory on the development of novel technology for biomass gasification. Subsequently the Team has expanded and been linked with the Southern Utah Business Resource Center (SUBRC). The SUBRC is a business assistance and support center, with proactive regional outreach giving particular emphasis to assisting rural entrepreneurs.

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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Hybrid & Adaptive Multimedia Processors

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 Hybrid & Adaptive Multimedia Processors (CHAMP) has been working on algorithms to automate the design of circuits on field-programmable gate array (FPGA) chips for video processing. The Center has spun out an initial concept for a company (HiDASoC) and has registered it in Utah. They are focused on creating both software tools based on these algorithms as well as packaging the circuits obtained using these algorithms as intellectual property.

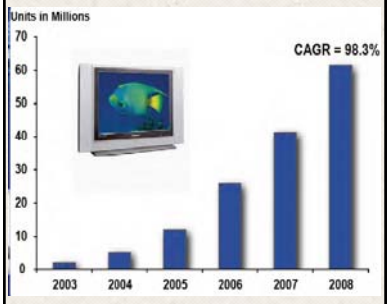
TECHNOLOGY

Video compression on embedded platforms is a promising technology in the area of security and surveillance. The most computationally intensive part of such applications is a process called Motion Estimation. The key to designing a powerful, low power and adaptable or responsive circuit to process these motion estimation techniques is the judicious allocation of video pixels onto on-chip embedded memory. This is a complex problem and CHAMP has created a set of algorithms that can automatically search the complex and vast set of design options and provide the user with the best possible pixel mapping strategy and associated circuits on an FPGA to solve the motion estimation processes.

PROGRESS

The Center is working on raising more funding to commercialize the technology. One of the current sponsors is Mathstar which is a chip manufacture that has given funding for one of the software tools that the Center has developed. The Center has also filed 2 patents during the year.

Imagine...



Being able to store a hundred times more video surveillance data through advanced compression based software using the same hardware.

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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 highly parallel microarray technologies with applications in genomics, pharmacogenomics, molecular diagnostics, and proteomics. The Center's research suggests practical ways to improve current microarray-based technologies in several critical areas, namely sensitivity of detection, specificity of molecular target recognition, and significantly higher throughput capabilities. Philotek, LLC was spun out of CMT for the purposes of developing and commercializing the novel microarray technologies. To date, Philotek and CMT have successfully secured a NIH grant and a funded technology development partnership with MOXTEK.

TECHNOLOGY

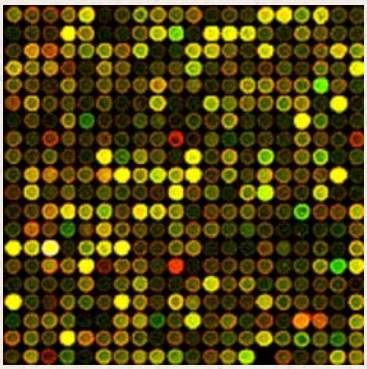
The core technologies from CMT include a consumable, next-generation microarray substrate that provides significantly higher sensitivity and shorter assay time than current products, a real-time instrument for performing microarray experiments, and associated novel assay technologies including kinetics analysis.

In conjunction with their development partner MOXTEK, the Center has taken key steps towards commercialization of the microarray substrate technology. They have also further improved their real-time microarray platforms to include higher-resolution imaging, better signal-to-background, and more robust microfluidics handling.

PROGRESS

CMT has been able to successfully form the spin-off company, Philotek, LLC, which is also a COE 2007-08 Licensee Grant recipient. They have also been able to secure a comprehensive license of all of CMT's intellectual property disclosures. The Center has collaborated to secure a three-year NIH grant for technology development, and also filing two other NIH grant applications. CMT is also solidifying the competitive position of the Company's technologies through multiple inputs from the field – potential customer interviews, competitive product assessment, pricing, and market research reports.

Imagine...



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

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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 Technologies (CNST) was established to create new Utah industries based on a novel sensor paradigm invented at the University of Utah: glass nanopore sensors (GNP). This sensor technology offers commercial opportunities in the areas of biomedical and forensic DNA sequencing and pharmaceutical drug screening. The technology also covers one-at-a-time nanoparticle analysis for manufacturing and viral diagnostics for homeland security and national defense and clinical chemistry, e.g. chemical panel screening in blood analysis. The patented nanopore platform technology was developed by the PI and his research collaborators.

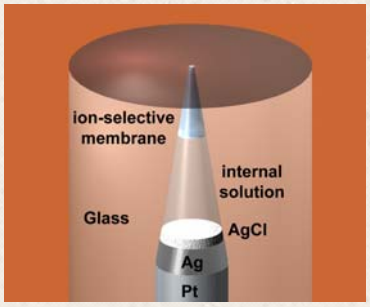
TECHNOLOGY

The overall goal of this Center in year one was to develop a broad range of chemical and biochemical sensor products based on the glass nanopore platform. The core technologies are the GNP electrode and GNP membrane — inexpensive sensor platforms based on single molecule and particle transport through a conical pore fabricated in glass. Prior to the Center, the members of the Director's laboratory at the UofU demonstrated prototype sensors for DNA sequencing, single nanoparticle detection, and blood ion analysis. In the first, year the core technology was extended to preparing nanopores from fused silica, which has significant advantages in broadening the range of applications of the nanopore concept, especially in rapid DNA analysis. Initial efforts were begun to develop manufacturing methods in order to allow sufficient quantity of devices for sale to other universities and companies for research evaluation. Research on nanoparticle analysis was scaled up by funding the research of two new graduate students.

PROGRESS

During the first year, the Center resulted in the formation of a spin-off company with its first-year goals being the acquisition of the long-term manufacturing rights for all glass nanopore devices, and developing a commercial product based on the nanoparticle sensor.

Imagine...



Detect and classify a virus or pathogen using advanced screening methods before it spreads on a large scale.

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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 (CTB) prepares and uses new biomaterials for reparative medicine, for the 3-D culture of primary cells and human stem cells, for toxicology models, and for veterinary care. In addition, the CTB developed novel anti-inflammatory sulfated and alkylated carbohydrates for dermatological and ophthalmic diseases.

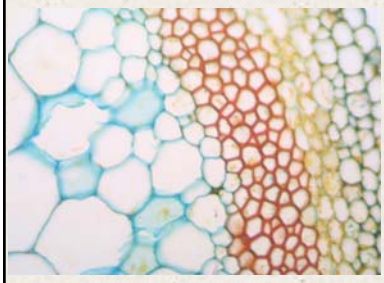
TECHNOLOGY

The CTB has established three companies based on its synthetic extracellular matrix (sECM) technology for veterinary, research/toxicology, and human device applications. In Year 3, the CTB filed two full utility and PCT patent applications (based on Year 2 provisional patents) for novel biomaterials and polymer modifications, both of which were licensed to CTB spin-out companies. In Year 4, the CTB developed, disclosed, filed patents on, and licensed a new "fall-apart" crosslinker technology which was licensed to Glycosan for its 3D cell culture products for stem cells. New nanoparticle crosslinking and oxygen-releasing technologies were reduced to practice, disclosed, and filed as patent applications. Also in Year 4, CTB developed the new sulfated and alkylated hyaluronan technology as anti-inflammatories for skin diseases. This technology, jointly disclosed and patent applied for in April 2008 with Dr. Thomas Kennedy, MD, led to the launch of CTB's fourth company, GlycoMira LLC, a development stage pharmaceutical company in Salt Lake.

PROGRESS

The Center for Therapeutic Biomaterials has been able to successfully sell their 3-D cell cultures through Glycosan Biosciences, which is also a COE 2007-08 Licensee Grant Recipient. The Center has also been able to evaluate trials through in vivo and 2-D cell cultures. CTB and Glycosan have developed coated beads and microsponges for large scale 3-D protein production. The Center has successfully accomplished and developed mice with human livers as toxicology models.

Imagine...



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

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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 for Thermal Management Technologies is commercializing selected space-based thermal technologies that present the highest opportunities for scaled, high-value civilian and military markets. Such arenas include remote sensing, homeland security, national defense, classified surveillance, computers, electronics, transportation, communication, the broader aerospace industry, and wherever improved thermal management is critical to system performance.

TECHNOLOGY

The first of TMT's technologies is the *Flexible Thermal Link* which provides an effective heat path between two components while minimizing any mechanical interaction. Flexible link applications include infrared (IR) imaging in satellites, military vehicles, aircraft, missiles, and security and night vision systems.

Channel-Panel, a second TMT technology, is a hermetically sealed, light-weight, sandwich-type panel with a two-dimensional grid of channels inscribed on the inner surface of the outer skin and containing a two-phase working fluid. These panels have been demonstrated to transport heat orders of magnitude more effectively than much heavier solid metal plates of similar dimensions.

Fiber Support Technology provides an orders-of-magnitude better way of mechanically supporting and thermally isolating a component than competing technologies. 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. *Thermal Switches* are among the other TMT technologies in the commercialization pipeline. High volume applications include transient cooling of electronics in missile deployment.

PROGRESS

A deployable space radiator panel was designed, fabricated, and delivered to SpaceDev for further evaluation. Contact with PCB manufacturer is ongoing. Concept designs for reconfigurable thermal panels has been submitted to DARPA. Laser cutting, welding, and powder deposition techniques have been extensively researched. A break through in molding techniques was achieved, potentially enabling lower cost manufacturing. Plans for a spin-out company have been further evaluated, refined, and implemented. A new company, Thermal Management Technologies, LLC has been organized and launched.

Imagine...

