STATE OF UTAH

Department of
Community and
Economic
Development

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CENTERS·OF
EXCELLENCE

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Utah Centers of Excellence Program

Report to the Utah State Legislature

1 November 1992

Ratio of Matching Funds to State Contract:

FY 1992 Matching Funds	$35,027,962
FY 1992 State Contracts	$2,342,500
Annualized Match Ratio	$14.95:1

Total Jobs Created

From Current Centers	2,174
Average Salary	$29,669

Annualized Economic Impact:
Total: $96,750,962
Annual Return to the State
Total: $12,093,870
Ratio: $5.16:1

COEP Annual Growth	FY 1991	FY1992
Industry Jobs Created	1,216	1,309
Center Jobs Created	810	865
Total Employees	2,026	2,174
Businesses Created	14	17
Matching Funds Ratio	$14.50:1	$14.95:1
Ratio on Investment	$4.81:1	$5.16:1

U CENTERS OF EXCELLENCE PROGRAM
Advisory Council

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Hyclone Laboratories
Logan, Utah

Lee Caldwell, Director of Education, Marketing & Sales
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Provo, Utah

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Utah Centers of Excellence Program
1992 Highlights

Impact on Utah Business

- 17 new high tech businesses emerged from center technology in 1992
- Over 1,300 industry jobs have been created
- The average salary per center job created is $29,669
- 7 companies have relocated to Utah in order to be closer to center research
- 69 high tech companies have been created since program inception 6 years ago
- An additional 145 existing Utah companies have received considerable assistance improving their products or processes

Impact on Higher Education

- Created 865 jobs (Attract and retain top researchers, graduates and undergraduates)
- COEP funds have been leveraged to acquire university equipment worth $66.8 million
- 80 patents have been awarded with an additional 88 currently pending
- Royalties are returning to the university to strengthen the research base

Return on State Investment

- Each state dollar attracts $14.95 from the private sector and/or the Federal Government
- The State receives $5.16 in state and local income taxes from center activity

Center Successes

- Theratech, Inc., a local company using patents and products developed by the Center for Controlled Chemical Delivery at the University of Utah, has raised a total of $37 million since going public in 1992.

- A new center has been approved that will focus on Utah's genetic mapping expertise. Research will be housed in the existing Center for Meat Processing Technology at Utah State University. The technology will be used to create a leaner lamb product, providing Utah ranchers a chance to sell value added, genetically improved breeding stock and associated products.

- Eleven new planning grants have been awarded over the past year. Planning grants are given for exploratory research to prove the commercial viability of a technology before full center status and funding is awarded. Some of the technologies currently being explored include: biomedical separations, control systems, natural products chemistry, silicon development, infrastructure design, applications of geometry and new product development.

Utah Centers of Excellence Program

Relocated Utah Companies / Newly Formed Companies FY1992

(Period Covering November 1, 1991 to October 31, 1992)

Cumulative Companies Relocated to Utah to Access Center Technology:

Company	Center
Futura Propulsion	Center for Advanced Composites
Nutriscience, Inc.	Center for Dairy Foods Technology
Intraspace	Center for Aerospace Technology
Systems Impact Inc.	Center for Information Technology
Silicon Graphics	Center for Biopolymers
NUTEK Corp.	Center for Meat Processing
Mira Imaging	Center for 3-D Imaging

Relocated Businesses: 7
Number of Jobs Moved: 43
Average Salary: $31,982

Newly formed companies from COEP technology in 1992

- ♦Center for Advanced Composites (9)
  - Baal
  - Merrell Enterprises
  - MATCO
  - American Vitrolite
  - Ashton Aerospace
  - Medilight
  - Mountain High Engineering
  - Mountain Land Support
  - Wasatch Engineering
- ♦Center for Biocatalysis (1)
  - Envirol, Inc.
- ♦Center for Biotechnology (1)
  - INTECH One-Eighty Corp.
- ♦Center for Inverse Problems, Imaging, Tomography
  - Monolithic Technologies
- ♦Center for Software Science (1)
  - Hippo Software Inc.
- ♦Center for Dairy Foods Technology (1)
  - Food Research & Development Group
- ♦Center for Advanced Coal Technology (1)
  - International Resin Resources
- ♦ACERC (1)
  - Combustion Services Inc.
- ♦Center for 3-D
  - Illustrative Impressions

New Companies Created: 17
New Jobs Created: 50
Average Salary: $33,307

Utah Centers of Excellence Program

Financial Return Summary

(Period Covering November 1, 1991 to October 31, 1992)

Ratio of Matching Funds to State Contract:

Oct 1991 thru Oct 1992 Matching Funds	$35,027,139
Current State Contracts	$2,342,500
Annualized Match Ratio	$14.95:1

Total Jobs Created:

From Current Centers	2,174
Average Salary	$29,669

Annualized Economic Impact
Total: $96,750,962

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Businesses Created	14	17
Return on Investment	$4.81:1	$5.16:1

Graduate Students:

There are 380 graduate students (or roughly 46% of all center employees) involved in center research.

Patents/Licensing Agreements:

Presently funded Centers have been issued 80 patents and entered into 84 licensing agreements. These licensing agreements are essential to the operation of 188 Utah industrial firms.

Cumulative Spin-off Companies	**69**
FY 1992 New COEP Spin-off Companies	**17**
Number of jobs created	50
Average salary	$33,307
Companies Relocating to Utah for Center Technology	**7**
Number of jobs moved	43
Average salary	$31,982
Federally Funded National Research Centers	**3**
Distinguished Centers of Excellence	**6**

Each is nationally recognized for research excellence and/or the receipt of more than $10 million in Federal and industrial funding.

Utah Centers of Excellence Program

Spin-off and Benefiting Companies

(1986-1992)

Cumulative Spin-off Companies	69
Cumulative "Benefiting" Companies . .	145

ACTIVE CENTERS

Center for Aerospace Technology
Simulacrum, Inc. (Spin-off)
Wasatch Aerospace Co. (Spin-Off)
Intraspace, Inc. (Relocated)
Wasatch Research & Eng., Inc.
R & D, Inc.

Center for Biocatalysis
*ENVIROL, Inc. (Spin-off)
WhetStone, Inc.
HyClone Labs
Computer Systems Architects

Center for Biotechnolgy
*INTECH One-Eighty Corp. (Spin-off)
UP&L
EarthFax
Hyclone Labs
Natural Product Sciences
Thiokol
AgriDyne Technologies, Inc.

Center for CAEDM
CIMETRIX
Design Synthesis
PROMODEL Corp.
Evans & Sutherland
Hercules
Hewlett-Packard
IOMEGA Corp.
Thiokol
VALTEK
Viewpoint Animation
Center for Chemical Technology
Benefiting Companies (26)
Solaray
Monarch Labs
Trysan
Western Zirconium
Morton Automotive
KEMGAS
Buena Ventura
Great Salt Lake Mineral
Artistic Precision Enterprises
Reily Wendover
AgriDyne Technologies
Albion Laboratories
Arrow Dynamics
Bel Viso Laboratories
Bureau of Mines
Cache Valley Cheese
Chromalox Inc.
C.T. Film, Inc.
Del Med, Inc.
Great Basin Brine Shrimp
Hill Air Force Base
Schreiber Foods, Inc.
Industrial Research
Miller Laboratories
Susumu Construction
Williams International, Inc.

