



THE PENN STATE BEHREND ECONOMIC DEVELOPMENT STORY

Spring 2007

Penn State Erie, The Behrend College, is an undergraduate and graduate college of a major research and land-grant university—The Pennsylvania State University. Land-grant institutions were founded with the idea that higher education could maintain classical and scientific studies but also should be responsive to the needs of the public. Penn State Behrend takes this land-grant mission seriously, as is reflected in this passage from the college's mission statement:

Penn State Behrend provides innovative, integrated and high-quality teaching, research, and outreach programs, with a particular focus on serving the tristate region's economic, social, and intellectual development.

To this end, the college has developed a number of initiatives that attend to community needs, especially in the area of economic and community development. These outreach- and research-related programs fall into four broad categories that build on the college's physical and intellectual capacity.

Knowledge Park. A 200-acre of campus reserved for research and development.

Applied research, education, and technology transfer. Centers and institutes related to such things as plastics, economics, radio frequency identification technology (RFID), eBusiness, engineering design, and customized education and training. In addition, college staff serves as conduit to the many resources available at all University locations, including more than 100 research centers located at the University Park campus and University-wide technology transfer programs.

Promoting innovation. The college is committed to driving the creation and implementation of new or improved products, processes, or services leading to commercial success.

Facilities. Penn State Behrend has fifty-one buildings on its 725-acre campus. Facilities include classroom and laboratory space, computer labs, a state-of-the-art athletics center, and a 160,000-square-foot Research and Economic Development Center housing the School of Engineering, and the Sam and Irene Black School of business.

Due to the longstanding commitment to economic and community development at the college, Penn State Behrend is considered a lead driver of economic development in the region.

In addition to direct efforts in economic and community development, the college also adds a great deal to the regional economy.

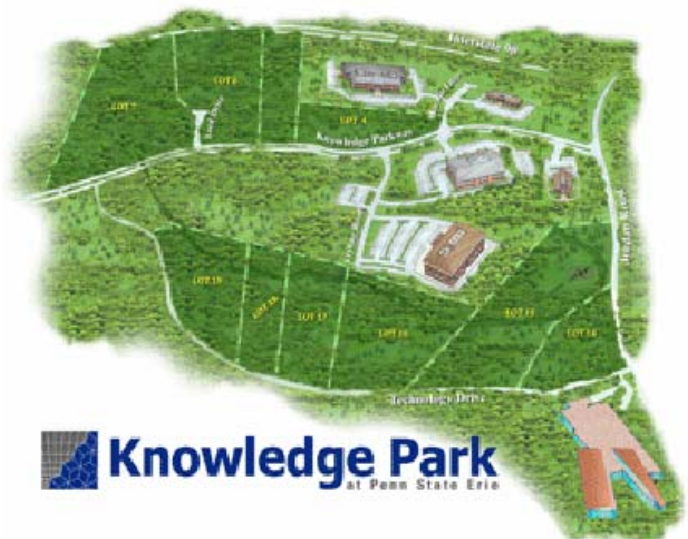
Tripp Umbach and Associates, Inc., the nation's leading provider of economic impact analysis, conducted a comprehensive study of the economic, employment, and community benefits created by Penn State Behrend within the Commonwealth of Pennsylvania and within Erie County. The college contributes significantly to Penn State's business volume impact of nearly \$125 million in surrounding Crawford, Erie, Venango, and Warren Counties.

Key findings:

- In 2003, the college contributed nearly \$158.9 million to the state's economy and nearly \$99.2 million to the economy of Erie County.
- The college is responsible for the employment of more than 1,300 persons in various sectors throughout the Commonwealth and more than 800 persons in Erie County.
- In 2003, the college generated more than \$7.2 million in tax revenue for Pennsylvania and more than \$1.6 million in government revenue for Erie County.
- Employees at the college contribute \$2.6 million annually in local charitable donations and volunteer services within the region.
- Students at the college contribute \$8.0 million annually in local charitable donations and volunteer services within the region.

KNOWLEDGE PARK AT PENN STATE ERIE

Jointly developed by Penn State Behrend and the Greater Erie Industrial Development Corporation (GEIDC), Knowledge Park offers a superior technological infrastructure and close ties to the college's strengths in applied research and technology transfer. In an atmosphere that promotes innovation, the park is accelerating the creation, recruitment, and expansion of knowledge-based organizations that focus on engineering, information management, and science. Close interaction of tenants with the college's faculty, staff, and students is a vital component of this collaborative environment.