A thermal link that can provide heat flow ten times better than the leading products in the market today.

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Unmanned Air Vehicles

BRIGHAM YOUNG UNIVERSITY

DEFINITION OF CENTER

The Center for Miniature Unmanned Air Vehicles is focused on the development of technologies that extend the capabilities of autonomous miniature air vehicles (AMAVs) and to license those technologies which are commercially viable.

TECHNOLOGY

The technologies developed through this program will significantly enhance autonomous miniature aerial vehicle capabilities for commercial and military applications. Research continues on a broad array of enhanced operational features including:

- Easy-to-use operator interfaces
- Vision-based control technologies
- Integrated MAV/SAR system
- Chemical sensing from a MAV platform
- Point source localization
- Tailsitter MAV with hover/perch-and-stare capability
- Integrating onboard vision processing hardware (Helios) into ground station & autopilot
- Vision-based control using Helios
- Vision-based obstacle avoidance

The Center's research in these technology areas has been driven primarily by military needs, but as civil and commercial opportunities develop, these technologies will have application to all markets. These technologies will be licensed to companies like Flying Sensors for commercial applications and Procerus for military use. These components will be packaged into product and service-based solutions for both industries. As expansion into the commercial market continues, additional features will become critical to sustain market share in aerial surveillance, monitoring, and measurement (ASMM) markets. Each of these technologies has generated interest from potential customers and some have licensing partners already identified.

PROGRESS

The Center's companion spinout, Flying Sensors, was also funded for 2007-08 to enhance the commercialization of these technologies.

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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2007-2008 Funded Licensees (Companies)

Dynamic Screening Solutions

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

DEFINITION OF COMPANY

Dynamic Screening Solutions, Inc. (DSS), formerly Universal Application Systems, provides simple solutions to the headache of paperwork. These solutions return legible, complete, electronic forms in a known format for ease of processing while providing robust administrative tools that help view, track, store, and report data. Using its licensed technology called The ONE Application, DSS created the award winning Utah Clicks System, www.utahclicks.org, that helps Utah citizens complete and electronically submit the paperwork for Medicaid, CHIP, Head Start, Baby Your Baby and others.

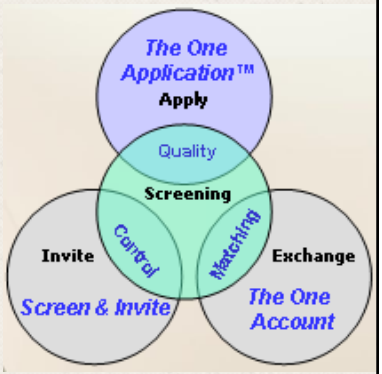
TECHNOLOGY

The ONE Application platform is the basis for the Center's ONE Application solutions. It provides technologies that enable customers to manage their paperwork process easily and efficiently. It is called The ONE Application because it combines application questions seamlessly so that clients feel as if they are only filling out one application. The ONE Application system gathers required information and populates the correct forms. The ONE Application can be deployed either as a J2EE application or as a stand-alone ColdFusion web application. The ONE Application incorporates the PostgreSQL open source database or SQL Server database. Other database implementations are also available.

PROGRESS

DSS launched from USU in 2007 as a C corporation and continues to operate and generate revenue from its base in Logan, UT. Similar systems have been set up for the states of Oregon and Indiana. Its web-service called Utah Clicks won a 2006 Innovation Award from the Council of State Governments. The Company continues to improve their technology and look for ways to expand their business.

Imagine...



Being able to fill out a single application for multiple programs including Medicaid, CHIP, and others.

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Flying Sensors

CENTER SMALL BUSINESS SPIN-OFF

DEFINITION OF COMPANY

Flying Sensors, a Licensee of the Center for Miniature Unmanned Air Vehicles, provides industry and government agencies cost-effective, fully-integrated, aerial sensing solutions. Integrated sensors include photograph, video, infrared, chemical, meteorological, and particulate sensors. 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 video production company. Flying Sensors has provided promotional videos to many State offices within Utah and other states. 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 hosts many different integrated sensors such as cameras, videos, IR, meteorological, and chemical. This allows for the collection of 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 through new ideas and prototypes. Through the bad economy they have continued to further develop the aerial technologies and have included an airship in their new offerings.

Imagine...

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

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Glycosan BioSystems, Inc.

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

DEFINITION OF COMPANY

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

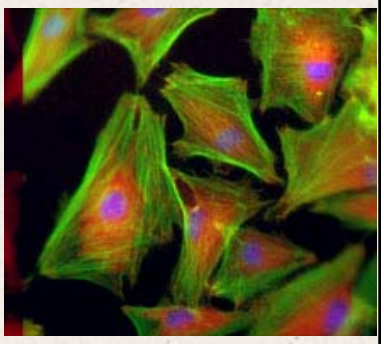
TECHNOLOGY

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 Research Foundation. Extracel is a synthetic extracellular matrix (sECM) 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 of the material, and by the founding of Sentrx Animal Care, Inc. for veterinary applications.

PROGRESS

Glycosan BioSystems has signed a preliminary supply agreement with a global cell culture company to sell and market Glycosan's Extracel line of products in the field of general 3-D cell culture. Glycosan has also signed a supply agreement with another global cell culture company to sell their HyStem line of products in the field of cultivating stem cells, Cell Therapy, and Regenerative Medicine. Sales are steadily growing for the company from website and distributor sales worldwide.

Imagine...



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

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Larada Sciences

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

DEFINITION OF COMPANY

Larada Sciences, a licensee of the Center for Alternate Strategies of Parasite Removal, will develop, manufacture and market medical products and services based on a warm-air treatment for head-lice infestations – the core technology generated from the Center. Key products include a durable medical device (the LouseBuster™) and associated single-use disposable kits marketed primarily for institutional sale to healthcare professionals. Lice eradication treatment services using the LouseBuster products will also be marketed via licensed service providers. The company will sell these products and services through established medical product distributors and sales organizations, and through a small inside sales force for direct sales.

TECHNOLOGY

The principal company technology encompasses a new device and procedure to offer healthcare professionals a breakthrough, non-chemical solution for eliminating head lice infestations. The LouseBuster™, kills lice and their eggs with a large volume of warm air delivered to the patient through a special applicator that exposes lice and eggs clinging at the base of hair shafts to the air. Clinical research has demonstrated the device is safe and effective, killing virtually all eggs and a majority of hatched lice.

PROGRESS

The Company has accomplished two complete product design cycles and conducted significant development work toward the final commercial design of the product. The team has greatly refined the original University device and the disposable applicator for improved performance, reduced manufacturing cost, and power efficiency. These engineering refinements allowed them to pass all of the applicable UL and IEC 60601 safety certification requirements – a major milestone. As of the close of FY 07-08, they have also conducted most of the clinical investigations necessary for submitting a 510(k) pre-market notification to the FDA, the approval of which is necessary before marketing the device in the US.

Imagine...

A very effective non-chemical solution for eliminating head lice and other parasites.

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Nano-Oxides, Inc.

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

DEFINITION OF COMPANY

Nano-Oxides, Inc., a licensee of the Center for Nanosize Inorganic Material Powders by Molecular Decomposition. The company's main focus has been to synthesize and market nanosize powders of various oxides. The powders are used in chemical industries in many various forms. These powders are used as catalysts, fillers in polymers, precursors for the fabrication of fuel cells, capacitors and other energy-related devices. The technology's novelty comes from the uniqueness and relatively low cost of its fabrication process.

TECHNOLOGY

The company has licensed technology from the University of Utah which is protected by three issued patents, and one that has been applied for. The principle company technology is on the synthesis of nanosize oxide powders in the 5 to 50 nm range. The powders are made by molecular decomposition. While other nano powder producing faculties can become expensive and yield less product, the processes developed at this company uses a patented molecular decomposition process to save on both product costs and equipment.

PROGRESS

Three patents have been licensed from the University of Utah. The company has sold powders to many national and international businesses. Nano-Oxides also sells products to many universities and research institutes. The company has been able to successfully synthesize Fe_2O_3, Fe_3O_4, metallic Fe, yttria-stabilized and un-stabilized 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. Its fully running website www.Nano-Oxides.com has already received orders through its purchasing applet and local companies have shown investment interest.

Imagine...

Reducing the price of the basic materials used in fuel cells, capacitors, and other catalyzing agents while at the same time maintaining efficiency and quality.

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Navigen Pharmaceuticals, Inc.

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

DEFINITION OF COMPANY

Navigen Pharmaceuticals is a licensee of the Center for Vascular Biotherapeutics. Navigen is a biotechnology company formed to develop therapeutics that address the vascular instability that underlies a variety of important disease states. Navigen's initial focus is on therapies to resolve hyperpermeability and neovascularization. Disease states that Navigen's therapies address include, but are not limited to, acute respiratory distress syndrome, retinopathies (including both wet and dry age-related macular degeneration (AMD) and diabetic retinopathy), arthritis, and cancer.

TECHNOLOGY

The company's technology base comprises the complementary but distinct technologies of two University of Utah scientists, Dr. Dean Li, Benning Professor of Medicine and Cardiology at the University of Utah, and Dr. Kang Zhang, Director of Ophthalmic Genetics of the Moran Eye Center and Associate Professor of Ophthalmology and Visual Science at the University of Utah. Dr. Li has identified novel molecules mediating vascular stability while Dr. Zhang's technology identifies a new approach to limiting neovascularization and vascular leak in the eye. Their lead therapy is protein therapeutic Slit2N which has arisen from Dr. Li's research.