Center for Cancer Genetic Epidemiology
Helix Technologies (Spin-off)

Center for Advanced Composites
Spin-off Companies (19)
Advanced Laminate Technology
Ultralite of America
Futura Propulsion Systems
Rocky Mountain Engineering
Medi-Sight
Performance Composites
Creature Composites
Synergy Marketing
Emily Rose Inc.
Dimensional Research
*American Vitrolite
*Ashton Aerospace
*Medilight
*Mountain High Engineering
*Mountain Land Support
*Wasatch Engineering
*Baal
*Merrell Enterprises
*MATCO

Benefiting Companies (15)
Delta Fiberglass
EDO
Evolution Skis
Fiber Tek
Terra Tek
INCO VaporFab
Fiber Dynamics
AeroTrans
CRP/Springlite
Vaporfab
Bemsco
Hexatron
UP International
TRA
BGA

Center for Computer Graphics and Scientific Visualization
Eng. Geometry Systems (S.O)

Center for Coal Research
FemtoScan Corp. (Spin-off)
*Intnl Resin Resources (Spin-off)
Advanced Processing Technologies

Center for Chemical Separations
IBC Adv. Technologies (Spin-off)
Parish Chemical Company
Tronac, Inc.
GalTech Semiconductor
DataChem
Johnson Matthey
ASARCO
Thiokol
Cascade Refining

Center for Computer Based Education
Cali, Inc. (Spin-off)
LinguaTech

Center for Dairy Foods Technology
*Food Research & Development Group (Spin-off)
Gossner Foods, Inc.
NutriScience, Inc. (Relocated)

Center for Inverse Imaging and Tomography
Techniscan, Inc. (Spin-off)
*Monolithic Tech (Spin-off)
R-Con International
Nichols Research
MOXTEK
Unisys Defense Systems
Evans & Sutherland
Computer Systems Architects
Alta Technology

Center for Advanced Materials
Ceramatec, Inc.
Nova Tech
Thiokol
Evans & Sutherland
Hercules
Fisher Company
Westcot Corp.
Concoyle Oilfield Tools, Inc.
Space Systems Engineering

Center for Meat Processing Technology
Mountain Lamb Co-op (Spin-off)
Timpanogos Meats (Spin-off)
NUTEK Corporation (Relocated)
ConAgra
E.A. Miller & Sons
Stone Meats

Center for Software Science
*Hippo Software, Inc. (Spin-off)

Center for Supercomputer
IBM
Thiokol
Hercules
WordPerfect
Kennecott
3-M Health Systems
SyncSort
Eden Solutions
Relational Technology Products

Center for 3-D Graphics
*Illustrative Impressions (Spin-off)
Mira Imaging (Relocated)
Strata, Inc.

Center for VLSI Design
Bonneville Microelect.(Spin-off)
Phonix
Iomega
Cirque Corporation
Softeze

Center for X-Ray Imaging
MOXTEK (Spin-off)
TechniScan

DISTINGUISHED CENTERS

ACERC
Reaction Engineering International (Spin-off)
*Combustion Serv. Inc. (Spin-off)
Geneva Steel
Pacific Corp.
Questar
Hercules
Thiokol
Ford, Bacon, Davis
UP&L
Center for Engineering Design
Animate Systems (Spin-off)
Sarcos Research Corp (Spin-off)
Sarcos, Inc. (Spin-off)
IOMED, Inc.

Center for Biopolymers
Protein Solutions, Inc. (Spin-off)
Silicon Graphics (Relocated)
Becton Dickinson Critical Care Monitoring
Cardiopulmonics, Inc.
HyClone Labs
Research Industries

Center for Controlled Chemical Delivery
Insutech, Inc. (Spin-off)
TheraTech, Inc.
Research Medical Inc.

Center for Space Engineering
Interactive Res. Co. (Spin-off)
ICOMP, Inc. (Spin-off)
Globesat Holding Co. (Spin-off)
Medcom, Inc. (Spin-off)
CXT, Inc. (Spin-off)
Space Dynamics Lab (Spin-off)
Thiokol Corporation
Hercules Corporation

GRADUATED/DISCONTINUED CENTERS

Center for Base Technical Education
Assesment Co. (Spin-off)
Software Co. (Spin-off)

Center for CIM
EDGE Foundation (Spin-off)
EDGE, Inc. (Spin-off)
Ozone Saver Industries (Spin-off)
CAM Software (Spin-off)
CIM Training Center (Spin-off)
Smartware (Spin-off)
Utah PODS Mfg. Co-op (Spin-off)

Center for Info Technology
Effective Instructional Technologies (Spin-off)
Systems Impact Inc. (Relocated)
Digitran
SkiHi

Center for Laser Institute
Cooper LaserSonics
HGM, Inc.
MetaLaser Corp.
Primemed
QLT, Inc.
Innovative Imaging Sciences

Center for Pyrometallurgical
Kennecott

Center for Quality & Integrity Design
Technology Management Associates, Inc. (Spin-off)
FASIDE Itnl, Inc. (Spin-off)

Center for Signal Processing
ASTECH, Inc. (Spin-off)
Deseret Digital Systems (Spin-off)
Vector Technologies (Spin-off)
Softsolutions
Eyring Research Institute
Space Dynamics Lab
Unisys Corporation

Center for Adv. Supercritical Fluid Separation
Chromatography Conferences (Spin-off)
Sensar Corporation (Spin-off)
Lee Scientific

Utah Centers of Excellence Program

Planning Grants Summary

1992

Planning grants are given for exploratory research to prove the commercial viability of a technology before full center status and funding is awarded. Following are technologies currently being explored:

Biomedical Separations (U/U)	$10,000
Control Systems Tech (USU)	$10,000
Integrated Science Education (U/U)	$10,000
Magnet Technology (USU)	$10,000
Silicon Development (BYU)	$10,000
Fuel Engineering (Snow College)	$10,000
Infrastructure Design (U/U)	$10,000
Information Technology (UVCC)	$10,000
Theory & Application of Geometry (U/U)	$10,000
Environmental Technology (U/U)	$10,000
New Product Development (BYU)	$ 9,700

Utah Centers of Excellence Program

Definition of Terms

Benefiting Utah Companies:
All Utah companies that have been created by or are in a substantial way, using technology from centers.

Center of Excellence:
Located at a Utah institution of higher learning, a "Center" is a designated location where specific research and development is conducted and technology transfer takes place, leading to commercialization of the products of that research.

Faculty, Graduate Student and Post Doctorates employed:
Positions being salaried directly as a result of centers activity.

Industry jobs created:
Those jobs that have directly or indirectly resulted from centers activity.

New Companies:
New Utah companies formed using the research and development of the specific technology at the institution since the centers program began.

State Contract:
Dollar amount of commitment to the center by the State Department of Community and Economic Development. State monies are not released until invoices are received for actual expenses and documentation of matching funds.

Distinguished Center of Excellence:
Funding in excess of $10 million or national recognition. These centers are allowed special funding beyond graduation if proposed projects are deemed worthy by the Advisory Council.

Graduated Center:
The Utah Centers of Excellence Program has a formal graduation policy requiring centers to become self sufficient. When a center has received a maximum of five years of funding it is graduated or granted "distinguished center" status.

Centers of Excellence

Center for Aerospace Science Technology

Professor Robert J. Twiggs/Weber State University/Ogden, Utah

Established as a center in 1988 to continue development of small low-earth orbiting satellites. It has expanded into a generalized technology incubation and development center that also provides engineering services to local companies. Research projects are geared toward demonstrating low-cost space technology.

Overview

Current State Contract $50,000

FY92 Matching Funds $424,043
Cumulative $2,467,992

Total Jobs Created 35
Industry 26
Center 9

Direct Center Spin-offs 2

Companies Relocating to Utah 1

Tot.Benefiting Utah Companies 5

License Agreements 0

Patents Applied 0

Patents Issued 0

Technologies

*Small satellite design including features such as
- -particle detector
- -color camera
- -light detection for ozone mapping
- -magnetometer
- -microcomputer
- -packet radio communications

*Development of sun angle detector

*Satellite Doppler beacon

Status

*Webersat satellite launched January 1990. Operational in polar orbit demonstrating advanced small satellite technology.
*Completed firs tof four year contract on AMSAT phase 3D satellite.
*Working with Southern California Edison in studying special application of satellite for power utility.
*Currently working on NASA ACTS program.
*Commercial applications of small satellites and availability of launch opportunities is being explored with Dept. of Defense.
*Working on contract with Honeywell to design a space camera for altitude determination in satellites
*Designed sun sensor to be used on Navy satellite.
*Working with Wasatch Research on a Jet Propulsion Laboratory study on satellite monitoring and interception of comets and asteroids.
*Working with Everett and Winthrop in development of an automated biomedical machine.

Economic Impact

*Magnetometer developed by center has been licensed by Orchid Engineering of Huntsville, Utah

*Helped move new company to Utah, Intraspace with 20 jobs and $6 million in contracts.

*Development of small satellite is attracting business to Utah for aerospace design and manufacturing

*Working with PacifiCorp to establish a Utah company to manufacture ground stations for small satellite applications

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Center for Biocatalysis

(National Center for the Design of Molecular Function)

Dr. Linda Powers/Utah State University/Logan, Utah

Established as a center in 1988. At the present time, no one has been able to isolate the interaction of molecules during a chemical reaction because of the speed at which it occurs. Instruments are being developed by the center that will store large amounts of information occurring simultaneously. By understanding the sequence of events during a chemical reaction, different molecules may be "programmed" for specific tasks. These "biomedical microchips" could benefit society in cancer research, industrial and environmental monitoring and waste management.