Key Attributes of the park include:

- a beautiful park-like campus setting;
- access to the college's faculty, staff, and students;
- access to research centers, educational resources, and events;
- the latest telecommunications infrastructure;
- access to conferencing, training, and child care facilities.

Knowledge Park encompasses 200 acres of Penn State Behrend's campus including more than twenty sites for buildings of 40,000 square feet or more. These sites are fully served by utilities, and nine sites are available for immediate construction. The first corporate multi-tenant building is a two-story, 72,000-square-foot structure. Space is available for lease in a second 66,000-square-foot multi-tenant building. A third, 36,000-square-foot building has several offices available. Subsequent buildings will include leasing, build-to-suit, and corporate-built options.



Knowledge Park is designed for organizations that want to develop knowledge-driven partnerships with other like-minded companies, Penn State Behrend, or other institutions of higher education in order to accelerate their competitive advantage. The park is not simply a real estate venture; it brings forward-thinking organizations together with faculty members, staff, and students providing access to interns, part- and full-time employees, fundamental- and applied-research opportunities, and education- and technology-transfer services.

A typical park prospect is characterized by one or more of the following:

- Serves as corporate headquarters for a knowledge-based company.
- Conducts applied or fundamental research and development.
- Includes part or product prototyping as well as pilot plants.
- Is involved in development and delivery of information technologies.
- Is a knowledge-based business start-up.

Knowledge Park had twelve tenants as of April 2007 with a total of 475 employees:

Tenants include:

- ***CMI EPTI, LLC***

CMI EPTI is a major supplier of horizontal HRSGs (heat recovery steam generators) to the power industry in North America and internationally. The primary business of

CMI EPTI is the design, supply, and aftermarket services of HRSGs.

CMI EPTI has been in the power and boiler business for over 160 years, tracing its Erie roots back to Presque Isle Foundry, Erie City Iron Works, Zurn Industries' Energy Division, Aalborg Industries, and Erie Power Technologies, Inc. Parent company, CMI Belgium, with over 100 years of boiler and power industry history, is a major supplier of vertical HRSG technology. Through these combined efforts, CMI EPTI will be capable of supplying power projects in any part of the world.



- ***InDeck Keystone Energy, LLC***

InDeck provides the Keystone Series watertube steam boilers, which are designed with the flexibility to meet special project requirements using InDeck's experience

gained from erecting more than 1,000 units. Steam generation is an ideal way to recover waste heat energy from waste gases in a form most easily utilized.

InDeck also is a supplier of OEM parts and services; e.g., stationary boilers for Erie City Iron Works, Zurn Industries' Energy Division, and Aalborg Industries, Inc. InDeck also provides comprehensive repair and upgrade capability for many products, including heat recovery steam generators, economizers, air heaters, and preheaters.

- ***Erie Insurance Group***

Erie Insurance Group, based in Erie, Pennsylvania, is the fourteenth largest automobile insurer in the United States based on direct premiums written and the twenty-second largest property/casualty insurer in the United States based on total lines net premium written. The Group, rated A+ (Superior) by A.M. Best Company, has almost 3.8 million policies in force and operates in eleven states and the District of Columbia.

- ***eBizITPA***

The Center for eBusiness and Advanced IT (eBizITPA) is a statewide Ben Franklin Technology Development Authority initiative designed to help Pennsylvania businesses understand, develop, and deploy information technology and e-business tools to be more competitive.



- ***Ben Franklin Technology PARTners of Central and Northern Pennsylvania***

For more than twenty years, Ben Franklin Technology PARTners CNP has been successful in bringing together representatives from business, industry, and education to stimulate economic growth and employment in the Commonwealth. This proud achievement has been the result of Ben Franklin's commitment to provide funding and operational assistance to emerging technology-based companies and existing small manufacturers that are developing innovative products/processes or attempting to get into new markets.

- ***Spinworks LLC***

This technology company develops and produces silicon carbide radiant tube inserts to help recapture lost heat in industrial furnaces that can result in significant savings in energy costs to industry. Spinworks invented a device called a Spyrocor, which saves approximately 5-20 percent on fuel costs per year.

- ***VertMarkets***

VertMarkets provides industry-specific online sales and marketing products and services to small- and medium-sized suppliers. VertMarkets is the leader in e-commerce enablement, with marketplace solutions that attract and connect buyers and suppliers online through its sixty-eight industry-specific marketplaces.