PROGRESS

Navigen has continued to advance its therapies and has filed five additional patents since licensing the technologies from the University of Utah. Navigen recently entered a research and development collaboration with a large pharmaceutical company for the development of Slit2N in retinopathies. Under this collaboration, Navigen will receive $7 to $9 MM over three years.

Imagine...

NAVIGEN™ PHARMACEUTICALS

A small protein that can aid in repairing vascular instability caused by various diseases such as acute respiratory distress syndrome, retinopathies, arthritis, and cancer.

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Philotek, LLC

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

DEFINITION OF COMPANY

Philotek, LLC is a licensee of the Center for Microarray Technology and its focus is commercialization of a suite of next generation microarray technologies licensed from the University of Utah. The company plans to do this by forming product development and distribution relationships with existing companies that are well-established in their space.

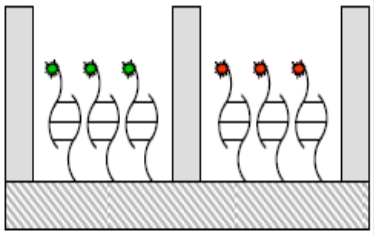
TECHNOLOGY

The company technology covers three main areas. The first is that they have the highest sensitivity microarray substrates available on the market, a significant 2-3 times more sensitive than the closest competitor and 10-12 times more sensitive than the standard substrates now on the market. Second, the company has real time analysis software to measure the progress of gene-to-gene binding reactions. This results in many data points, much greater accuracy in analyzing the gene-to-gene binding reactions versus the single, much less reliable data point taken at the end of the binding reaction used in current protocols, and potentially much faster time to results. The third area is microarray assay technologies to measure single nucleotide polymorphisms, DNA methylation, and a generally applicable simplification (called CDA) of microarray formats to pre-label genes rather than to have the end user perform an expensive and time-consuming labeling preparation themselves.

PROGRESS

The Company licensed from the University of Utah all of the applicable disclosures and inventions emanating from the Center for Microarray Technology. Philotek partnered with the U of U Center team to apply for a $1.6 million FastTrack NIH grant to fund the development of the real time software and CDA technologies in the field of performing mitochondrial DNA analysis using microarrays – a breakthrough from several perspectives. Philotek also filed another NIH grant at the end of 2007 to study the genes associated with epilepsy using real time software and the Company's high sensitivity microarray substrates. The Company developed commercialization plans for market opportunities with respect to developing all of the originally licensed technologies.

Imagine...



Viewing microarray substrate concentrations real time, with much greater sensitivity than the current technology available.

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State of RT

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

DEFINITION OF COMPANY

State of RT is a Licensee of the Center for Interactive Ray-Tracing & Photo-Realistic Visualization, and was formed to commercialize the interactive ray tracing technologies developed at the Center at the University of Utah over the past decade.

The company focuses on "ray tracing", a software method for generating more visually compelling and accurate images than those produced by current graphics hardware such as that produced by ATI and NVIDIA. The State of RT team is working on improving the features and robustness of Manta Ray, a software program developed at the University of Utah. The Manta Ray is a program plug-in that emphasizes speed, and is the most flexible high speed ray tracer in the world today.

TECHNOLOGY

Two main software products, Manta and Galileo were the cornerstone of the original development at the Center and were built on three key patents. This technology exploits parallel processing to render highly realistic images in real-time. The core ideas are now being incorporated into products at NVIDIA.

It is the company's plan to commercialize the ray tracing plug-in application for leading industry visualization and 3-D animation tools such as 3ds Max and Maya. The value of starting with these industry leading partners is that they are already established as leaders across a range of video game, film and manufacturing markets. The plug-in application will be called Manta Ray. This first commercialization step will further harden the Centers unique ray tracing engine, which will then be reused and improved upon to enter other market opportunities ahead, with its first follow-on target being interactive ray tracing video games, a $50 billion market growing at twice the rate of film and television.

PROGRESS

State of RT was acquired by NVIDIA Corporation in the Spring of 2008. The employees of State of RT opened the Salt Lake City branch office of NVIDIA.

Imagine...

A way for video game programmers and television producers to manipulate scenes and images to make them more realistic than ever before.

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VisualShare, LLC

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

DEFINITION OF COMPANY

VisualShare, a Licensee of the Center for Electronic Medical Education, provides software solutions for image sharing and collaboration, with a focus on the medical industry. VisualShare builds applications for organizations that need to share images, conduct reviews and document results. One of VisualShare's initial markets is Tele-health applications that serve geographically distant communities. The company products establish a framework to support image-centric collaboration and sharing. The framework stores all collected information in a single record that can be re-used for many stakeholder requirements, such as internal or external reviews, quality assurance/quality control, audit, and evidentiary logging purposes.

TECHNOLOGY

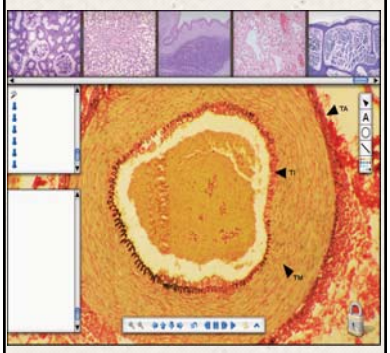
VisualShare's technology includes TeleCAM™, a solution for expert review of child abuse. The Center also has VisualStrata™, which is an on demand solution for internal/external review of clinical imaging in pathology, ophthalmology and cardiology.

PROGRESS

VisualShare has recently been issued a United States patent and has two divisional patents pending. TeleCAM™ is the underlying telehealth technology for diagnosing child abuse as part of a public-private network with Intermountain Healthcare's Center for Safe and Healthy Families and the Utah Attorney General's office.

VisualShare technology has been launched into a National telehealth program for addressing the needs of primary care in rural and underserved communities in Minnesota, Alaska, Nebraska, South Dakota, Maryland and New Hampshire.

Imagine...



Being able to collect, publish, review, share, and collaborate your documents, worksheets, images and other files with one software application.

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2007-2008 Business Team Grant Recipients

These teams received Business Team support during the 2007-08 year of $25,000, on average, to help mature their business plans and move closer to commercialization.

Biomolecular Nanophotonics

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

DEFINITION OF CENTER

The Biomolecular Nanophotonics team develops chemically engineered micro/nanosystems to dramatically improve the performance of Nucleic Acid Amplification and Detection. Currently they are characterizing electromagnetic interactions with biological materials for sensing, optoelectronics, biomedicine, and microscopy.

The team expects that these improvements will radically improve diagnosis of gene disorders and development of gene therapies, including RNAi. This would allow for more efficient and quicker diagnosis and treatment of human diseases.

TECHNOLOGY

Many advances by the Center were made using proprietary antennae called Optical Plasmon Capillaries developed and fabricated in the proposed Center for Biomolecular Nanophotonics. The Center uses a rectangular silica capillary coated on one surface with gold that covalently binds a proprietary chemistry which attaches to a hexagonal virus. Free electron plasmons, induced to vibrate by incident polarized green light, are shifted from blue to red by unlabeled virus that binds to the gold chemical surface. Binding produces an optical signal. Plasmon capillaries are coupled to a remote source of electromagnetism and integrated with a detector to produce a surface plasmon resonance (SPR) system.

PROGRESS

With assistance from their COE funded Business Team members, Biomolecular Nanophotonics has successfully been able to spin off a startup company, Celux Scientific, LLC in Jan, 2008. In the last 2.5 years, with funding from National Institutes of Health, Environmental Protection Agency, Millipore Corp., UofU and local sources, researchers in the proposed Center have been able to couple electrons to visible light in a new way to destroy bacteria ≥200% more effectively. With this, they have also identified new ways to catalyze protein interactions ≥1000% faster.. They have developed many other detection methods and interaction properties with no dyes or labels.

Imagine...

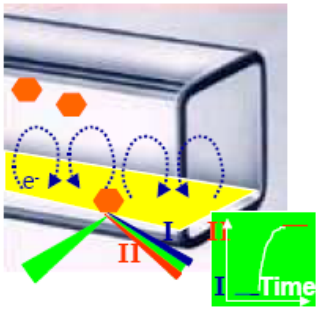

Figure 1. Virus detected in plasmon capillary

Detect and classify a virus with up to 100x better resolution and as much as 100x faster than conventional methods.

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Management of Provenance & Exploratory Workflows

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

DEFINITION OF CENTER

The Center for Management of Provenance & Exploratory Workflows provides novel techniques and user interfaces that streamline exploratory computational processes, such as data mining, simulations, and the construction of insightful visualizations. Applicable industries include medical imaging, digital artistry and modeling. This project will transition existing university developed technology into commercial products. Specific objectives include the development of a high-quality licensable "core" library, a plug-in architecture, and a spin-off company, VisTrails, Inc. aimed at the 3-D animation software market.

TECHNOLOGY

The Center at the University of Utah continues to generate new technologies along with new patents. The spin-off company, VisTrails, Inc., has used the core VisTrails library to create a plug-in application for AutoDesk's Maya software system and Kitware's Paraview visualization system.

PROGRESS

The Center has established a spin-off company, VisTrails, Inc., incorporated as a Delaware Corporation, and based in Salt Lake City. Over the past year, VisTrails, Inc. obtained funding from the National Science Foundation (SBIR phase I and IB) the Department of Energy (SBIR Phase I) and the University of Utah (VIP award). With these funds and the help of the COE Business Team, the team created plug-in applications for Maya and Paraview. Both applications are in Beta.