Overview

Current State Contract	$0
FY92 Matching Funds	$2,465,000
Cumulative	$3,189,030
Total Jobs Created	20
Industry	0
Center	20
Direct Center Spin-off	1
Total Benefiting Utah Companies	4
License Agreements	1
Patents Applied	3
Patents Issued	0

Technologies

*Parallel processing electronics

*Spectroscopic Technology

*Biocatalysis

*Infrared imaging

*Molecular design

*Bioanalytical instrumentation

*Molecular components and portable instrumentation for specialized monitoring

*Elucidate bio-catalytic processes involving metals and develop synthetic analogs

*New technology in automation data analysis and handling

Status

*Established as National Institutes of Health Biomedical Research Resource Center

*New breakthrough in infrared imaging

*Approximately $2.25M in equipment installed

*"TransAcq" parallel processing module (powers up a PC to be equal to a VAX 8650)

*Software written linking module to standard X windows format

*Two-color photothermal spectroscopy developed

Economic Impact

*"TransAcq" module being licensed to CSA, a Provo Co.

*Breakthrough in infrared imaging could make significant contribution in early disease detection

*"WhetStone", a center spin-off will use technology in risk assessment management

*ENVIROL, INC. A new center start-up company will use the center technology in the contaminated soils area.

*New spectroscopy instrumentation being developed with local industries for special biomedical applications

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Center for Biotechnology

Dr. Steven Aust/Utah State University/Logan, Utah

Established in 1987, this center utilizes three service laboratories for plant breeding and development, animal disease control, food processing, engineering and biological hazardous waste management. A wood rotting fungi has been isolated that will detoxify many of the most dangerous organic hazardous wastes such as PCBs and residual insecticides.

Overview

Current State Contract	$100,000
FY92 Matching Funds	$646,560
Cumulative	$4,358,096
Total Jobs Created	20
Industry	0
Center	20
Direct Center Spin-off	1
Total Benefiting Utah Companies	7
License Agreements	1
Patents Applied	1
Patents Issued	2

Technologies

*Fermentation biology

*Microbiology

*Molecular biology

*Monoclonal antibodies

*Data analysis

*Biological hazardous waste management

*Macromolecular synthesis and analysis

*Recombinant DNA tech implant breeding & development

*Microbiologicals in agriculture

*Monoclonal antibodies to control animal diseases

Status

*White rot fungus renders PCP's & PCB's harmless in the laboratory

*Treatment of creosote contaminated water has shown effective cleanup in the laboratory

*Bioremediation of explosives in contaminated water & soil

*Soil contaminated with oil

*Biodegradation of plastics

*Ability to degrade cyanide

*Dupont donated a mass spectrometer

*AirForce contract through Spectrum Sciences

*One patent awarded and one filed for biological hazardous waste management

*Applying for additional Department of Defense funds through cooperation with a Utah Company

*Pursuing opportunity in Poland to educate scientists and transfer white rot technology to European countries

Economic Impact

*A center spin-off company, INTECH 180, Corp. formed to expand and commercialize the technology.

*INTECH and EARTHFAX, Corp have formed a partnership to use the technology on contaminated oil spill sites.

*Patent issued for fungus used for environmental clean-up

*USU Biotechnology Building has been completed

*Discussing commercialization of white rot fungus with 3 Utah companies

*Income from service laboratory was $11,408

*Currently supported by NIH grants, contracts from Thiokol, Department of Defense and Dupont

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Center for Cancer Genetic Epidemiology

Dr. Mark H. Skolnick/University of Utah/SLC, Utah

Established as a center in 1991. The development of recombinant DNA technology allows researchers the opportunity to diagnose, treat and eventually prevent human genetic disorders. Center staff members are utilizing DNA based diagnostics to determine if a patient has a predisposition to certain genetic forms of cancer. Isolating defective genes and other precursors increases the likelihood of detecting tumors at treatable stages. Genetic research at this center is focused on four of the most common cancers: breast, colon, prostate and melanoma.

Overview

Current State Contract $100,000

FY92 Matching Funds $2,129,646
Cumulative $10,063,658

Total Jobs Created 38
Industry 10
Center 28

Direct Center Spin-off 1

Total Benefiting Utah Companies 1

License Agreements 1

Patents Applied 1

Patents Issued 0

Technologies

*Genetic Analysis

*Gene Localization

*Gene Discovery

*Gene Diagnostics

*Gene Therapies

Status

*Mapping the 17q breast cancer gene and pursuing gene isolation of this locus.

*Gathering prostate CA families.

*Preparing for linkage studies of breast, colon, prostate and melanoma cancers.

Economic Impact

*New relationship with Memorial Sloan Kettering Cancer Center in New York.

*New spinoff company: Helix Technologies

*Disposable kit planned to determine genetic predisposition of patient for breast cancer

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Center for Chemical Separations

Dr. Reed Izatt/Brigham Young University/Provo, Utah

Established as a center in 1987. Researchers with backgrounds in organic chemistry, inorganic chemistry and chemical engineering are studying the full development of a new ligand bonded silica gel technology. The resulting products are used in a variety of separation systems. A few applications of center technology include precious and base metals refining, heavy metal and organic clean-up and nuclear waste management.

Overview

Current State Contract . $50,000

FY92 Matching Funds . $409,445
Cumulative $2,204,025

Total Jobs Created 41
Industry 25
Center 16

Direct Center Spin-offs 1

Total Benefiting Utah Companies 9

License Agreements 1

Patents Applied 14

Patents Issued 9

Technologies

*Pilot plant scale up for individual separations
*Individually designed macrocycles for molecule separations
*Patented technique for attaching macrocycles to solid substrate allows for reuse
*Ligand bonded silicagel (Superlig) technology
*Researching use of superlig materials to remove selected components from highly acidic radioactive waste

Areas for Technology Application include:

1. Precious and base metals refining, mining & recycling
2. Heavy metal and organic clean-up from industrial effluents in water and air
3. Analytical scale separation and concentration of species of industrial, medical and environmental importance
4. Nuclear waste management

Status

*Methodology for precious metals separations developed
*Selling product to industry
*Need to develop capability in gas, high purity materials and biological separations
*Capability in environmental, analytical & precious metals markets
*Battelite Pacific Northwest Laboratories are funding radioactive cleanup studies
*Set up pilot plants in 4 of the largest precious metal refineries in the USA. Metals of interest are rhodium, platinum and palladium
*Negotiations completed for a grant from Thiokol to develop materials for the removal of ppm amounts of heavy metals from culinary and waste water streams
*Recipient of a Phase III SBIR Grant from Metre-General, Inc.
*Superlig materials capable of making quantitative separations

Economic Impact

*Created spin-off company IBC with 25 jobs.

*Company attracting many sources of growth capital.

*Process for separating platinum rhodium represents a 40-60% cost reduction to the industry

*Potential for developing multi-million dollar system to clean up accumulated nuclear waste

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Center for Chemical Technology

Edward B. Walker/Weber State University/Ogden, Utah

Established as a center in 1990, this center conducts innovative applied research in a variety of chemically-related areas that lead directly to new and/or enhanced product innovations. Ranging from natural product chemistries to new separation technologies, the multi-disciplinary nature of the center makes it the perfect high-tech resource center for the entrepreneur in Utah.

Overview	Technologies	Status	Economic Impact
Current State Contract $100,000 FY92 Matching Funds $171,033 Cumulative . . . . . $614,787 Total Jobs Created . . . . . 198 Industry . . . . . 189 Center . . . . . 9 Direct Center Spin-offs . . . . . 0 Tot.Benefiting Utah Companies 26 License Agreements . . . . . 3 Patents Applied . . . . . 3 Patents Issued 1	*Naturally occurring antibiotics *Bacteria anti-adherance factor *Low temperature tar-sand extraction methodology using biodegradable surfactant *Partitions/separations technology *Environmentally-safe solvents to replace CFC-based cleaners *Reverse osmosis system validation *Beta-carotene extracted from the Great Salt Lake	*New patent issued for tar sands extraction *New bacteria adherence inhibitor product introduced July 1990 *New environmentally safe solvent introduced	*Company looking to move to Utah to take advantage of tar sands patent *Cranberry extract supplement has current sales in excess of $60,000 (gross/month) *Eastman Chemical sponsoring a feasability study to determine if beta-carotene can be harvested from algae in the Great Salt Lake. Could result in a major harvesting/extraction facility worth more than $50 million and would create 60 new jobs.