- ***iMBA - Penn State World Campus***

The iMBA features instruction by Penn State graduate faculty members that can be accessed anytime, anywhere. The program provides a learning option for people

busy with career and family responsibilities. Students can complete the 48-credit program in two years, without having to quit their jobs or relocate.

- ***Plastics Services Network***
Plastics Services Network was established in 1991 in cooperation with Penn State Erie, The Behrend College. It is a unique organization that offers consulting and testing services to the plastics industry including part design, process and material selection, material testing, product development, and training.
- ***Paradigm Wave, Inc.***
Paradigm Wave, Inc. is a global IT solutions provider focused on delivering customer value through high quality processes and cost-efficient solutions. Its teams provide the entire range of IT solutions from strategy consulting to implementation and maintenance across a range of vertical domains such as telecom, transportation, healthcare, manufacturing, education, and government.
- ***Economic Development Corporation of Erie County***
The Economic Development Corporation of Erie County is a private non-profit agency that facilitates the creation of new jobs and wealth by providing technical assistance, financing, and real estate programs to organizations that can be engines for economic growth and community prosperity.
- ***Child Care Center***
The 8,500-square-foot center offers accredited, affordable, high-quality child care to children of Penn State faculty, staff, students, and alumni; Knowledge Park employees; and the Erie community.



CENTERS AND AFFILIATED RESOURCES

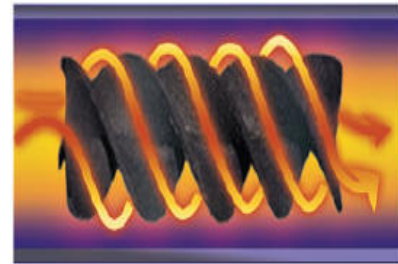
- ***Center for eBusiness and Advanced IT (eBizITPA)***
In late 2002, eBizITPA was established as a Ben Franklin Center of Excellence located at Knowledge Park. This public/private partnership brought together resources from General Electric, the region's largest employer; Penn State Behrend, the region's largest university; and the Erie County Economic Development Corporation, the region's largest economic development partner, to form a regional technology-based economic development organization. Its goal is to serve the fourteen rural counties of northwest Pennsylvania in creating and developing new programs and tools to serve the fledgling information technology industry as well as the growing information technology needs of the thousands of small companies in the region. Once tested, these programs could be expanded to the many rural counties across Pennsylvania that do not have the resources of urban centers such as Philadelphia and Pittsburgh.

Specific programs and activities include education and training programs in e-business and supply-chain IT; research and business development consultation and funds for advanced IT projects; technology transfer in e-business and advanced information technologies for use by Pennsylvania companies; apprenticeships to build a cost-effective pool of information technology talent; grant programs that raise the visibility and reach of Pennsylvania's IT-related companies; development and implementation of

eDynaQuote, a reverse auction e-sourcing tool that has saved clients an average of 25 percent on purchases and which has driven more than \$10 million of business to Pennsylvania companies; research projects including such things as synthetic vision, development of an untethered tracking device for rail cars, and development of Great Lakes based maritime radar surveillance systems.

A newly developed program targets IT-related product development and includes four areas of support: Marketing Research Assistance – eBizITPA offers 50 percent matching funds, up to \$3,000, for approved primary marketing research projects, and up to eighty hours of market intelligence analysis and studies; Beta Project Assistance – eBizITPA offers financial assistance to help fund beta projects, typical assistance ranges from \$3,000 to \$7,000; Prototype Assistance – eBizITPA offers financial assistance to IT-related businesses wishing to diversify or expand into new markets, typical assistance ranges from \$3,000 to \$12,000; Engineering Apprentice Program – eBizITPA offers financial assistance to cover up to 650 hours of engineering apprentice project time for analytical, research, and design activities in advanced IT areas.

- ***Applied Energy Research Center***, established in January 2006, provides unique and innovative solutions to one problem confronting industry: continually increasing energy costs. This center engages the technical resources of Penn State Behrend's School of Engineering and Engineering Technology and that school's undergraduate students.