Additionally, VisTrails, Inc. demonstrated at SIGGRAPH '08 in the VisTrails, Inc. booth. The demo was well received and generated over 150 leads from the conference. In Feb. 2009 VisTrails will present at the Wayne Brown Forum in Midway. This will be the start of the company's fund raising efforts.

The Center has filed 5 patent applications and has also developed a comprehensive business plan. They are also beginning to build relationships with potential partners and customers

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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MIMO Communication Systems

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

DEFINITION OF CENTER

The Center for MIMO Communication Systems started the year as an academic center with a series of patent pending MIMO algorithms developed by its director. The Center's goal, along with its companion spinout, is to work with an outside ASIC development team to develop and market a prototype "System On Chip" that uses the MIMO Center's primary patents.

TECHNOLOGY

Dr. Behrouz Farhang-Boroujeny has invented a family of algorithms for reducing the complexity of the signal detection and searching process from exponential to linear. So, instead of requiring 2^X searches - the system requires Xn searches, where n is a fixed number in the range of 10 to 30. As an example, while the current three antenna system needs 4096 (2^{12}) searches, 12n searches suffice using this technology. A new system with six antennas could be deployed (using this technology) for the same processing costs of current two antenna systems.

The complexity of the signal detection and searching process has presented the industry with a natural limit on the number of transactions which could be performed cost effectively. This innovation has eliminated this natural limit. It is, by definition, a breakthrough technology.

PROGRESS

During the course of the year, the Center launched a spinout company called Advanced Signal Detection, Inc. – which is a firm entirely founded on the algorithms developed by the Center's director. At the end of the year, despite a very difficult economic climate, Advanced Signal Detection is nearing its first infusion of capital. As a business, a decision was made to secure the funding necessary to build the technology and then to sell the resulting technology. So, the role of the Business Team Partnership was entirely focused on securing capital for development and operational purposes. Accomplishments in terms of raising capital is a fairly straightforward thing. While the capital has not been raised, progress has been achieved to an unexpected degree.

Imagine...

Advanced Signal Detection

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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Nanomedicine Applications in Cancer

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

DEFINITION OF CENTER

The Center for Nanomedicine Applications in Cancer received a Business Team grant to support the commercialization efforts for its novel, targeted nano-scale drug delivery systems for diagnostic and therapeutic purposes. The propriety technology consists of a nanoglobular delivery system capable of transporting more than one agent at a time to solid tumors in the body; e.g., contrast agents for imaging and detecting tumors, peptides for targeting tumors and chemotherapeutic agents for treating tumors without invasive surgery. The team believes its nanoglobules are the first and only rigid, three-dimensional synthetic biomaterials developed for biomedical applications. The water-soluble drug carrier is capable of orally delivering anti-cancer drugs directly to targeted organs and tumors in unmodified forms and swiftly eliminating the drug from the normal tissues of the body.

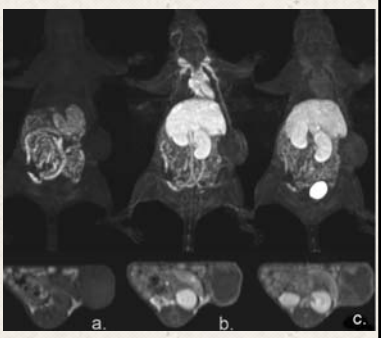
TECHNOLOGY

The initial product is a biodegradable macromolecular MRI contrast agent that can be attached to the nanoglobular delivery system and transported to solid tumors for imaging and detection. The Company's longer-term strategy is to non-invasively treat solid tumors by using its nanoglobular system to deliver therapeutic agents directly into cancerous tumor cells via targeted peptides. Features of the nanoglobular technology include oral administration, specific delivery of drug to targeted sites, and rapid clearance from the normal tissues of the body. The benefits include safer and more accurate cancer detection and more effective treatment than currently available procedures.

PROGRESS

ContraDyn, Inc. is a spinout of the Center which was incorporated in 2006. The Center has effectively demonstrated the feasibility of its contrast agents for non-invasive evaluation of therapeutic efficacy of an anticancer treatment with MRI. The center is now developing site-specific nanoscaled drug delivery system for cancer therapy. Monthly meetings have been organized with the Business Team. With the help of Business Team members, two requests for funding have been submitted to the National Cancer Institute for preclinical development of our contrast agents.

Imagine...



Being able to transport cancer fighting drugs easily and safely to targeted tissue through a carrier macromolecule.

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Nanoparticle Production

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

Cosmas, Inc. is a new licensee emerging from a Center of Excellence Business Team grant to the BYU Center for Nanoparticle Production, formerly the Center for the Production of Nanometer Sized Metals, Alloys, Metal Oxides & Mixed-Metal Oxide Powders. It will commercialize a very low energy process to produce a nearly unlimited array of different, high-quality, well-defined inorganic nanoparticles. It is positioned perfectly to take advantage of the emerging field of nanomaterials, which is just now seeing its first commercial applications. The European Commission recently published a comprehensive report which predicted that the nanomaterials market will reach 300 Billion Euros by 2015. It is the goal of Cosmas, Inc. to use strategic partnering to become a leading international supplier of nanoparticles.

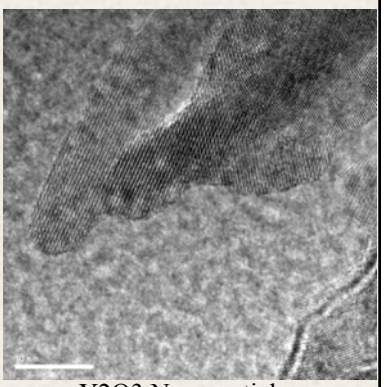
TECHNOLOGY

The Center has developed a unique synthetic method to produce a wide range of inorganic nanoparticles. They can successfully produce metal oxide nanoparticles of up to 75 different elements with little variation in the production method. The Center can make mixed metal oxide nanoparticles of any combination of any number of metals in any exact ratio, one of the most attractive features of their products. They can produce very small particles typically less than 10nm and as small as 2 nm, quite a breakthrough in size and consistency in the industry. The small size increases surface area for chemical applications and it increases efficiency in coatings. The Center can also control particle size variation, make crystalline particles which retain physical properties of the bulk material, with purity levels as high as 99.9999%.

PROGRESS

In this past year the Center has developed commercial partnerships with a variety of established chemical companies around the world. The team is currently developing these partnerships for potential commercial applications and sales. They have also scaled the process to easily produce kilogram quantities per day. Along with producing larger quantities of particles, they have developed processes to disperse the particles.

Imagine...



Y2O3 Nanoparticles

Be able to synthesize nanoparticles at a lower cost and faster than the current methods, at a purity as high as 99.99999%.

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Brian_woodfield@byu.edu

Resveratrol Technology

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 Center for Resveratrol Technology at Brigham Young University has developed stable analogs of resveratrol in order to commercialize novel applications such as topical (skin and hair), nutritional supplements and pharmaceutical products. The Center received a Business Team grant for the 2007-08 fiscal year to try and assist the team in their commercialization efforts.

TECHNOLOGY

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's concept was to commercialize stable analogs (synthetic) versions of resveratrol to improve shelf life of compounds.

PROGRESS

The Center for Resveratrol Technology was unable to fully utilize their Business Team during the 2007-08 fiscal year and no progress was reported to the Centers of Excellence Program.

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Water Treatment Technology

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

DEFINITION OF CENTER

The Center for Water Treatment Technology (formerly Tero Technologies) received a 2007-08 COE Business Team grant. With the help of the Business Team, the Center created the spinout company Wastewater Compliance Systems (WCS), Inc. WCS addresses the need of wastewater lagoon operators who seek to comply with state and federal environmental regulations by improving efficiency and capacity of existing systems without dramatically increasing capital or operating costs. Using patented technology licensed from UU-TCO, the company provides evaluations, installation and monitoring services to wastewater lagoon operators.

TECHNOLOGY

Lagoon efficiency and utilization can be dramatically improved by creating biological conditions to enhance growth and development of diverse microbial colonies. Such colonies thoroughly consume water-borne contaminants, but exist only within a thin bio-film attached to a submerged surface exposed to varying degrees of aeration; from highly aerated aerobic zones to lesser aerated anoxic zones. Beneficial bacterial colonies also require protection from sunlight, a warm environment, and proper air-nutrient mixing.

All these conditions are satisfied with the Center's patented Poo-Gloo® submerged devices. Poo-Gloos® consist of several concentrically nested domes that economically remove water-borne containments by enhancing the growth of naturally occurring bacteria. These bacteria effectively reduce biochemical oxygen demand, total suspended solids, and ammonia (NH_3/NH_4^+) in wastewater prior to discharge. Other compounds are also removed.

PROGRESS

WCS, Inc. was formed under a Business Team partnership in February, 2008. By December 31, 2008, WCS profitably completed commercial beta projects at two Utah municipalities. Currently, WCS employs seven full and part-time persons to support 2009 operations. The Company is currently closing an initial seed investment round from the angel investor community.

Imagine...

A device that could dramatically increase the purification process of lagoons without a large investment of capital or operating costs.

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Web IDEA*SIS

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 Web IDEA*SIS is part of USU's Summit Research, which is made up of educators, researchers, and computer experts who are interested in helping educators and administrators do their jobs easier, better, more cost-effectively and in a more legally compliant way, with an initial focus on the Special Education marketplace and the requirements of the Individuals with Disabilities Education Act (IDEA). The Center sees their markets as individual schools in the Bureau of Indian Education (BIE) system, single school districts, and small consortia that cannot attract or afford the companies currently doing expensive and less effective custom web-based software. Through the IDEA*SIS software and their software support and training services, the Center offers expertly designed and written web-based programs and training materials for teachers and administrators. They also offer expertise in helping educators to collect the data they need to satisfy the ever-changing IDEA and monitoring requirements, and understand Special Education procedures, requirements, and changes.

