



THE PENN STATE BEHREND ECONOMIC DEVELOPMENT STORY

Spring 2009

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, technology, 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 area 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, eBusiness, engineering design, and customized education and training. In addition, college staff serves as a 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, an athletic 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 a lead driver of development in the region.

In addition to direct efforts in economic, technology, 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.

Key findings:

- In 2008, the college contributed \$204 million to the state's economy and \$167 million to the economy of Erie County.
- The college is responsible for the employment of 1,370 persons in various sectors throughout the Commonwealth and 931 persons in Erie County.
- In 2008, the college generated more than \$9.2 million in tax revenue for Pennsylvania.
- The college spent \$10.7 million in capital improvements and purchase of goods and services in 2008.
- Faculty and staff spent \$16.2 million in 2008.
- Students spent \$33.8 million in 2008.

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. Utilities fully serve these sites, and nine sites are available for immediate construction. The park includes three multi-tenant corporate office buildings, which are two-story structures of 72,000; 66,000; and 36,000 square feet. 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.

One or more of the following characterize a typical park prospect:

- 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.

As of June 2009, Knowledge Park has fourteen tenants, employing nearly 500 professionals.

Tenants include:

- ***CMI EPTI, LLC***

CMI EPTI is a major supplier of horizontal 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 assist Pennsylvania businesses and organizations with understanding, using, and developing information technologies to grow the economy by providing resources to enable company formation and growth, developing technology talent and expertise, and facilitating collaborative efforts to stimulate innovation.



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

For more than twenty-five 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.

- ***Jameson Publishing***

Launched in May 1980, Jameson Publishing's first publication appeared in October 1980. At the time, Jameson Publishing had three employees. During the early 1990s, Jameson Publishing moved the Erie, Pennsylvania, to help bolster its growth. The move worked. Today Jameson Publishing has 50+ employees and publishes three national trade magazines for the IT industry. The three magazines are *Business Solutions*, *Integrated Solutions*, and *Integrated Solutions for Retailers*. In order to maintain consistent growth, Jameson Publishing expanded operations with a second location in the Pittsburgh, Pennsylvania, area. All of Jameson Publishing's magazines and newsletters help executives and business owners increase profits and trounce the competition through detailed industry analyses and revealing profiles of highly successful professionals. Jameson Publishing bases its success on the simple motto: "We will not be great by what we accomplish, rather by what we help others accomplish."

- ***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.

- ***Visual Composites LLC***
Launched in 2008, Visual Composites is a faculty-managed and owned business commercializing a patent developed by the School of Engineering and a research firm, Storm Development. The technology being commercialized enables the design and manufacturing of advanced silicon carbide ceramic components which can be used for industrial processing heating systems; hydrogen fuel cells; and industrial and commercial heating, ventilation, and air conditioning.

- ***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***
Established in 1991, Plastics Services Network 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.

- ***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.

- ***Penn State Behrend Early Learning Center***
The 8,500-square-foot center offers accredited, affordable, high-quality childcare to children of Penn State faculty, staff, students, and alumni; Knowledge Park employees; and the Erie community.

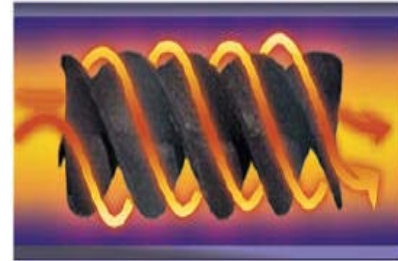


CENTERS AND AFFILIATED RESOURCES

- ***Center for eBusiness and Advanced IT (eBizITPA)***
eBizITPA was established in 2002 as a Ben Franklin Center of Excellence and has grown to become a provider of statewide technology-based economic development services. Its goal is to serve the businesses of the rural counties of Pennsylvania in adopting state-of-the-market information technology to compete nationally and globally and to build the capacity of Pennsylvania-based information technology service providers.

Specific programs and activities include education and training programs in e-business and e-marketing; research and business development consultation and grants for advanced IT projects; technology transfer in e-business and advanced information technologies for use by Pennsylvania companies; apprenticeships and internships to build a cost-effective pool of information technology talent; and the IT Kick-Start program which promotes joint company-IT provider projects in northwest and northcentral Pennsylvania.