The center is located in Penn State Behrend's Research and Economic Development Center (REDC). Start-up was supported by a grant from the Pennsylvania Department of Community and Economic Development's Keystone Innovation Starter Kits grant program (\$231,000). In addition, a grant from the Center for Rural Pennsylvania (\$50,000) funded initial research in wind energy within rural areas of the Commonwealth; future research will be sustained through additional solicited grants and through direct industrial sponsorship. Other possible sources of funding include the United States Department of Energy and the Penelec Sustainable Energy Fund.

Applied research goals include the measurement of industrial process efficiencies through energy-monitoring studies; applying new and emerging technologies to lower the energy costs associated with high-energy consumption industrial processes; transferring energy-saving technologies to industrial sponsors to enhance their profitability and to create and sustain their employment; developing new innovative, patentable, energy-efficient technologies and products for the industrial, power generation, and transportation marketplace; and spinning off new businesses to manufacture these innovative products and retain these companies within the Commonwealth.

- ***The Pennsylvania Technical Assistance Program (PENNTAP)*** is an industrial technology extension partnership that focuses on strengthening Pennsylvania's economy by providing scientific and technological support to business and industry, primarily focusing on improving the competitiveness of small- and medium-sized manufacturing companies. Specific assistance areas include: environmental, food industry, forest products, information technology/e-business, NASA technology transfer, occupational

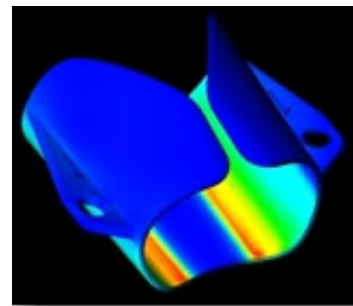


safety and health, product development, and statistical data and analyses. Over the past five years PENNTAP has assisted in the creation or retention of 2,450 jobs and has realized \$73.5 million in economic benefits.

- **Ben Franklin Technology Partners of Central and Northern Pennsylvania (BFTP)**, located in Knowledge Park, provides loans to assist manufacturers address issues related to research and development, technology transfer, and training. In addition, Ben Franklin's affiliated Transformation Business Services Network provides operational assistance to past, current, and potential future portfolio companies. This support is focused in functional areas to augment the capability of the companies' management teams.



- The **Center for Continuing Education** develops and delivers credit and noncredit education and training programs for business and industry, education, and others, and provides assistance for companies seeking grants to defer training costs. The center specializes in customized education programs for business and industry in areas such as lean manufacturing, *Six Sigma* methodologies, project management, management skills (leadership, coaching, supervision, and conflict resolution), sales and marketing, and others. Annually, the center conducts more than fifty customized programs with regional companies.
- The **Plastics Computer-Aided Engineering Center** serves as a plastics industry resource for the development and deployment of computer-aided engineering and design technologies. The center's mission is to justify the implementation of flow analysis software technologies in companies that develop, design, or manufacture plastic products and tooling.
- The **Plastics Technology Center** assists plastic-related companies to become more competitive. The center is an operating unit of the Northwest Pennsylvania Industrial Resource Center. Selected services include product and part design, process improvement, rapid prototyping and tooling, materials testing and analysis, and metal to plastic conversion. The center also directs the *Keystone Ideas* program which leads small companies and entrepreneurs through the product realization cycle while minimizing financial risk during product development.




The Plastics Technology Center, together with the Plastics Computer-Aided Engineering Center, annually work with nearly sixty companies on fee-for-service projects totaling more than \$400,000 and including almost forty new or improved products.

- The **RFID Center of Excellence** is a collaborative effort of the college and eBizITPA. The objectives are to: assist businesses in the implementation of RFID technology in order to increase productivity and reduce costs and prepare for supply chain customer compliance; assist information technology providers to understand and learn RFID technologies; provide RFID implementation services; conduct and coordinate applied



research in the areas of RFID technology and supply chain management; facilitate sharing of the RFID knowledge base among interested University faculty. Center staff has conducted Department of Defense related RFID workshops in five cities throughout Pennsylvania.