TECHNOLOGY

Current technologies and their plan for this fiscal year include the use of a flexible and complete set of "generic," but "up-to-date" forms and reports to keep start-up costs low. The Team has implemented the use of online training materials and WYSIWYG screens and printed forms to reduce initial training needs. The Center looks to provide comprehensive Special Education administrative reports, and a superior special education partnership and close-to-the customer computer support services and response systems.

PROGRESS

Through the Business Team Partnership, the Center has accomplished the following goals. They have successfully created Summit Research, LLC, and begun preparations to take the products to market. The Center has established sales, invoicing, and accounts receivable processes, and also has implemented a web-based contact management system.

Imagine...

IDEA SIS

Improve education, research, and administration through web based programs designed to be more efficient and more cost effective.

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Program Description

PROGRAM DESCRIPTION

BACKGROUND - "OUR JOB IS JOBS"

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.

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 encouraging entrepreneurs to partner with Utah colleges and universities, to effectively commercialize technology from these institutions.

Licensee Grants Come to Fruition During 2007-08

During the 2007 Legislative Session, the Legislature passed and the Governor signed law changes to the COE statute that permitted ongoing support of grants to Licensees of technologies developed at Utah's colleges and universities. Due to these changes, during the 2007-08 selection process, Licensees of any former Center of Excellence were eligible to apply for a Licensee Grant.

For 2007-08, the funded teams included 9 Licensees, 3 of which had companion Centers which were also recommended for funding. Another 8 standalone University Centers received funding, for a total of 11 University Centers, and a final 8 University Teams were received Business Team support, which is intended to develop a better understanding of the market before further grants are made. For 2007-08, the Centers of Excellence program supported a total of 28 teams, and 25 different technologies, with 20 selected for significant development funding.

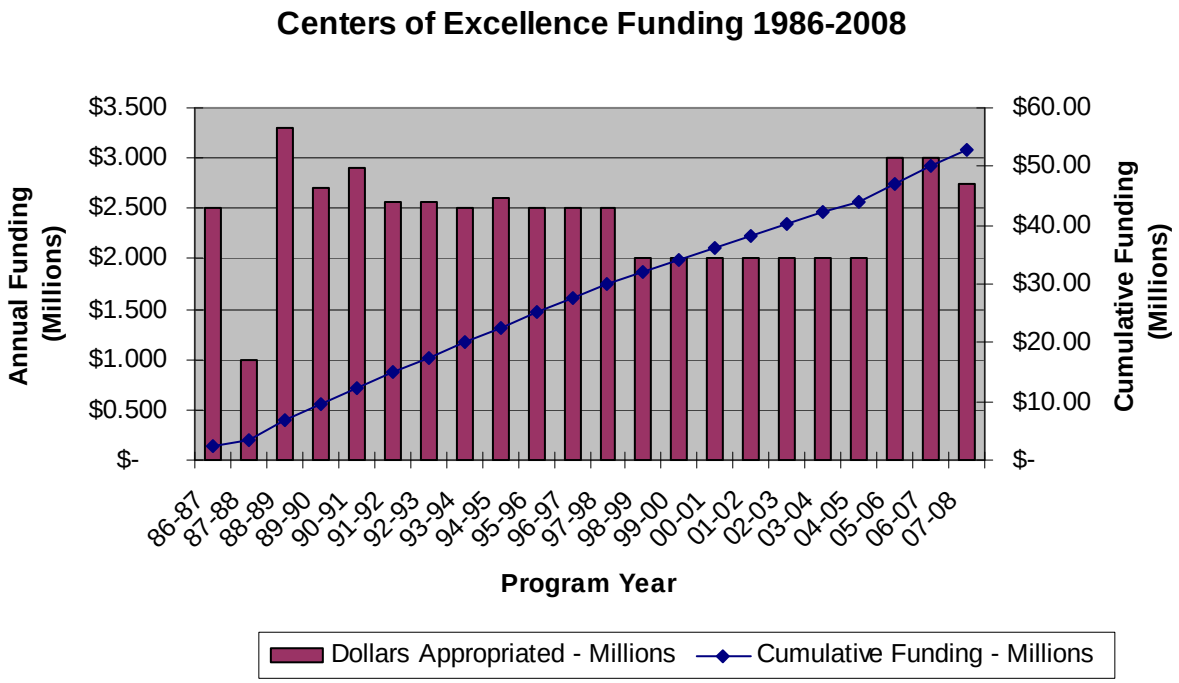
The excellent progress made by the Licensees funded during 2007-08 in creating jobs and expanding the success of their businesses and strengthening Utah's economy led to significant changes to the program for 2008-09. The program has been refocused to help provide funding to the Licensee, the company that is licensing a university-developed technology.

The intent of this grant funding is to help accelerate the process of taking these leading

edge technologies to market. Companies of any size are eligible to apply, including startups as well as existing companies that are planning to create a new product or product line from the licensed technology. The goal of these funds is to help defray the risk in taking these innovative new technologies to market in order to encourage more such licensing and the accompanying job creation that comes from exciting new market opportunities.

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. Since the 2005-06 fiscal year, annual funding has stood between $2.75 million and $3 million. The historical annual and cumulative totals, standing at $52.89 million at the end of the 2007-08 fiscal year, are shown in the graph below. During the 2008 Legislative session, $2.75 million was allocated to the Centers of Excellence Program for the 2008-09 fiscal year.



FUNDING ONGOING SUCCESS

Success Story #1 – VisualShare

VisualShare is a pioneering life sciences software-as-a-service healthcare technology company. VisualShare provides technology that permits remotely located medical professionals to share images as well as notes and information about those images, providing access to high quality medical care and specialists for patients everywhere. This is the first solution available in the marketplace that provides real-time image collaboration across clinical locations.

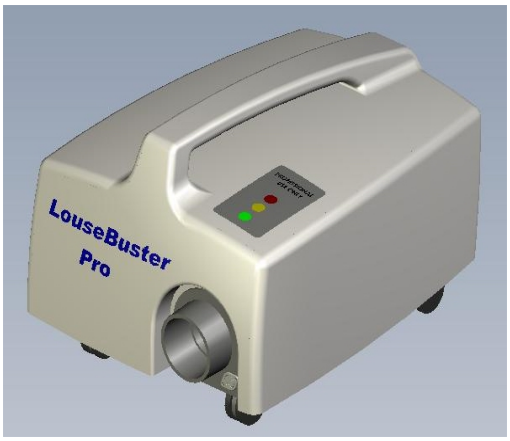
VisualShare, established in 2005, is a spin-out of the Center of Excellence for Electronic Medical Education (CEME) at the University of Utah and is also a Licensee Grant Recipient. The Company develops image-based decision support solutions for telehealth and diagnostic imaging as part of an exclusive license to all intellectual property developed in CEME.

As a Licensee grant recipient, a major goal of the Company was to use the COE funds to create two new sales and marketing positions that focused on creating brand awareness, develop a marketing plan and expand existing customer/sales pipeline. "I am grateful for the COE program because it has allowed VisualShare to hire the necessary expertise in sales and marketing that, in turn, has led to an increase in sales revenue more than five times from the previous year" says Patricia Goede, President and Co-founder.

In addition to funding new positions and thereby creating jobs for Utah, the relationship with COE provided access to business expertise that allowed the Company to gain feedback on go to market strategies, develop a business pitch and prepare for fundraising. Associates of the COE program carefully reviewed and critically evaluated the business model and facilitated introductions to the business community that led to introductions to the larger investment community. "The COE program contributes tremendous value in helping to develop a network of opportunities for companies and the Utah business community" states Goede "the human resources at COE take a hands on approach and are very supportive of each center".

Success Story #2—Larada Sciences

Larada Sciences Inc. formed in 2006, delivers medical products and services based on breakthrough technology, for the safe and effective non-chemical treatment of head lice. Pediculosis (head lice) is a multi-billion dollar problem that afflicts about 25% of children by the time they're teenagers and the problem is growing rapidly because head lice are evolving resistance to many of the currently used lice pesticides. Larada's first product, the "LouseBusterT", is a medical device that uses a high volume of warm air to kill head lice and their eggs, in a way that is completely chemical-free, safe, effective, inexpensive, and requires only one treatment lasting about 30 minutes.



Larada Sciences is a spin-out company of the University of Utah Center for Alternate Strategies for Parasite Removal. The LouseBuster technology was the driving innovation behind the Center. This device (the "LouseBuster™"), kills lice and their eggs with a large volume of warm air, precisely temperature-controlled, that is delivered to the patient through a special applicator that exposes lice and eggs clinging at the base of hair shafts to the air. Preliminary trials have demonstrated the device is safe and very effective, killing virtually all eggs and a majority of hatched lice, leading to cure rates of virtually 100% from a single 30 minute procedure. Patents are pending and licensed, and full clinical trials are currently underway that will lead to FDA clearance and CE marking. The company will soon be ready to complete the final product design and certification testing, then scale-up for manufacturing and market entry.

COEP funding has helped Larada achieve significant milestones including:

- Developing critical proof-of-concept and working prototypes
- Attracting matching funds for research and development
- Attracting research and distribution partners
- Expanding intellectual property rights
- Securing a major round of private investment capital

"We consider our relationship with the COEP and the State of Utah more than a small affiliation. The plain truth is that Larada Sciences would have never gotten off the ground or grown, or been able to grow as fast as we have without the financial support of the COEP". Randall Block, President & COO

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"

Selection Process

For the 2007-08 selection process, the Centers of Excellence program kept in place last year's changes to the selection process which proved to be very effective.