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Center for Advanced Composites Manufacturing and Engineering

Dr. A. Brent Strong/Brigham Young University/Provo, Utah

Established July 1990 to assist existing and start-up composite manufacturing companies within the state. Assistance includes technical trouble-shooting, unique testing, prototype development or solving other commercial problems. The Center also supports product development in unique composites and plastics technology which can be spun off into private companies.

Overview

Current State Contract $165,000

FY92 Matching Funds $1,239,413
Cumulative $2,283,541

Total Jobs Created 111
Industry 81
Center 30

Direct Center Spin-offs 19

Total Benefiting Utah Companies34

License Agreements 1

Patents Applied 3

Patents Issued 1

Technologies

*Basic composite and plastic manufacturing technologies:

-pultrusion filament winding
-lay-up/laminating
-resin transfer molding (RTM)
-ceramic sintering
-injection molding
-extrusion
-compression molding
-blow molding
-rotational molding
-vacuum forming

*Various testing methods

*Unique vibration damping and cure sensing

*Rapid prototyping

*Plasma treatment

Status

*National technology workshop held w/NIST. Highest attendance of any NIST workshops in any state

*3 technical books published and 39 technical presentations given

*4 technical conferences, including one that brought together Utah's composite and medical device manufacturers

Economic Impact

*Assisted 12 new companies bringing total to 77

*Assisted in launches of 9 new companies during 1992

*Assisted in obtaining $300,000 in contracts, bringing total to $16.8 million and over 500 new jobs

*2 on-site training courses developed for Utah companies

*Received a materials grant of over $800,000 from McDonnell Douglas

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Center for Computer Aided Engineering Design & Mfg.

Dr. Joseph Free/Brigham Young University/Provo, Utah

Established center in 1991. The main focus is research in computerized drafting, 3-D design, solid modeling, finite element modeling, numerical controlled mfg, robotics, facilities management, plant monitoring and control, data base management and inventory planning.

Overview

Current State Contract $100,000

Matching Funds $272,753
Cumulative $738,470

Total Jobs Created 116
Industry 75
Center Related Jobs 41

Direct Center Spin-offs 0

Tot.Benefiting Utah Companies 10

License Agreements 9

Patents Applied 0

Patents Issued 0

Technologies

*Six software products:

- Promodel
- ROBLINE
- OPTDESX
- CATS
- Movie (C-Quel.BYU and MOVISTAR.BYU
- MAXXICAD
- GEOSOLID.BYU

Status

*OBTDESX ported to high end workstations

*ADCATS interfaced to autocad

*Recipient of grants from Ford Motor Corp., Sandia National Labs, NSF, IBM and Motorola

*Negotiations underway with IBM, Boss Corporation, Novell, Intergraph, Hewlett Packard, ATTC and a venture capital group based in Europe to establish major license and distribution agreements of center products

Economic Impact

*Sales/Revenue figures:
Software Licenses: $610,000

*Center's products are marketed exclusively through CIMETRIX, PROMODEL Corporation and Design Synthesis. These three spin-off companies provide a direct, world-wide outlet of center products and professional employment opportunities for Center graduate students

*There are over 1,600 licensed users of Center generated software

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Center for Computer Graphics & Scientific Visualization

Dr's Richard Riesenfeld and Elaine Cohen/University of Utah/SLC, Utah

Established center in 1991 that was also awarded a $14.68 million grant from the National Science Foundation. The federal funding establishes the first national center for computer graphics research. The center will collaborate with four other universities around the country to solve large scale graphic problems. Activities range from artistic rendering and medical applications to engineering design and computer-aided manufacturing.

Overview

Current State Contract $100,000

FY91 Matching Funds $675,000
Cumulative $2,060,000

Total Jobs Created 32
Industry 2
Center 30

Direct Center Spin-offs 1

Total Benefiting Utah Companies 1

License Agreements 1

Patents Applied 0

Patents Issued 0

Technologies

*Alpha 1 related research in modeling, visualization and manufacturing.

Status

*Lead organization in a 5-university National Science Foundation Research Center in computer visualization.

*Sponsor and conduct summer computing camps for Utah high school students

*Newest product allows designers to test parameters in computer simulation.

Economic Impact

*Formed a spin-off company, Engineering Geometry Systems, to commercialize Alpha1 technology.

*Leveraging applications oriented research and development in computer graphics, computer aided integrated design and manufacturing and scientific visualization for commercialization.

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Center for Dairy Foods Technology

Dr. Paul Savello/Utah State University/Logan, Utah

Established as a center in 1990. In its second year of funding, this center uses two innovative processes, Ultra-filtration and Ultra-High Temperature to develop new dairy products and to increase their shelf-life. The center also focuses on a concept of fractioning milk, much like petroleum, to develop markets for value-added components. The Center has successfully provided the expertise and pilot plant equipment to accelerate a spin-off company and assist three other Utah businesses.

Overview

Current State Contract	$130,000
FY92 Matching Funds	$555,000
Cumulative	$1,113,000
Total Jobs Created	14
Industry	11
Center	3
Direct Center Spin-offs	1
Companies Relocating to Utah	1
Benefiting Utah Companies	3
License Agreements	0
Patents Applied	5
Patents Issued	0

Technologies

*Methods to fractionate and concentrate milk components in non-degradative ways

*Aseptic processing (Ultra-high temperature)

*USC specialized membranes of various pore sizes to separate milk properties

Status

*Technology has attracted one firm to relocate to Logan

*Have developed new skim milk that tastes like 2% or whole milk

*Have created powdered milk blend that makes feta or cottage cheese over night, only adding tap water

Economic Impact

*Technology will greatly add value to the milk raw material

*Producing a product line for a Utah company that will be distributed through a multi-national corporation

*A newly established firm has been exploring a new aseptic concentrated milk product for export

*Technology successfully transferred to a Utah company to export Utah milk products to Mexico

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Center for Inverse Problems, Imaging and Tomography

Steven A. Johnson/University of Utah/SLC, Utah

This center was created in 1989. The breadth of research underway at this center is devoted to solving imaging problems with diagnostic medical scanning, seismic imaging, sonar and radar. Current projects include: advanced medical ultrasound scanners, geophysical imaging for oil exploration and advanced imaging for buried hazardous waste remediation.

Overview

Current State Contract	$100,000
FY92 Matching Funds	$614,840
Cumulative	$1,342,761
Total Jobs Created	62
Industry	36
Center	26
Direct Center Spin-offs	2
Total Benefiting Utah Companies	9
License Agreements	2
Patents Applied	2
Patents Issued	5

Technologies

*Medical Ultrasound imaging

*Bottom and Sub-bottom sonar

*Millimeter wave radar imaging

*Ultrasound non destructive testing

*Geotechnical imaging

*Optical microscope

Status

*Completing and testing the advanced medical scanner

*Demonstration-prototype development for Millimeter Wave Radar imaging to see through fog

*Completing demonstration prototype work and testing of scanners for detecting buried objects

*Development of proof-of-concept prototype of advanced optical microscope

*Market studies of medical scanners, optical microscopes and application of advanced imaging to hazardous site remidiation.

Economic Impact

*TechniScan negotiating venture capital to expand operations

*Contract with center, Techniscan and EG&G Idaho, Inc. for imaging of hazardous sites

*$525,000 grant from the National Heart, Lung and Blood Institute for medical scanner testing.

*Awarded a third grant from the Navy for imaging polar sea ice.

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Center for Advanced Materials and Microelectronics

Dr. Gerald B. Stringfellow/University of Utah/SLC, Utah

Established as a center in 1988. This center provides unique testing facilities, technical expertise and problem solving assistance to Utah industry. Composite, ceramic and semiconductor materials are currently being explored for structural, aerospace and electronic applications.