- ***Economic Research Institute of Erie (ERIE)*** Established in late 1982, ERIE is an applied research unit of Penn State Behrend's Sam and Irene Black School of Business. The purpose of ERIE is to collect, analyze, interpret and disseminate data, information, and forecasts for the Erie regional economy. Its continuing research program seeks to help the local community better understand the regional economy and its linkages to the national economy. ERIE provides a source of information for local leaders and media who have questions about the local, national and international economies; compiles data on the local economy from a wide range of sources; and helps local users access and evaluate economic-related data. Another important goal of ERIE is to provide students with relevant experience in applied economic research.
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- The logo for the Economic Research Institute of Erie (ERIE) features the word "ERIE" in large, bold, blue capital letters. A white line graph with an upward-pointing arrow is superimposed over the letters. Below "ERIE", the words "Economic Research Institute of Erie" are written in a smaller, blue, sans-serif font.
- The ***School of Engineering and Engineering Technology Applied Research & Design Center*** provides state-of-the-art applied research and technology transfer to benefit industry in areas related to computer, electrical mechanical, and software engineering. Selected areas of expertise include computer-aided design, finite element analysis, manufacturing systems and processes, machine vision, measurements, instrumentation and control, signal processing, fluid flow and heat transfer analysis, vibration, and data communication networks.
 - ***Partnership Erie*** provides non-profit organizations in the Erie region an inexpensive way to establish a presence on the Internet, and provide Penn State Behrend students with practical experience. This outreach center was established to provide complimentary web planning, development, hosting, and maintenance services to the nonprofit community.

PROMOTING INNOVATION

This section describes how the college will assume its role as a major driver of innovation in the region. For purposes of this initiative, innovation is defined as “the creation and implementation of new or improved products, processes, or services leading to commercial success.” The college’s approach includes four key components.

- ***Component 1:*** The college will actively prospect for innovative ideas from a number of sources: Underutilized /orphaned University intellectual property (IP) that is available for licensing; IP from Penn State Behrend faculty and staff members and students; medical- and biomedical-related ideas; underutilized /orphaned IP within regional companies; ideas from regional business plan competitions, angel networks, etc.; IP donated by the inventor /company to a non-profit organization; and other sources of IP, such as other colleges and universities.
- ***Component 2:*** The college will actively participate in a communitywide “idea and IP” screening process or *Collaborative for Innovation & Commercialization (CIC)* and in promoting and preparing selective ideas for continued support and commercialization. Key regional organizations came together to develop and implement a coordinated screening

process for ideas generated during the prospecting phase. The organizations represent regional innovation and economic development interests. The goal is to bring direct, focused, and systematic assistance to entrepreneurs / intrapreneurs, including those with new product ideas and those wishing to expand an existing business through a product innovation.

The second phase of this component will be to position high potential ideas to be more attractive to funding agencies and other investors. High-potential ideas culled from the communitywide screening process will be evaluated to determine what types and level of business and technical support are needed to move them toward commercialization and prepare them for presentation to potential investors.

- **Component 3:** The college will build its education, business, research, and technology development and transfer capacity to support innovation

Among recent capacity-building initiatives, the college has launched an Applied Energy Research Center and an RFID Center of Excellence; moved into a 160,000-square-foot REDC, with plans to strengthen the linkages between the business and engineering curricula; and supported eBizITPA's year five grant of \$1.5 million from DCED.

Continue building the college's internal capacity will also include support for such things as business and engineering facilities, including equipment donations and endowments; the college's signature business and engineering applied research centers – advanced design and manufacturing, energy, plastics design and processing, and advanced information systems; student scholarships, assistantships, and grants for research, entrepreneurship, and capstone experiences; faculty research and entrepreneurship grants; faculty chairs/professorships; visiting positions – entrepreneurs in residence, etc.; Knowledge Park; outreach programs such as K-12 entrepreneurship camps and competitions; and a seed “revolving loan” fund for innovation.

- **Component 4:** The college will establish an Innovation Center, directed by the college's innovation specialist, to oversee the development of its resources in support of innovation.

FACILITIES

In addition to Knowledge Park and the intellectual and other resources listed above, this initiative will ensure that high quality physical and infrastructure resources are available, including the college's research and technology transfer laboratories located in the Research and Economic Development Center (REDC) as well as other scientific and business facilities.

Research and Economic Development Center

Opened in summer 2006, the REDC is a unique academic building that allows the college to combine the physical and intellectual resources of its two professional schools (business and engineering) to create an



enhanced regional asset. At 160,000 square feet, the REDC will include a number of classrooms, computer laboratories, and instructional laboratories; and space to facilitate faculty member, staff, and student entrepreneurship.