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 34 volunteer reviewers, 13 of them new to the program this year. Together the Advisory Council contributed more than an estimated 600 hours of volunteer time to the selection process. For the 2007-08 selection year, the COE Advisory Council conducted 55 reviews, including 9 that included both a University Center proposal and a Licensee (company) proposal, for a total of 64 funding opportunities. There were 41 university proposals, and 23 Licensee proposals, including the 9 "companion" Licensees. The funding requests totaled $10,050,656, more than 3 times the COE budget of approximately $3 million. After completing these 55 separate review meetings, the reviewers met in 3 sub-committees. These sub-committees are:

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

Each sub-committee, comprised of the reviewers in that area, met for a 5-6 hour sub-committee meeting where they discussed each proposal, evaluated the proposed funding request, and made the initial recommendations for funding and amount of funding. Each proposal that was recommended for funding also received a score on a scale of 0-5 (5 is high score). The average of the reviewers score was assigned to the proposal, and then each sub-committee's selections were ranked by score. This process narrowed the field of proposals from 64 down to 35 which were considered by the full Advisory Council.

On May 22, 2007, 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 and

voted to accept these as a group. Next, the Council worked its way down the list of sub-committee recommendations, in descending order of score, rotating through each sub-committee. The Council then either accepted the committee's recommendation, or modified the recommendation. Each recommendation was accepted by a majority vote, and the process of discussion and recommendation continued until a majority vote was reached for each proposal. At the end of the process, the Council also accepted the list of all of those proposals which were not recommended for funding. The Council then allocated approximately $186,000 to be used for a second round of business team funding and for additional business team funding for this year's Centers, under the discretion of the COE Director.

As it was last year, this process was very successful this year and allowed reviewers to go deep into 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 had to be made, given the extremely high number of proposals this year compared to last year. The key requirements for funding this year included: The potential for a technology to create a large Utah employer (100 or more employees), whether the proposing team was credible to accomplish the needed commercialization activities, and for teams already in the program, whether the program was "on track" and meeting key milestones.

Evaluation of Licensee Grant Concept during 2006-07

During the 2006-07 year, we performed an evaluation of the concept of licensee grants, providing small grants of funds to two licensees, Flying Sensors and Glycosan Biosystems. 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. Both companies' CEO's testified to the legislature of the value of these grants to their businesses, allowing them to quickly secure additional capital, sales, or both and move their businesses rapidly forward. Their success helped the Legislature support these statutory changes.

Grants to Licensees

During the 2007 Legislative session, the Legislature passed House Bill 125, attached as an appendix to this report, which permits the Centers of Excellence program to grant funds to any licensee of a technology developed at one of Utah's colleges or universities. This significant change was intended to help "bridge the gap" in the process of maturing a technology out of the university and into industry. In particular, these funds are intended to complement the friends and family and angel rounds of funding – funding which can be very challenging to get here in Utah. This funding gap can also delay the ability to take a technology to market, as it may take an entire year to

raise a first round of funding here, where it might take only 3-6 months in other parts of the country.

Throughout the history of the program, Centers spinouts have not been immune to these market dynamics. Therefore, this year, the Utah Legislature passed the bill permitting licensee grants.

It is important to understand the appropriate role of the COE Licensee grants. These are not intended to replace private capital, but to augment it. In cases where Licensee applicants this year either had received actual venture capital or had projected revenues in excess for $1million per year, the council was very clear that these were not appropriate uses of the COE licensee grant program. In cases where the team had been able to raise or was in the process of raising angel funds, the COE Licensee grants were deemed entirely appropriate in the context of the Legislature's intent.

New Concept implemented in 2006-07 - Pre-Proposal Business Teams

Last year, after reviewing 35 proposals, it was clear 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 as well as the job creation potential. Under the "Pre-Proposal Business Team" Concept, a pre-proposal solicitation went out in late summer, and applicants went through an abbreviated application process. Seven (7) additional proposals were selected for business team support in early fall 2006. Of these 7 teams, 3 received core funding this year, and another 2 were granted another full year of business team support. For these two, the Council felt that although progress had been made in clarifying the "go to market" strategy, additional effort was needed to get a complete plan in place. This year, it is hoped that we will be able to offer the business team solicitation even earlier in the year for additional time for business plan development.

FUNDING SUMMARY

For the 2007-08 selection process, the Program received a total of 64 proposals with a total of 55 reviews as 9 of the reviews were concurrent reviews of both a university Center proposal and a licensee proposal for that technology. There were 23 total licensee proposals and 41 university proposals and total funding requests exceeding $10 million.

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 (the more traditional model) were recommended for funding, for a total of 11 university Centers, and a final 8 university teams were recommended to receive Business Team support. This totals 28 teams selected for support of one kind or another, and 20 recommended for "core" support (Center or Licensee grant). This also represents 25 different technologies with support this year.

6 existing university Centers were renewed this year, and 5 new Centers were granted this year. Of last year's 28 teams which received support in some way, including 16 funded university teams and 12 teams receiving business team support, the following statistics are of interest. Ten (10) university teams were selected for funding. Of these, three (3) also had companion licensees, six (6) were existing funded Centers for 2006-07 and four (4) were awarded Business Teams last year. The last of the 11 centers selected for funding was a new Center proposal that had not received a business team last year.

Another 3 of last year's 28 teams had a licensee funded, but the center was not funded. This reflected the fact that these Centers were viewed as ready to transition into the licensee and serves as incentive for the teams to accomplish this transition completely out of the university. Three of last year's 28 teams were granted a follow-on full year of Business Team support. Finally, twelve of last year's teams were not funded. Three (3) of these completed their participation in the program and graduated, 3 did not apply, and 6 applied but were not renewed.

In addition, out of the 5 new university teams selected for funding this year, 4 of them had business teams last year and the fifth had an experienced former Center Director as a co-PI. This reflects the view of our COE advisory council that having a business team work with a Center before receiving funding helps establish confidence in the market and in the team. It is a way of reducing the risk to the taxpayer. There were many new Centers this year that had hoped for funding, but who received a business team. Of the 29 proposals for new university Centers, 8 received business team funding and 5 received core funding, for a total of 13 receiving support in some way.

Approximately $2.4million of the program budget went to "core support" grants, with

just under $1.3 million going to licensees and the remainder, just over $1.1million going to Centers. In addition, all university teams also receive business team support, which is funded separately and is expected to be $200,000 this year for 8 teams. Another $225,000 is scheduled to be invested in Business Team Grants to potential Centers.

The largest single core grant was $190k to a Licensee, and the largest "total" funding to a single technology, was $200k (a combination of a Center and Licensee). In addition, for the first time, grants were made to Southern Utah University and the College of Eastern Utah under the updated matching grant program passed in the 2006 legislative session. Under this program, non-doctoral granting schools are required to have a 1:1 funding match. Grant recipients from institutions offering doctorate degrees are still required to have a 2:1 funding match.

Funds Allocated by the Legislature + Carryover	~$3,000,000
Direct Center Funding (Technology Funding to Centers)	**$ 1,109,318**
Licensee Funding	**$ 1,285,000**
Business Team Funding for Centers*	$ 200,000
Business Team-ONLY Funding*	$ 225,000
Funding for 2007-08 pre-proposal Business Teams and additional Business Team Support	$ 180,682
* Average estimated funding of approx. $25,000 per Center customized based on Center needs. Paid and Managed directly by COEP	

2007-2008 Selection Process

Some statistics on the applicants and awardees are listed below.

Total Number of University Proposals for 2007-2008	**41**
Total Number of Licensee Proposals	**23**
Total Number of REVIEWS for 06-07	**55**
Total Number of Funding Opportunities	**64**
Existing Centers Seeking Renewal	**12**
Proposals for New Centers	**29**
Proposals from BYU	**12**
Centers + Licensees funded from BYU	**2**
Proposals from U of U	**32**
Centers + Licensees funded from U of U	**12**
Proposals from USU	**17**
Centers + Licensees funded from USU	**4**
Proposals from SUU	**1**
Centers + Licensees funded from SUU	**1**
Proposals from CEU	**1**
Centers + Licensees funded from CEU	**1**
Proposals from WSU	**1**
Centers + Licensees funded from WSU	**0**
Centers + Licensees Funded	**20**
Existing Centers Renewed	**6**
New Centers Funded	**5**
Licensees Funded	**9**
Centers with Business Team Grants	**8**
Total of Centers Supported for 2007-08	**28**
Total of Technologies support for 2007-08	**25**
Graduating Centers at end of 2006-2007 year	**3**
Existing (06-07) Centers not renewed for 07-08	**6**
2006-07 Teams that did not apply for 07-08	**3**

Centers by Technology Area	
Mat./Mfg./Energy/Environment Total	**8**
Licensee + University Core Funding	6
Business Team Only	2
Inf. Tech / Aerospace/ Defense/ Electronics Total	**9**
Licensee + University Core Funding	6
Business Team Only	3
Life Sciences	**11**
Licensee + University Core Funding	8
Business Team Only	3
Total Recommended for Funding	**28**

Distribution by University

	Centers	Biz Teams	Licensees	Total
BYU	**1**	**2**	**1**	**4**
USU	**3**	**1**	**1**	**5**
UU	**5**	**5**	**7**	**17**
CEU	**1**	**0**	**0**	**1**
SUU	**1**	**0**	**0**	**1**
WSU	**0**	**0**	**0**	**0**
Total Supported Teams	**11**	**8**	**9**	**28**

Business Team Enhancement to Accelerate Time to Market

The second year of the COE Business Team program, which uses a State RFP to recruit seasoned entrepreneurs and technology executives to assist the Centers, has been very successful. Of this year's licensee grants, 6 of them have emerged from current Centers with the strong support, and in 4 cases direct participation, of the business team members. In addition, one of the Licensees from a graduated Center also includes a former Business Team Member who spent a year to get the Licensee up and running in partnership with the Center Director.