Overview

Current State Contract	$150,000
FY92 Matching Funds	$939,734
Cumulative	$4,340,778
Total Jobs Created	54
Industry	45
Center	9
Direct Center Spin-offs	0
Total Benefiting Utah Companies	9
License Agreements	0
Patents Applied	3
Patents Issued	1

Technologies

*Multiple layer epitaxy

*III/V compound chip design

*Ceramics as solid electrolytes and structural components

*Composite materials

*Organometallic vapor phase epitaxy

*Polymer property prediction models

Status

*Focus on III/V compounds, composites & ceramics estb. Advanced material for infrared detection in 8-12 micron range designed & disclosed to patent office

*Leading edge research in bismuth oxide fuel cells

*Close collaboration with local composites manufacturers

*Image analysis system for failure diagnosis available for use by local industry

*Unique combined thermogravimetry/mass spectrometry facilities available

Economic Impact

*Option on infrared detection chip license taken by Space Eng. Inc., Logan, Utah

*Center heavily involved helping move a branch of IBM, Philips or Hewlett Packard to Utah

*Ceramatec, Beta Power Inc. and Edo Western are successful small high tech ceramics firms

*Commercial sales of the Tripos "Sybil" stimulation program ($24,000) include Hercules BASF and B.F. Goodrich

*$100K grant from Exxon Chemicals for polymer modeling work

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Center for Meat Processing Technology

Dr. Von T. Mendenhall/Utah State University/Logan, Utah

Established as a center in 1991. Researchers are developing meat processing technologies to increase shelf-life during refrigerated storage, reduce fat content and create new value-added meat products. Special project in 1992. Research focuses on genetically improving Utah livestock through identifying genetic markers and using embryo cloning.

Overview

Current State Contract	$199,000
FY92 Matching Funds	$111,390
Cumulative	$327,340
Total Jobs Created	29
Industry	16
Center	13
Direct Center Spin-offs	2
Total Benefiting Utah Companies	6
License Agreements	1
Patents Applied	2
Patents Issued	0

Technologies

*Ultra-High Temperature pasteurization of meat surfaces

*Development of reduced-fat or lowfat meat products

*Development of processing technology to remove fat from raw meats

*Blending technology for meats from diferent species

*Irradation technology to produce meats that do not require refrigeration

*Genetic markers to "tag" superior genes for carcass composition in sheep.

*Embryo cloning techniques to disseminate genes to lamb and sheep producers.

Status

*Patent on UHT treatment of meat surfaces should be issued in November

*A new lowfat lamb chop has been developed with less than 10% fat. The new process masks the undesirable flavors of lamb

*Current research on the destruction effects of UHT on pathogenic micro-organisms completed

*Conducting tests to measure for quality attributes and chemical composition of both normal and heavy muscle lamb siblings.

Economic Impact

*Center created company markets 32,000 lambs per year (1/10 of Utah's total production)

*Significant potential to revitalize Utah's lamb/beef industries

*Licensing UHT technology will provide half of what the center needs to become self-sustaining

*ConAgra of Hyrum has installed all the equipment for the production of Ultra-High Temperature steaks and are currently involved in testmarkets.

*Timpanogos Meat of Springville continues to produce the Sierra Chop and is seeking stronger markets

*Anticipate passing this cloning technology on to Utah ranchers in order to create a "value-added" meat product.

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Center for Software Science

Dr. Robert Kessler/University of Utah/SLC, Utah

Established as a center in 1990, they concentrate on system software which "operates" the computer, allows programmers to program the computer and enables users to run applications. A parallel Lisp product currently being developed will allow users to solve large problems using networked workstations.

Overview

Current State Contract $100,000

FY92 Matching Funds $1,499,239
Cumulative $5,737,393

Total Jobs Created 32
Industry 5
Center 27

Direct Center Spin-offs 1

Total Benefiting Utah Companies 1

License Agreements 1

Patents Applied 0

Patents Issued 0

Technologies

*Operating systems - define capabilities and features of the next generation operating system

*Parallel languages to solve problems using networked workstations

*Distributed computing allows network connected computers to perform larger tasks more rapidly than on single computer systems

*Common programming environment for PCs, MACs and workstations

Status

*MAC Dump program being distributed to 53 universities/businesses has generated $9,500

*DARPA project will help Center to establish leadership in object-oriented programming

*Phase 1 of common programming environment is nearing completion.

Economic Impact

*Spin-off company formed: **HIPPO Software**

*Joint license between Hippo and another Utah company to distribute in Asia

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Center for Solid Waste Recycling

Dr. Reed M. Nielsen/Utah State University/Logan, Utah

Established 1991. The separation of recyclables from waste streams is currently a hand process. A prototype machine has been developed that will collect and transform polystyrene (gathered from waste streams) into raw material suitable for manufacturing a variety of consumer products. There is no automated equipment for the collection of polystyrene on the market at the present time.

Overview

Current State Contract	$50,000
FY92 Matching Funds	$106,000
Cumulative Match . .	$260,000
Total Jobs Created	4
Industry	0
Center	4
Direct Center Spin-offs	0
Total Benefiting Utah Companies	1
Patents Applied	1
Patents Issued	0
License Agreements	0

Technologies

*Designed, refined and fabricated automated equipment for removing polystyrene from predictable waste streams.

*Polystyrene sortation and densification

Status

*The second phase automated equipment has been installed in a recycling plant for field test and evaluation

*Patent application filed

*Automatic Densifier ready for production

Economic Impact

*Preliminary work on a license agreement has begun

*Working closely with Huntsman Chemical

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Utah Supercomputing Institute

Dr. David M. Grant/University of Utah/SLC, Utah

Established in 1989, in conjunction with researchers from IBM, the mission of USI is to establish a High Performance Computing Center to serve as a computational resource for Utah companies and universities. This partnership among industry and education is a unique resource for solving scientific and engineering problems that require unusually large memory and visualization requirements.

Overview	Technologies	Status	Economic Impact
Current State Contract . $250,000 Matching Funds .... $4,370,000 Cumulative ..... $34,501,000 Industry Jobs Created ..... - Center Related Jobs ..... 17 Benefiting Utah Companies .... 9 Patents Applied ..... 0 Patents Issued ..... 0 License Agreements 1	*Fully operational site *Developing infrastructure associated with a high speed communications network and numerically intensive computing resources *Application of computer codes to scientific and engineering problems requiring numerically intensive high end visualization computer resources	*IBM 3090 600 installed at University of Utah (operational) *Increasing cooperative use between universities *Newsletter published giving information on access and use *UNIX operating system under Beta Test *Designated as a large memory competency center by IBM *2 full time visualization specialists from IBM are working at the center *Exploring a roll-over into a new IBM 390/900 supercomputer that is 3 times as fast and increased memory capacity	*IBM has contracted for $13M in matching funds *Negotiating on printer technology with IBM (potential $2M) *Also negotiating visualization package worth approximately $2 million *Signed a new 3 year agreement with IBM regarding visualization

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Utah Research Institute

Dr. David Norton/Utah State University/Logan, Utah

Established as a center in 1987. The main focus is described by "Parts on Demand System (PODS)", a cooperative effort among Utah's largest universities to implement a paperless order and production process for small parts. Combined resources have enabled URI to successfully compete for military and industrial contracts.

Overview

Current State Contract . $57,500

FY92 Matching Funds $5,100,000
Cumulative $10,843,980

Total Jobs Created 87
Industry 0
Center 87

Direct Center Spin-offs 0

Total Benefiting Utah Companies 0

License Agreements 0

Patents Applied 0

Patents Issued 0

Technologies

*Computer Aided Logistics Systems (CALS)

*Parts on Demand Systems (PODS)

*Prototypes to solve manufacturing problems

*Management systems to control engineering and manufacturing

*Evaluate and test software

Status

*Submitted proposal to General Motors & foreign governments for $10 M

*Defining statement of work with Ogden Air Logistics Command for maintenance of Air Force weapons systems.

*Opportunity to work as a subcontractor with BDM Corporation in a Design Engineering Program Phase II for the Ogden Air Logistic Center

Economic Impact

*Successful bidder on CALS/PODS program for Ogden Air Logistics Command ($4.5 M)

*Definition of statement of work on Air Force Weapons System Maintenance should yield $1 M contract

*Awarded $380,000 contract to provide software engineering services to the Air Force Software Technology Support Center (STSC). Significant long term opportunity within the Air Force and Department of Defense

*Received a $3.7 million contract to help develop, test and install a Spare Parts Productions and Reprocurement System (SPARES) for Ogden Air Logistics Center

Center for Value Added Seed Technology

Dr. Grant Vest/Utah State University/Logan, Utah

Established center in 1991. The center is developing agricultural products that will prevent major yield losses for wheat and barley producers in Utah. In addition to patented breeding lines of wheat that will increase yields 10 to 15%, a special turf seed is being researched that is drought resistant.