REDC engineering facilities include five computer-aided engineering labs; four plastics labs (manufacturing/processing, materials testing, quality assurance and metrology, secondary operations); seven manufacturing labs (rapid prototyping, programmable logic controllers, general manufacturing, advanced metalworking, two metrology labs, automation); nine electrical science labs (motors and circuits, microprocessors and embedded systems, signal processing, measurement and instrumentation, circuits and devices, electrical systems, advanced technology, software and digital design, circuit fabrication); two thermal and fluid sciences labs (wind tunnel, fluid and thermal sciences); four materials labs (testing, heat treating, clean room, secondary materials testing); and three research labs (bench top/computers, small- and medium scale experiments, large-scale experiments).

Many services are available through the REDC and associated faculty and staff members:

- Design and analysis software proficiency – ANSYS FEA (Structural, Heat Transfer, and Dynamic Modeling), Cambridge Materials & Process Selector, FLUENT CFD Software, FLO-SERIES fluid flow, MATHCAD, MATLAB, Mechanical Dynamic modeling, PROE Parametric Design, PROE/PROCAST, and PROE/PRO Manufacturing.
- Laboratories available for applied research – CAD/CAM, Digital Signal Processing, Machining Labs, Machine Vision, Materials Testing, Mechanical Measurements & Instrumentation, Metrology, Rapid Prototyping, and Thermal Testing.
- Faculty-Led Student Design Projects – senior students work with faculty members and industrial representatives on applied design problems, latest design technologies are used under direction of faculty with industrial experience, opportunities are created to evaluate new technologies with specific application to your business, and creative solutions are found to actual design problems with resultant product improvements and cost reductions.
- University Library and Patent Search Resources – engineering database retrieval, patent searches, and access to most major university engineering libraries.

Other College Facilities

- **Management Information Systems (MIS) Computer Laboratories**
 - ✓ **Hardware** – The MIS laboratory contains forty-one PC workstations. All machines use the latest computing technology, are multimedia capable and are networked with Internet and e-mail access. The instructor's podium drives dual overhead data projectors and is equipped with classroom-control software.
 - ✓ **Software** – All software is served by the *GE Foundation Computer Center's* Enterprise servers, offering a menu of business applications including: SAP, Crystal Reports, Cognos PowerPlay and Impromptu, KnowledgeSeeker, Expert Choice, Project2000, Rational, Sybase PowerDesigner, SQL Server, and the Visual Studio .net suite. Other applications offered in the lab include: Microsoft Office suite, Corel Office 2000 suite, Macromedia web development and animation tools, and Java programming software.

Registered students can use their home PCs to remotely run any software available in computer labs.

- **Psychology Laboratory**

- ✓ **Hardware** – The Psychology laboratories include eight rooms equipped with networked Windows XP systems. Lab workstations are networked to the main computer hub and have access to all available network software, including SPSS for statistical data analysis. The lab also has several specialized systems for research. The lab contains a specially designed sound-attenuated chamber with two individual booths for research. Students and faculty members conduct online and offline research experiments in a number of formats and modalities.

Direct access to the college's Web servers allow for the development of research experiments on the Web using Macromedia Authorware software. A Digital camera and Adobe Photoshop and Premier allow the creation of digital still and video images for teaching and research.

- ✓ **Software**

- *Courseware for Observational Research (COR)* instructs students in the basics of observational research, coding techniques, sampling strategies, reliability analysis and Chi Square statistics with the use of interactive digital video case modules
- *The cognitive lab* has two stand-alone systems for online auditory and visual stimuli presentation and data collection using *PsyScope* software. Two additional systems are equipped with *E-Prime* psychology software tools, which allow students and faculty members to design and run experiments appropriate for all populations.
- *The neuroscience lab* has two Event-Related Potential (ERP) systems. ERPs are scalp-recorded brain waves time locked to a particular stimulus. One system has 16 channels and amplifiers from Contact Precision Instruments. This system collects ERPs with PC-EXP and Pandora, a program designed to measure, average, and display ERP signals. The other is a Neuroscan system with two, thirty-two-channel Synamps, amplifiers that allow the simultaneous collection of sixty-four channels of EEG. The system uses SCAN 4.3, a program designed for the continuous or epoched recording of EEG and event-related potentials.