We have been fortunate that we have been able to recruit so many experienced individuals who have been able to help foster not only the plan and strategy, but also the actual process, of taking these technologies into the market. This year's process produced 4 new spinouts, in addition to the two that received Licensee grants last year. All of these were deemed by the Council to be on a strong track for success, with experienced management in place, which reflects very well on the past 2 years of the Business Team program.

COMMERCIALIZATION PROCESS

The COE program continues to work to assist both Centers and Licensees in tapping resources and expertise to help them grow to be successful companies in Utah. The Business Team program continues and the COE program partners with a variety of existing non-profits to help teams establish industry relationships. These groups include the Wayne Brown Institute, the Utah Fund of Funds, the Utah Technology Council and the Utah Fund of Funds.

2007-2008 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. 07-08" 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	Funded Centers	07-08 Funding	Total Funding	07-08 Matching	Patents Pend. 07-08	New Patents (Issued)	Spin-Offs/ Licensees
UU	Cellular Therapy and Regenerative Medicine	100,000	100,000	655,983	1	0	2
CEU	Clean Coke Technology	125,000	125,000	488,835	1	0	1
USU	Control of Flow in Manufacturing	175,182	330,490	592,779	2	0	1
UU	Tungsten Carbide and Diamond Composite	125,000	250,000	372,853	4	0	1
SUU	High end Pharmaceutical and Biomedical Process Optimization	59,760	59,760	35,000	2	0	0
USU	Hybrid and Adaptive Multimedia Processors	50,000	50,000	98,000	2	0	1
UU	Microarray Technology	50,000	250,000	507,280	5+	0	1
UU	Nanopore Sensor Technologies	125,000	125,000	502,000	4	0	1/2
UU	Therapeutic Biomaterials	70,000	570,000	698,000	4	0	4
USU	Thermal Management Technologies	154,376	154,376	518,283	2	0	1
BYU	Unmanned Air Vehicles	75,000	481,385	675,000	0	1	2
University	**Funded Companies**	**07-08 Funding**	**Total Funding**	**07-08 Matching**	**Patents Pend. 07-08**	**New Patents (Issued)**	**Spin-Offs/ Licensees**
USU	Dynamic Screening Solutions	150,000	150,000	102,567	NA	NA	NA
BYU	Flying Sensors	125,000	200,000	325,000	NA	NA	NA
UU	Glycosan BioSystems	75,000	135,000	-	NA	NA	NA
UU	LARADA Sciences	170,000	170,000	-	NA	NA	NA
UU	Nano-Oxides, Inc.	150,000	150,000	-	NA	NA	NA
UU	Navigen Pharmaceuticals, Inc	190,000	190,000	-	NA	NA	NA
UU	Philotek, LLC	100,000	100,000	605,000	NA	NA	NA
UU	State of RT	175,000	175,000	225,000	NA	NA	NA
UU	VisualShare, LLC	150,000	150,000	939,000	NA	NA	NA

University	Business Team Grant Recipients	07-08 Funding	Total Funding	07-08 Matching	Patents Pend. 07-08	New Patents (Issued)	Spin-Offs/ Licensees
UU	Bimolecular Nanophotonics	Business team N/A	N/A	N/A	5	1	1
UU	Management of Provenance & Exploratory Workflows	Business team N/A	N/A	N/A	1	0	1
UU	MIMO Communications Systems	Business team N/A	N/A	N/A	4	3	1
UU	Nanomedicine Applications in Cancer	Business team N/A	N/A	N/A	3	0	1
BYU	Nanoparticle Production	Business team N/A	N/A	N/A	1	0	0
UU	Water Treatment Technology	Business team N/A	N/A	N/A	2	0	1
USU	Web IDEA*SIS	Business team N/A	N/A	N/A	0	0	1

2008-2009 Funded Centers

2008-09 Selection Process Completed in Calendar Q2 2008.

For the 2008-09 selection process, there were two categories of eligible applicants. First were 5 University Centers which had received their first year of funding in 2007-08 and who were eligible for a second year of funding as a university Center. The second group was any company, an existing firm or a startup, which was newly licensing a university developed technology.

For the 2008-09 Solicitation, 3 of the 5 eligible University Centers and 36 Licensees submitted proposals for a total of 39 proposals received, of which 21 Licensees were selected for funding and 1 University Center recommended for a second year of funding, bringing the total to 22 proposals recommended for a COE grant this year.

For the 2008-09 fiscal year funding recommendation, the Centers of Excellence Program continued to refine the selection process. As always, the linchpin of the Centers of Excellence program is the COE Advisory Council, anchored by members of the GOED Board and by the State Advisory Council on Science and Technology.

The COE Advisory Council is a group of seasoned technology industry executives, CEOs and CTOs, VPs and Senior Directors, who are interested in helping Utah and the Centers of Excellence Program succeed. This year there were 28 volunteer reviewers on the Advisory Council, 5 of them new to the program for 2008-09. For the 2008-09 selection year, the COE Advisory Council conducted 39 reviews of 3 University Center proposals and 36 Licensee Grant proposals. The funding requests this year were in excess of $4.5million, significantly exceeding the current COE budget of $2.75 million.

Funding Recipients for the 2008-09 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

Advanced Composite Solutions (Licensee of Center for Advanced Structural Composites – BYU) Jonathan Adams, Founder/CEO NEW as a company $100,000

Taking to market a premier composite 3D structural technology, IsoTruss® that delivers extremely high strength, very light structures. ACS has successfully introduced the IsoTruss® technology through our Delta 7 subsidiary (www.delta7sports.com) by producing high-end handcrafted bicycles. The company's long term strategy includes Recreation, Aviation & Manufacturing. New innovations include new tooling and manufacturing techniques permitting cost reduction while maintaining performance.

CastleRock Engineering, Inc (Licensee of Center for Control of Flows in Manufacturing USU) Angela Minichiello, President 1st year as Licensee $75,000

CastleRock Engineering Inc. will commercialize two technologies developed at Utah State University (USU): Aerodynamic Vectoring Particle Sorting (AVPS) and Coanda-assisted Spray Manipulation (CSM). Each technology applies flow control techniques to particle laden flow streams to improve current, and enable new, more efficient particulate based manufacturing processes.

ContraDyn, Inc. (Licensee of Center for Nanomedicine Applications in Cancer U/U) Dennis Farrar, CEO 1st as Licensee $100,000

"ContraDyn is a startup focused on commercializing targeted nanoglobular drug delivery systems, which the Center has developed. These novel three-dimensional globular structures can carry multiple compounds including small molecule drugs, imaging agents and targeting peptides directly to cancer tumor sites at lower doses, reduced systemic toxicity, and much greater therapeutic efficacy than other delivery technologies. Delivery of off patent or well studied but unapproved drugs should substantially abbreviate FDA approval requirements."

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

COSMAS, Inc. (Licensee of Center for The Production of Nanometer Sized Metals, Alloys, Metal Oxides & Mixed Metal Oxide Powders BYU)
Lynn Astle, CEO **New as company** **$100,000**

Cosmas, Inc. will commercialize a solid state process to produce a nearly unlimited array of high quality, well-defined metal oxide, mixed metal oxide, metal and metal alloy nanoparticles. The process is simple, requires comparatively little energy (i.e., low cost) and is easily scalable for production. It produces products up to 99.999% pure, as small as 1 nm, with size distributions of typically ±10%. Applications include protective coatings, catalysts, batteries & fuel cells, electronics and ceramics.

CRE Energy, Inc (New License – BYU)
Dr. Ralph L. Coates, President **New as company** **$100,000**

The central mission of CRE is to demonstrate and commercialize the Clean Shale Oil Surface Process (CSOS), incorporating patent pending CRE technology, and sublicensed BYU technology for CO2 management. Demonstrated technology for significant production of gasoline and diesel with no CO2 emissions; compliant with UT/Federal emissions regulations.

GlycoMira, Inc. (New Licensee – U/U)
Thomas P. Kennedy, MD and Glenn D. Prestwich, PhD, Cofounders and Co-inventors
New as company **$100,000**

GlycoMira ("Amazing Sugars") is a development stage pharmaceutical company targeting the topical treatment of inflammatory skin diseases affecting over 100 million Americans. GlycoMira's motto is "From Life. For Life." Our proprietary sulfated compounds are derived from the natural sugar hyaluronic acid to make remarkably potent drugs that block inflammation. Our topical therapeutics have the potential to restore health and quality of life to those suffering from disfiguring diseases such as rosacea, psoriasis, eczema, acne, and actinic keratosis.

Heavystone Laboratory, LLC (Licensee of Center for Functionally Graded and Designed Cemented Tungsten Carbide and Polycrystalline Diamond Composite Materials U/U)
Dr. Zak Fang, Principle & CTO, Dr. Al Poskanzer, CEO
1st year as Licensee **$120,000**

Developing advanced composite materials with predictable wear and failure characteristics designed for demanding applications such as mining, drilling, and grinding. These new materials developed at the University of Utah are designed to extend the life of tools and bits used in oil and gas drilling, metal cutting, milling, drilling, mining, construction, and other wear resistant tools.