Overview

Current State Contract	$70,000
FY92 Matching Funds	$168,613
Cumulative	$210,913
Total Jobs Created	17
Industry	0
Center	17
Direct Center Spin-offs	0
Total Benefiting Utah Companies	0
License Agreements	0
Patents Applied	0
Patents Issued	0

Technologies

*Biotechnology
- Plant tissue culture
- Molecular procedures
- PCR, RAPD, RFLP Procedures

*Plant Physiology

*Plant Breeding, Genetics and Cytogenetics

*Develop drought-tolerance turf

*Transfer apomixis from wild grass species into commercial small grain crops

Status

*Current grass breeding program has led to the development of two crested wheatgrass breeding populations suitable as turfs

*Efforts to transfer DNA from sainfoin (bloat safe) to alfalfa (bloat causing) via microinjection and electroporation is underway

*Developing improved varieties of small grains and forages

Economic Impact

*Received a USDA grant of almost $90,000

*Drought tolerant turfgrass will be released in three years

*Hybrid wheat could create value added wheat seed production for Cache Valley

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Center for VLSI Design

Dr. Kent F. Smith/University of Utah/SLC, Utah

Established center in 1991. A new technology called Path Programmable Logic (PPL) is an innovative design approach for compact integrated circuits. This technology has been developed in response to an identified marked niche for a less expensive, more user-friendly design program. The ability to interface PPL with other commercial software packages makes this design program attractive to smaller engineering firms needing custom integrated circuits.

Overview

Current State Contract $100,000

FY92 Matching Funds $819,000
Cumulative $1,065,000

Total Jobs Created 71
Industry 53
Center 18

Direct Center Spin-offs 1

Total Benefiting Utah Companies 5

License Agreements 1

Patents Applied 0

Patents Issued 0

Technologies

*Research and development of tools for design of integrated circuits

*Physical placement of logic software, libraries and cell libraries

*Interfaces to 3rd party software

Status

*Transfer of source code of licensed technology to private Utah company

*Development of new tools and libraries in CMOS, GaAs and HBT technologies

*New graphical user interface under development

*Presently writing proposals to NSF and DARPA

Economic Impact

*Joint venture was formed with a European company to sell center products in Europe

*First generation sales of software beginning

*Beginning discussions with companies in the Pacific Rim

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Center for X-Ray Imaging

Dr. Larry Knight/Brigham Young University/Provo, Utah

Established in 1987, this center has successfully commercialized x-ray research by carving a product niche among the biggest manufacturers in the analytic instrument business. The ability to reflect and focus x-rays permit scientists to achieve remarkably high resolution when measuring minute objects. Experiments should begin soon on the compact x-ray laser, an instrument necessary for the success of the Strategic Defense Initiative. In addition to defense applications, advanced x-ray technology is used to detect trace materials in substances and would provide simpler, safer medical testing. Continued funding from national laboratories (LLNL, Oakridge). Support in excess of $13 million, private sector.

Overview

Current State Contract $100,000

Matching Funds $185,000
Cumulative $1,825,568

Total Jobs Created 47
Industry 27
Center 20

Direct Center Spin-offs 1

Benefiting Utah Companies ... 2

License Agreements 1

Patents Applied 4

Patents Issued 4

Technologies

*Atomic Layer Epitaxy (ALE)

*MultiLayer X-ray Optics

*Leading edge technology in X-ray imaging

*X-ray laser technology

*Thin film technology and diagnostics

*Bright x-ray sources

*Electronic x-ray detectors

*Damage resistant nano structures

*Pure silicon production

Status

*Spin-off company **MOXTEK** created 16 jobs & sales of over $1M

*10 years of experience in a difficult research area. Have become leaders with little or no competition

*Can create multi-layer reflectors with film thicknesses between 3 and 20A

*Technologies with commercial potential include:
- Micro x-ray source
- Reflective x-ray optics
- X-ray laser
- Phase microscope
- Submitted 3 proposals for federal grant programs (ATP, AXOP and CRADA)

Economic Impact

*Spin-off company, MOXTEK has received four Phase I SBIR grants and one Phase II SBIR

*Near term market for large & small X-ray windows is $6 million annually

*$100 million markets possible in medical & non-destructive testing areas

*MOXTEK negotiating with venture capital companies for expansion

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Center for 3-D Software

Eric Pedersen/Dixie College/St.George, Utah

Established center in 1991, to study practical application of three dimensional modeling for the graphic arts industry. A main focus is to conduct market research on three dimensional modeling, digitizing, and rendering tools and then produce those tools. Along with the tools, the Center is developing 3d shapes and attribute libraries.

Overview

Current State Contract	$50,000
Matching Funds	$145,432
Cumulative	$145,432
Total Jobs Created	35
Industry	29
Center	6
Direct Center Spin-offs	1
Companies Relocating to Utah	1
Total Benefiting Utah Cmpanies	3
License Agreements	2
Patents Applied	0
Patents Issued	0

Technologies

*Create software libraries of three dimensional shapes and textures

*Studying practical applications of three dimensional modeling for the graphic arts industry

Status

*4 texture libraries are in the market

*Agreed to co-develop source code for a new computer graphics product with Utah company Mira Imaging

*Center is a consortium of Dixie College's graphic arts, art and computer science departments

*Licensing software code-illustrator importer

Economic Impact

*Newly created libraries are distributed internationally through Strata, Inc. of St. George. Dixie College receives a royalty from sales

*Conduct an annual seminar that is self-sufficient. Provides a direct marketing avenue for products developed at the Center

*The school receives a royalty from college research and industry interaction

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Distinguished Centers

Center for Advanced Combustion Engineering Research

Distinguished Center

Dr. L. Douglas Smoot/Brigham Young University/Provo, Utah
Dr. David Pershing/University of Utah/Salt Lake City, Utah

Established as a center in 1986 as a joint project between BYU and the U of U. This center is working towards the clean and efficient use of low-grade fossil fuels. Near term emphasis is on the development of advanced combustion technology that will take advantage of alternative low-cost fuel resources such as coal, heavy oil, oil shale and tar sands. All of these fuel sources are abundant in Utah. Received "Distinguished Center" status in 1991.

Overview

Current State Contract . . . $100,000

FY92 Matching Funds . . $2,501,889
Cumulative $17,239,640

Total Jobs Created 271
Industry 130
Center 141

Direct Center Spin-offs 2

Total Benefiting Utah Companies . . 9

License Agreements 30

Patents Applied 0

Patents Issued 0

Technologies

*Combustion process strategies

*Fuel structure reaction mechanisms

*Fuel minerals

*Mechanisms for pollutant formation and control

*Reacting, turbulent flows

*Comprehensive model development

*ACERC 3-dimensional computer simulation of combustion process code (computer-aided design combustion technology)

Status

*Center recognized as a leading world combustion research center

*Created one new combustion reactor for research on the use of fluidized bed in toxic waste disposal

*Continue to host national and international meetings & guest speakers

*True collaboration between eight universities

Economic Impact

*$13.4 million grant from National Science Foundation from 1989-1994

*Annual direct and supported research effort of over $7,000,000/year

*Research equipment at the Center exceeds $13,000,000

*New spin-off company: Combustion Services Inc.

*Source of new technology for Center members within the State, including Geneva Steel

*4 new industrial contracts have been approved worth $490,000

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Center for Total Artificial Hearts & Biomedical Devices

Distinguished Center

Dr. Donald B. Olsen/University of Utah/SLC, Utah

Established as a center in 1987. Currently developing the first electro-hydraulic artificial heart (an advanced version of the JARVIK-7) which utilizes a single energy converter and unified ventricles that will fit in humans. Other implant projects include the urinary bladder, urethra, ureter and a sphincter. The center's scope of research includes: conceptualization, prototype development, fabrication, bench and implant testing and assessment. Received "Distinguished Center" status in 1991.