- **Science Computer Laboratories**

- ✓ **Hardware** – The School of Science and the School of Engineering and Engineering Technology operate a Linux cluster consisting of a Pentium server and twenty-two Pentium workstations. The workstations are multimedia capable and are networked with Internet access. The School of Science also has a specialty data communications laboratory, which has a variety of workstations and servers running a combination of Linux, Novell, and Microsoft software. Students have the opportunity to do hands on work with wireless and wired LANs and WANs with a variety of telecommunications equipment including repeaters, bridges, hubs, switches, routers, and multiplexors.
- ✓ **Software** – The Linux cluster supports a variety of free and licensed software. In addition, the computer center has installed X-Window server software on its Microsoft network so that Linux sessions may be conducted from any of the college's public

workstations.

Other software available in the school includes *Maple*: a symbolic mathematical manipulation package; *Splice*, an electronic circuit simulation program; and *XPP*: a differential equation solver.

- **Other Scientific Resources**

- ✓ **Scanning Electron Microscope**: Hitachi S570 capable of 100,000 times magnification; used to study the inner and outer topography of surfaces.
- ✓ **Fourier Transform Nuclear Resonance Spectrometer**: Bruker Avance II 400 Mhz with broadband probe; used to determine the structure of unknown compounds, primarily through the location of hydrogen and carbon atoms.
- ✓ **Gas Chromatography/Mass Spectrometry**: Broadly applicable analysis techniques used to analyze and assist in the identification of unknown volatile compounds.
- ✓ **HPLC Chromatography**: Used to perform analysis and to assist in the identification of unknown compounds, especially those of higher molecular weight, including proteins.
- ✓ **Fourier Transform Infrared Spectrometer**: Used to perform analysis and to assist in the identification of unknown compounds in solid, liquid, and gas phase.
- ✓ **Atomic Absorption Spectrometer**: Primarily used to analyze trace compounds and cations in water samples, including lead and other contaminants.
- ✓ **Fluorescent Spectrometer**: Measures the emission of light to analyze and characterize fluorescent material.
- ✓ **Fluorescent Microscope**: Assists in analysis and characterization by allowing for the imaging of fluorescing materials.
- ✓ **Atomic force microscope**: Used to study the topography of surfaces. Capable of profiling surfaces smaller than one micron.
- ✓ **Ultraviolet/Visible spectrometer**: Used to characterize and quantify compounds that absorb ultraviolet or visible light.
- ✓ **Neodymium YAG Laser**: Used for characterization of non-linear optical material.

PROMOTION OF ENTREPRENEURSHIP AMONG THE COLLEGE'S FACULTY AND STAFF

- **Faculty-Led Companies**

- ✓ **Beaumont Technologies Incorporated (BTI)**: John Beaumont, faculty member and company president: BTI's injection molding technologies include MeltFlipper® melt-management technologies used to solve runner and cavity filling imbalances; 5 Step Process™ mold imbalance diagnostic software; and CAE by BTI™ flow/filling simulation analysis. In addition, BTI now offers training seminars on practical rheology, runner & gating design, and 5 Step Process Mold Diagnostics.

- ✓ **Spinworks LLC:** Tom Briselden, faculty member and company president: Spinworks is the exclusive producer of radiant tube inserts made of Silicon-Carbide. The patented twisted “Y” design produces non-turbulent high convection flow resulting in the highest rate of uniform heat transfer possible, yielding 5-20 percent fuel savings and related productivity increases.
 - ✓ **Embedded Controls Corporation:** Ron Krahe, faculty member and company president: Ron has been designing and programming computer-based controls for over ten years.
- **Other Programs and Affiliations**
 - ✓ **Coursework:** The college is developing a comprehensive program to establish a true business and engineering education partnership between the Sam and Irene Black School of Business and the School of Engineering and Engineering Technology. A business/engineering faculty team, working under the support of a GE Foundation grant, has already conducted research to identify the core business and engineering knowledge required for the program, designed a project management course for engineers, and designed an interdisciplinary course on Product Realization and Entrepreneurship. In the latter course, teams of business and engineering identify a product opportunity, conduct market research, develop an engineering design, create a business plan, and present their idea at a tradeshow.
 - ✓ **Student Entrepreneur Summer Fellowship Program:** The purpose of this program is to encourage and support entrepreneurship among our undergraduate and graduate students. Successful applicants will receive \$2,000 through their respective school, with funding to be expended between May 1 and August 31. Applicants must be undergraduate or graduate students or teams of students enrolled in a Penn State Behrend major; ideas generated from classroom activity are also eligible. Business concept criteria must involve innovative products or services, be compatible with college resources, and include a motivated entrepreneur or entrepreneurial team with faculty mentor.
 - ✓ **Erie Keystone Innovation Zone:** In October 2005, the Ben Franklin Technology Development Authority approved \$250,000 for the Erie Keystone Innovation Zone (KIZ). The funding will be used to support innovation and entrepreneurship in the region. The KIZ will focus on advanced manufacturing, information technology, life sciences, and homeland security businesses that can develop innovative ideas and products for the marketplace. Penn State Behrend is one of several business and technology partners for the KIZ, which is coordinated by the Technology Council of Northwest Pennsylvania.
 - ✓ **Commercialization & Innovation Collaborative (CIC):** CIC was created in summer 2006 as an outgrowth of the state’s KIZ program. CIC facilitates coordinated economic development and university-based support to entrepreneurs and small business owners in northwest Pennsylvania. The process begins when a CIC steering committee member sponsors an entrepreneur or small business owner (client) who intends to commercialize a new product or process. The sponsor shares with the group information regarding the client’s current and potential needs, which organizations are already involved, and an overview of the technology hurdles that must be overcome to move the client forward. Based on this information, a case manager—or coach—is assigned and a general plan to assist the client is outlined. Once the case manager fully understands the extent and