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

International Reservoir Simulation Research Institute, Inc. (New License – BYU)
Hugh B. Hales (Key contact/PI) New as company $50,000

International Reservoir Simulation Research Institute, Inc. (IRSRI) will employ new technologies developed at Brigham Young University's International Reservoir Simulation Research Institute, particularly a high performance, high speed Pressure Solver, to revolutionize the reservoir simulation industry. Reservoir simulation is the use of computer programs to model the production of oil and gas from oil fields allowing optimization of actual production, helping to increase the world's oil supply.

Larada Sciences, Inc. (Licensee of Center for Alternate Strategies of Parasite Removal (U/U) Larry Rigby, CEO 2nd year as Licensee $80,000

Larada Sciences Inc. is a University of Utah spinout company formed in 2006 to deliver medical products and services based on breakthrough technology for the safe and effective Nonchemical treatment of head lice. Pediculosis (head lice) is a multibillion dollar problem that afflicts about 25% of children by the time they're teenagers and the problem is growing rapidly because head lice are evolving resistance to many of the currently used lice pesticides. Larada's first product, the "LouseBusterT", is a medical device that uses air to kill head lice and their eggs, in a way that is completely chemicalfree, safe, effective, inexpensive, and requires only one treatment lasting about 30 minutes.

Millenniata, Inc. (New License – BYU)
Henry J. O'Connell, Pres./ CEO/Founder New as company $85,000

Millenniata has licensed optical data storage technology from BYU that is the first permanent, Backwards compatible archiving solution for the digital age. Millenniata's new Write Once Read Forever ™ DVD technology will provide secure, accessible, permanent data storage in excess of 1000 years for all types of digital records, data, and media. The patented Milliennial Disc™ is made from materials known to endure for centuries, yet is readable in any standard DVD drive so it can easily be used by business, institutions, and families.

NeuroAdjuvants, Inc. (New License – U/U)
Theodore Stanley, M.D., Pres. & CEO New as company $100,000

NeuroAdjuvants, Inc. will develop and commercialize a proprietary platform technology enabling multiple "first in class" neuropeptide based therapeutics for a wide variety of neurologic and psychiatric disorders. This platform provides a breakthrough ability to harness therapeutic potential of neuropeptides and provides both stability & blood-brain-barrier permeability. The initial focus is to identify novel therapies for pain and epilepsy with future potential applications to other neurologic and psychiatric disorders.

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

RUReady, Inc. (New License – U/U)
Charles Wight, Managing Director **New as company** **$100,000**

RUReady is a company that provides an interactive and self paced online learning program for mathematics that bridges the academic gap between high school curriculum and college requirements. Using RUReady instead of college based remedial classes reduces institutional costs of remedial instruction and provides curriculum based, open-ended questions, creativity assessment, hints, instant error feedback, and partial credit scoring, providing a "teacher like" experience online, at a fraction of the cost of traditional instruction.

Sera Prognostics, Inc. (New License – BYU and U/U Joint Biomarker Center)
Dennis Farrar, President & CEO **New as company** **$100,000**

Sera Prognostics will identify and commercialize peptide biomarkers that are predictive of preterm birth (13% of pregnancies), preeclampsia (5%) and other pregnancy complications. These biomarkers have emerged from the Joint Biomarker Center, a collaboration between BYU and the University of Utah with blood samples provided by the U of U and serum proteomics performed at BYU. So far, Sera has identified 5 biomarkers for PTB and 2 for PE. Both conditions can be treated, with outcomes significantly improved by early detection.

STEDI, LLC (New License – USU)
Geoffrey G. Smith (Key contact) **New as company** **$100,000**
STEDI is licensing from Utah State University's Substitute Teaching Institute a training solution and materials to train substitute teachers. 70% of substitutes in the U.S. are not trained and STEDI provides the only university based training program for Substitutes. Via the university, STI/USU has sold materials for 13 years, and sales last year were $900,000. The system currently reaches 900 of the nation's 16,000 school districts, but only 38 have sales of $5,000 or more. STEDI, LLC will allow significant expansion of the reach for this system to help train America's substitute teachers.

TSplines, Inc. (New License – BYU)
Matt Sederberg, CEO **New as company** **$100,000**

TSplines, Inc. has licensed from BYU a revolutionary new technology, TSplines, that solves significant modeling problems in computer-aided design (CAD). This new technology, which is compatible with NURBS (nonuniform rational Bsplines— the industry standard technology), creates analysis ready CAD models by default, and also introduces timesaving animation modeling workflows to CAD, two breakthroughs which significantly reduce the design time of product development. Current company products focus on industrial design and architecture, and COE funding will help the firm expand into aerospace, automotive and analysis.

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

Thermimage, Inc. (New License – U/U)
Douglas Turnquist, President & CEO **New as company** **$100,000**
Thermimage, Inc. has invented a noninvasive, painless and less costly way to produce deep tissue temperature measurements. The device will first be used to diagnose Vesicoureteral Reflux (VUR) in children, a dangerous condition that allows urine to backflow into the kidneys of young children. The current procedure is painful and requires the use of catheters and ionizing radiation, where this new technique will heat the bladder contents and then detect any increase in temperature in the kidneys signaling reflux.

TMT, Inc. (Licensee of Center for Thermal Management Technologies USU)
Forrest Fackrell & Clair Batty **1st year as Licensee** **$100,000**

Thermal Management Technologies, L.L.C. is a new spinout of the Center of the same name at Utah State University. The company will create solutions for high performance thermal management challenges. Products include flexible thermal links for thermal connection and mechanical isolation used in imaging satellites with commercial applicability to aircraft, automobiles, and communications systems; and channeled cooling panels for rapid response spacecraft with commercial applicability to computer and electronics cooling.

Torion Technologies, Inc. (New License – BYU)
Dr. Douglas Later, President and CEO **New as company** **$100,000**
Torion Technologies, Inc. is commercializing the GUARDION™7 chemical detector using technology developed at BYU. The GUARDION7 is a hand portable, sensitive, selective, and rapid instrument for detecting chemical threats. The GUARDION7 is lightweight, reliable, and easy to use and detects hazardous compounds in as little as 30 seconds. Key markets for the gas chromatograph toroidal ion trap mass spectrometer (GCTMS) include the defense and military, first responders, security, environmental, and forensics.

VisTrails, Inc. (Licensee of Center for Management of Provenance & Exploratory Workflows U/U) Greg M. Jones, PhD, CEO **1st as Licensee** **$200,000**

VisTrails' goal is to "Provenance Enable the World" and become the leading provider of software solutions for the provenance of computational tasks. Based on our patent pending technology, VisTrails is developing provenance enabled management solutions for complex software applications, offering new functionality that will revolutionize the way people explore, analyze, and create data. This technology dramatically improves such tasks as: improving animation and graphics consistency and speed, calibrating simulations for hedge funds, for locating oil wells, and review and analysis of medical images.

Licensee / Center (University)	Years Funded to Date	Award Amount (cont.)
Wasatch Nanopore Sensors, LLC (Licensee of Center for Nanopore Sensor Technologies UU) William Pagels, PhD CEO	**1st Year as Licensee**	**$100,000**

Wasatch Nanopore Sensors (WNS) is a recently formed spinoff from the Center for Nanopore Sensor Technology (CNST) to commercialize nanopore sensor technology fabricated from glass, quartz and other materials. A nanopore sensor relies on molecule and particle transport through a single conical shaped pore that can be modified by chemical methods to design sensors for different applications. These extremely sensitive sensors are useful in key applications such as DNA sequencing and particle size analysis.

Wastewater Compliance Systems, Inc. (Licensee of Center for Water Treatment Technology U/U) Fred Jaeger, President	**1st Year as Licensee**	**$100,000**

The company addresses the need of wastewater lagoon operators, generally municipalities, who seek to comply with state and federal environmental regulations by improving efficiency and capacity of existing systems without dramatically increasing capital or operating costs. The company provides robust, low cost ways to remove common pollutants such as nitrogen compounds from lagoon systems with a submergible, domed shaped aeration device that resembles an igloo. The patented "pogo" is simple and inexpensive to build and easy to install and maintain.

University Centers of Excellence

Center (University)	Years Funded to Date	Award Amount
Center for Clean Coke Technology (CEU) Dr. Robert Topping, PI	**1**	**$275,000**

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. The pilot scale facility will demonstrate the upgrading of carbonaceous feedstocks by calcining and briquetting into Clean Coke products.. 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.

Graduating Centers June 30, 2008 (Completed)

Flying Sensors (Licensee of Miniature Unmanned Air Vehicles) (BYU)

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

Center for Miniature Unmanned Air Vehicles (BYU)

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.

Glycosan BioSystems, Inc. (Licensee of Therapeutic Biomaterials) (U/U)

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

Center for Therapeutic Biomaterials (U/U)

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 Biosciences) have been spun out of the Center to date.

Center for Hybrid & Adaptive Multimedia Processors (CHAMP) (USU)

Commercializing tools and software systems to accelerate time to market of new features for multimedia consumer devices.

Center for Microarray Technology (U/U)

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)

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.

Nano-Oxides (Licensee of Nanosize Inorganic Material Powders By Molecular Decomposition) (UU)

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 & PhotoRealistic Visualization) (U/U)

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)

Commercializing multiuser 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.

Center for High End Pharmaceutical and Biomedical Process Optimization (SUU)

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 3dimensional 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.

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

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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.