Overview

Current State Contract $20,000

FY92 Matching Funds ... $2,769,003
Cumulative $10,755,877

Total Jobs Created 51
Center 51

Direct Center Spin-offs 0

Total Benefiting Utah Companies ... 0

License Agreements 3

Patents Applied 3

Patents Issued 2

Technologies

*Engineering-miniature hydraulics, device design, design analysis, CNC machining capability, computer machining capability, device fabrication, polymers, plastics, metallics and QA/QC

*Electrical design & fabrication

*Integrated circuits & VLSI

*Device testing

*Animal experimentation-surgery, radiology, hematology, immunology, biochemistry, pathology, device retrieval analysis

Status

*Have established shared leadership in electric artificial heart projects

*Have only system with motor backup capabilities

*Considered world leader in artificial organ research

*Conducting animal studies for fully implantable electric artificial heart

Economic Impact

*$10 million backlog in research

*Have formed joint venture company, Cardio West with Ariz. Med Ctr.

*Re-acquired pneumatic heart rights to reinstate testing.

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Center for Biopolymers at Interfaces

Distinguished Center

Dr. Karin D. Caldwell/University of Utah/SLC,Utah

Established as a center in 1986, this is an internationally recognized industrial membership center whose focus is the study of interfacial interactions between biological and artificial materials. Knowledge of these interactions has provided valuable insight into the biocompatability of implant materials. Research is being applied to the areas of artificial organ and implant production, production of contact lenses and diagnostic devices and the development of numerous industrial products. Received Distinguished Center status in 1991.

Overview

Current State Contract 0

Matching Funds $822,395
Cumulative $4,232,182

Total Jobs Created 40
Industry 10
Center Related Jobs 30

Direct Center Spin-offs 1

Companies Relocating to Utah 1

Tot.Benefiting Utah Companies 5

License Agreements 0

Patents Applied 12

Patents Issued 1

Technologies

*Biosensors

*Purification of materials

*Diagnostics

*Artificial organ and implant production

*Contact lenses and diagnostic devices

*Researching surface interactions to assist the following industries:
- Food processing
- Medical devices
- Scientific instruments
- Pharmaceuticals
- Cosmetics

*Studying the interaction of proteins and nucleic acids with synthetic surfaces

*Develop methods for monitoring the status (concentration/activity) of proteins absorbed or bound to surfaces

Status

*4 Utah companies are current center members

*23 member organizations representing the largest biomedical companies in the world

*Semi-annual meetings hosted in Salt Lake City bring attendees from around the country

*12-15 projects funded annually after internal reviews are conducted

*Interdisciplinary approach; member scientists come from 4 different colleges representing eight academic departments

*12 patents pending; 1 disclosure filed

*Consortia of faculty members and students from U of U College of Engineering, Science, Pharmacy and School of Medicine as well as faculty from BYU.

Economic Impact

*Service labs are offering specialized analysis services to outside companies and organizations on a fee basis

*New company formed: Protein Solutions, Inc.

*Silicon Graphics, Inc. moved to Utah as a result of center technology (7 employees)

*Center is working vigorously to help move a member company here or to expand an existing Utah company using CBI technologies

*Significant fraction of the $19.8 million allocated from federal sources for the soon to be built Biomedical Polymers Building

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Center for Controlled Chemical Delivery

Distinguished Center

Dr. Sung Wan Kim/University of Utah/SLC, Utah

Established as a center in 1986. A world leader in drug delivery systems, this center is developing innovative delivery systems for pharmaceutical and chemical agents. One of their spin-off companies recently announced a multi-million dollar research contract with Syntex, a multi-billion dollar in sales U.S. pharmaceutical company. Researchers are working on oral delivery systems for insulin that will promote absorption. Additional systems are being designed for the continuous release of drugs for anit-hypertensive and anti-cancer therapy. Received "Distinguished Center" status in 1991.

Overview

Current State Contract $100,000

FY92 Matching Funds $1,489,257
Cumulative $10,661,063

Total Jobs Created 131
Industry 89
Center 42

Direct Center Spin-offs 1

Total Benefiting Utah Companies 3

License Agreements 4

Patents Applied 14

Patents Issued 2

Technologies

*Membrane transport

*Novel hydrogels

*Polymeric surfactants

*Macromolecular drugs

*Heparin removal filters

*Insulin delivery systems

*Design of nonthrombogenic surfaces

*Oral delivery of peptides (insulin)

*Biodegradable polymeric prodrugs

*Colon targeting

*Targetable anti-cancer systems

Status

*Heparin removal filters are being developed as a disposable system to remove excessive amounts of heparin from circulating blood

*Research continues on the self-regulated insulin delivery system

*Sponsors international symposium on drug delivery systems every other year

*Nine patents licensed to two Utah companies

*Over 50 researchers toured CCCD facilities to discuss future research collaboration and joint research

Economic Impact

*Spin-off TheraTech, Inc. has 60 employees with $3.5 M in sales in 1992

*Successful 9M IPO in 1991

*New spin-off company, Insutech, Inc. formed to specialize in insulin delivery systems

*TTI will begin marketing a female hormone patch, est. $5 million first year

*Research Medical, another Utah company, is developing a heparin filter based on center technology which should produce sales of $50 million/year

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Center for Engineering Design

Distinguished Center

Dr. Stephen C. Jacobsen/University of Utah/SLC, Utah

Established center in 1986. Projects include artificial limbs, drug delivery systems, physiological signal monitors, artificial kidneys, robots and microelectro-mechanical systems. Received Distinguished Center status in 1991.

Overview

Current State Contract $100,000

FY92 Matching Funds $1,866,853
Cumulative $16,579,286

Total Jobs Created 102
Industry 57
Center 45

Direct Center Spin-offs 3

Total Benefiting Utah Companies 4

License Agreements 2

Patents Applied 5

Patents Issued 36

Technologies

*Drug delivery systems

*Physiological signal monitor

*Robotics

*Microelectro-mechanical systems

*Artificial Limbs

*Artificial Kidneys

*Teleoperation

Status

*Robots with 54 degrees of freedom

*Artificial limbs now widely sold

*Working on development of miniature motor with rotor the diameter of human hair

*New contracts with Disney, Merck and Navy Dept.

*2 Licensing Agreements

*15 Research papers published or submitted nationally - 1991

Economic Impact

*Recipient of major federal grants from DARPA and NSF

*Have created 3 companies with sales totalling $15 million annually and 15% pretax profit

*Have created 109 jobs including 35 professional engineers

*New robot contract will introduce technology to Europe

*Annual funding of $3.5 million (COEP funds represent 4 to 5% of operating budget)

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Center for Space Engineering Research

Distinguished Center

Dr. Frank Redd/Utah State University/Logan Utah

Established as a center in 1986. This center is Utah's leader for new technology developments involving space remote and in-situ sensing systems, image compression technology and small satellite systems. Sensing equipment developed at the center was the primary experimental effort on a recent shuttle mission. Besides creating six private companies, the center's research benefits many commercial space-oriented firms in Utah. Received "Distinguished Center" Status in 1991.

Overview

Current State Contract $0

FY92 Matching Funds . $407,566
Cumulative $7,857,408

Total Jobs Created 292
Industry 284
Center 8

Direct Center Spinoffs 6

Total Benefiting Utah Companies 8

License Agreements 7

Patents Applied 4

Patents Issued 1

Technologies

*Infrared instrumentation
*Sensor calibration
*Upper atmosphere measurements & modeling
*Plasma diagnostics
*Data analysis
*Image compression technology
*Cryogenic systems
*Program management
*New technology developments in space remote and in-situ sensing systems
*Storage of medical imagery
*Anticipating NASA contract for a commercial remote sensing small satellite
*Satellite - borne imaging systems for commercial and military applications
*Video phones and direct satellite broadcast TV
*Contracted to develop "Micro Satellites" from McDonnell Douglas
*Small Satellite control systems
*Small Spacecraft Systems

Status

*Increased annual operating budget to $20 M
*Successfully competed to win $20 M contract for critical SDI satellite (1992 launch)
*Now host nationally recognized annual small satellite conference
*Have flown 350 payloads, 75 of which involved cryogenics
*Have become a space grant university with U of U, BYU & Denver U.

Economic Impact

*Image compression technology demonstration will facilitate new concept in video phones(market size equal to VCR's)

*Pursuing joint composite projects with a BYU Center of Excellence and Hercules Corporation

*Development of space cryogenic technology promises expansion in economic opportunities

*Tremendous success of the CIRRIS 1A experiment aboard the space shuttle Discovery promises increased business opportunity as Dept of Defense Market becomes more competitive

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Center for Supercritical Fluid

Distinguished Center

Dr. Milton Lee/Brigham Young University/Provo, Utah

Established in 1986, this center provides a focal point for research and development, education, training in the area of chemical analysis where high resolution separation and high sensitivity detection are emphasized.