needs of the client, the case is referred to the CIC steering committee which meets regularly to discuss pending projects, clarify roles among economic development groups, and identify available resources for assistance.

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Web site: pennstatebehrend.psu.edu/research/research.htm

HOW DO I ACCESS THE COLLEGE'S RESOURCES?

Below is a summary of the many ways Penn State Behrend can assist business and industry with outreach. If you still aren't sure where to turn for help, please use our Single Point of Contact system:

Voice mail: 814-898-7700

E-mail: industryhelp@psu.edu

Web: pennstatebehrend.psu.edu/research.htm

Services Provided by Faculty and Staff

Technical Information Services

Companies have access to free technical information through the Pennsylvania Technical Assistance Program (PENNTAP). Local contact can be made at 814-898-6046. The college's Lilley Library also is an excellent resource for online databases and patent searches. The library can be contacted at 814-898-6106.

Fee-for-Service Projects

In general, projects of short duration that do not involve intellectual property are handled through a single-page quote sheet or through a memorandum of agreement for academic research services. You may contact a specific technical resource or use our Single Point of Contact option. A listing of selected faculty members' teaching and research expertise is available in PDF format on our Web site.

Research Projects

Projects that include intellectual property (patents, etc.), no matter what size, are handled through a sponsored research agreement. You may contact a specific technical resource or use the Single Point of Contact option.

Applied Research Centers

Companies can gain access to faculty expertise through any of the college's centers that engage in fee-for-service, outreach, or education activities.

Professional Development and Training

Through the Center for Corporate and Continuing Education, staff is available to assist in the design and delivery of professional development and training programs for business, industry, educators, and others. Contact can be made through the center at 814-898-6103. Services Provided by Students

Services Provided by Students

Internships

Internships are considered professional, career-related experiences in a business or industry setting. Student interns can bring fresh and creative ideas to an organization at nominal cost while allowing company representatives to evaluate the interns as potential full-time employees. Internships are coordinated through the Career Development Center (CDC) at 814-898-6164.

Senior Projects

All senior students in engineering and engineering technology degree programs are required to conduct team-oriented capstone projects. Each project must address an actual design or manufacturing problem that is sponsored by regional industry. The students work alongside representatives of industry to formulate and implement solutions, and then present their findings at the annual Richard J. Fasenmyer Engineering Design Conference. Contact the School of Engineering and Engineering Technology at 814-898-6153 for details.

Service and Volunteerism

Many students engage in substantive community-based service projects. The Center for Service Leadership holds a volunteer fair each fall to assist local community-based organizations in recruiting students. Contact the center at 814-898-6609.

Part-Time Employees

Many students are available to work part time. Students often play significant roles within an organization while gaining invaluable on-the-job experience. Students may be contacted directly or through a faculty member, but we recommend that part- and full-time job opportunities be channeled through the CDC at 814-898-6164.

Access to Graduates

Through partnerships with Penn State Behrend's faculty, staff, and students, company representatives can have enhanced exposure to students and, consequently, better opportunities to recruit students. During the annual fall career fair, companies set up booths and have the opportunity to meet informally with potential employees. Formal student recruitment and interviewing is coordinated through the CDC at 814-898-6164.