Overview

Current State Contract $0

FY92 Matching Funds . $174,479
Cumulative $3,011,676

Total Jobs Created 52
Industry 36
Center 16

Direct Center Spin-offs 2

Total Benefiting UT. Companies 3

License Agreements 3

Patents Applied 3

Patents Issued 6

Technologies

*Supercritical fluid chromotography and extraction

*Radio frequency plasma detection

*Time-of-flight mass spectrometry

*Capillary chromotography and electrophoresis

Status

*Time-of-flight mass spec. patent issued

*Prototypes built and tested

*Production instruments under construction

*Plasma ION source for elementry analysis under development

Economic Impact

*Spin-off company: **Lee Scientific** has had $1.6M in revenues over past 6 months

*Spin-off company: **Sensar** has sold its first mass spectrometer

***Sensar** in final negotiations for venture funding

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Appendices

UTAH CENTERS OF EXCELLENCE Cumulative Statistics
11/1/91 to 11/1/92

Center	Year founded	Ins	FY'92 State Contract	Cum. State Contract	FY'92 Match	Cumulative Match	Equipment Value	Ctr. Empl. & Grad.	Avg. Ctr Salary	Ind. Empl.	Avg. Ind. Salary	Ctr. Visit	New Co. 1992	New Co. Cum.	Patent	Patent Pend.	Lic. Agrmt.	User Co.	Co. Moved to Utah
ACTIVE																			
Aerospace	1988	WSU	$50,000	$675,000	$424,043	$2,467,992	$2,500,000	9	$14,556	26	$42,500	55	0	2	0	0	0	5	1
Biocatalysis	1988	USU	$0	$840,000	$2,465,000	$3,189,030	$2,250,000	20	$16,350	0	$0	13	1	1	0	3	1	4	0
Biotechnology	1987	USU	$100,000	$910,000	$646,560	$4,358,096	$1,312,313	20	$23,970	0	$0	60	1	1	2	1	1	7	0
CA2EDM	1991	BYU	$100,000	$100,000	$272,753	$738,470	$645,000	41	$27,073	75	$34,146	96	0	0	0	0	9	10	0
Cancer Genetics	1991	U/U	$100,000	$100,000	$2,129,646	$10,063,658	$375,000	28	$31,312	10	$52,500	3	0	1	0	1	1	1	0
Chem. Separation	1987	BYU	$50,000	$796,645	$409,445	$2,204,025	$25,000	16	$7,831	25	$25,800	14	0	1	9	14	1	9	0
Chem. Tech.	1990	WSU	$100,000	$174,000	$171,033	$614,787	$2,865,000	9	$28,178	189	$24,769	687	0	0	1	3	3	26	0
Composites	1990	BYU	$165,000	$165,000	$1,239,413	$2,283,541	$493,000	30	$21,866	81	$20,429	110	9	19	1	3	1	34	1
Dairy	1990	USU	$130,000	$150,000	$555,000	$1,113,000	$350,000	3	$31,000	11	$27,143	58	1	1	0	5	0	3	1
Graphics & Visual	1991	U/U	$100,000	$100,000	$675,000	$2,060,000	$2,500,000	30	$30,000	2	$35,000	2	0	1	0	0	1	1	0
Materials	1988	U/U	$150,000	$755,700	$939,734	$4,340,778	$10,000,000	9	$45,444	45	$63,222	10	0	0	1	3	0	9	0
Meat Processing	1991	USU	$100,000	$169,640	$88,890	$304,840	$270,000	9	$18,000	16	$13,250	35	0	2	0	2	1	6	1
Software Sci.	1990	U/U	$100,000	$170,938	$1,499,239	$5,737,393	$2,533,304	27	$49,978	5	$18,600	3	1	1	0	0	1	1	0
Solid Waste	1991	USU	$50,000	$50,000	$106,000	$260,000	$150,000	4	$30,500	0	$0	9	0	0	0	1	0	1	0
Supercomputer	1989	U/U	$250,000	$1,125,000	$4,370,000	$34,501,000	$5,000,000	17	$34,882	0	$0	21	0	0	0	0	1	9	0
Tomography	1989	U/U	$100,000	$167,400	$614,840	$1,342,761	$1,545,000	26	$28,615	36	$38,694	73	1	2	5	2	2	9	0
URI	1987	USU	$57,500	$895,500	$5,100,000	$10,843,980	$0	87	$27,245	0	$0	0	0	0	0	0	0	0	0
Value Seed	1991	USU	$70,000	$70,000	$168,613	$210,913	$1,020,000	17	$33,270	0	$0	0	0	0	0	0	0	0	0
VLSI Design	1991	U/U	$100,000	$125,123	$819,000	$1,065,000	$520,000	18	$31,277	53	$27,659	20	0	1	0	0	1	5	0
X-Ray	1987	BYU	$100,000	$560,000	$185,000	$1,825,568	$1,620,000	20	$38,760	27	$25,925	11	0	1	4	4	1	2	0
3D Software	1991	DIX	$50,000	$60,760	$145,432	$145,432	$287,500	6	$17,874	29	$21,094	15	1	1	0	0	2	3	1
Totals			$2,022,500	$8,160,706	$23,024,641	$89,670,264	$36,261,117	446	$587,981	630	$470,731	1,295	15	35	23	42	27	145	5

Current Match Ratio: 14.95
Annualized Economic Impact: $96,750,962
Annual Return to State: $12,093,870
Ratio: 5.16

Total Jobs: 2,174
Average Salary: $29,669

DISTINGUISHED																			
ACERC	1986	BYU	$100,000	$600,000	$2,501,889	$17,239,640	$13,000,000	141	$27,707	130	$30,720	131	1	2	0	0	30	9	0
Artificial Heart	1987	U/U	$20,000	$475,000	$2,769,003	$10,755,877	$2,000,000	51	$30,323	0	0	0	0	0	2	3	3	0	0
Biopolymers	1986	U/U	$0	$670,000	$822,395	$4,232,182	$3,063,680	30	$22,833	10	$34,912	9	0	1	1	12	0	5	0
CCCD	1986	U/U	$100,000	$646,000	$1,489,257	$10,661,063	$530,000	42	$22,829	89	$35,548	46	0	1	2	14	4	3	0
Eng. Design	1986	U/U	$100,000	$863,000	$1,866,853	$16,579,286	$2,300,000	45	$38,880	57	$35,376	3,076	0	3	36	5	2	4	0
Space Engineering	1986	USU	$0	$1,050,000	$407,566	$7,857,408	$3,440,000	8	$33,000	284	$32,666	55	0	6	1	4	7	8	0
Supercritical Fld	1986	BYU	$0	$0	$174,479	$3,011,676	$1,000,000	16	$27,750	36	$34,562	49	0	2	6	3	3	3	0
Totals			$320,000	$4,304,000	$10,031,442	$70,337,132	$25,333,680	333	$203,322	606	$203,784	3,366	1	15	48	41	49	32	0
GRADUATED/DISCONTINUED																			
Coal	1987	U/U	$0	$390,000	$1,160,078	$2,886,810	$1,950,000	10	$16,000	16	$0	3	1	2	9	3	4	3	0
Info. Tech	1988	USU	$0	$436,325	$303,495	$5,832,196	$600,000	52	$26,333	28	$35,333	27	0	1	0	0	2	4	1
Comp. Bas. Ed.	1987	BYU	$0	$510,000	$221,483	$1,101,624	$263,768	8	$8,280	21	$20,426	0	0	1	0	0	0	2	0
Qual. & Int. Des.	1988	U/U	$0	$260,000	$286,000	$921,018	$2,400,000	16	$14,250	8	$10,750	8	0	2	0	2	2	2	0
Totals			$0	$1,596,325	$1,971,056	$10,741,648	$5,213,768	86	$64,863	73	$66,509	38	1	6	9	5	8	11	1
FINAL TOTALS			$2,342,500	$14,061,031	$35,027,139	$170,749,044	$66,808,565	865	$27,851	1,309	$30,871	4,699	17	56	80	88	84	188	6