- ***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 that school's undergraduate students.



The center is located in Penn State Behrend's Research and Economic Development Center (REDC). The state supported center start-up through 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; the college will sustain the center through additional solicited grants and through direct industrial sponsorship.

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



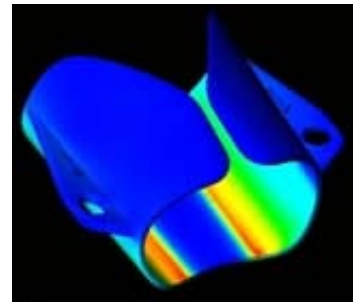
safety and health, product development, energy efficiency, and statistical data and analyses. Over the past five years PENNTAP has assisted in the creation or retention of 2,450 jobs and has realized \$73.5 million in economic benefits.

- **Ben Franklin Technology Partners of Central and Northern Pennsylvania (BFTP)** 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. Staff focuses support 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 Technology Center** assists plastic-related companies to become more competitive. The center is a technology partner 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 leads small companies and entrepreneurs through the product realization cycle while minimizing financial risk during product development.



- The **RFID Center of Excellence** is a spinoff of eBizITPA and administered by the college's Sam and Irene Black School of Business. 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; and facilitate sharing of the RFID knowledge base among interested University faculty. Center staff has conducted Department of Defense related RFID workshops 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.
- ***Enterprise Resource Planning Center of Excellence (ERP CoE)***
Created in 2008 in conjunction with the Sam and Irene Black School of Business and GE, it received official center recognition from the University and designation as federal legislative priority. During a three-year develop phase the center will create credit and noncredit education and workforce development programs to assist in the transition of IT talent from offshore locations to northwest Pennsylvania. To date the center has received \$250,000 from GE and \$200,000 from the Ben Franklin Partnership program.
 - The ***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. The college established Partnership Erie to provide complimentary Web planning, development, hosting, and maintenance services to the nonprofit community.

PROMOTING INNOVATION

Penn State Behrend is committed to the growth of innovation and technology transfer in the region. Innovation is defined as *the creation and implementation of new or improved products, processes, or services leading to commercial success*. To direct this effort the college has established a Business and Technology Innovation Center (BTIC).

BTIC's mission is to accelerate economic growth in northwest Pennsylvania and the tristate region through the promotion and facilitation of research, development, commercialization, and the utilization of advanced technology.

Goals of BTIC include:

- grow an entrepreneurial culture for students, faculty members, and new ventures;
- promote and expand commercialization efforts and applied research;
- accelerate the development and regional use of Penn State Behrend business and technology capabilities.

BTIC support includes:

- coordinated access to applied research experts;
- resources made available through an emerging regional supply chain of technology development;
- connecting qualified and motivated student interns with technology development needs;
- integrated relationships to leverage higher education resources throughout the region;
- strong technology support and advocacy among local, state, and federal economic and technology development agencies;
- identification of local, state, and federal technology development grant opportunities along with application strategy development;
- conduit to Penn State's vast business, technology transfer, and research resources;
- expertise in the development and commercialization of proprietary technology;
- active client case management within the regional Commercialization and Innovation Collaborative of Northwest Pennsylvania (CIC).

In addition to the services and resources identified above, BTIC will incorporate two principal programs:

- ***Entrepreneurial Fellowships*** available to exceptional undergraduate or graduate students in the commercialization of promising technologies developed by Penn State faculty members, students, or partnering regional businesses.
- ***Applied Research and Design Laboratories*** will grow internal technology capacity, attract students and faculty members motivated by applied research and design, and strengthen technology transfer between college resources and regional businesses.

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, 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, REDC includes 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 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 members with industrial experience, opportunities are created to evaluate new technologies with specific application to 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/Business computer laboratories span three distinct rooms and contain a total of 136 workstations. All machines use the latest computing technology, are multimedia capable and are networked with Internet and e-mail access. Instructor podiums in each lab offer multimedia capabilities with overhead data projection and classroom control software. The Financial Services Trading Floor simulation lab offers dual-monitor workstations for maximum productivity. The instructor's podium in this facility drives dual overhead data projectors along with a 46" LCD television monitor and can display Bloomberg financial data feeds from an adjacent dedicated room and workstation.
 - ✓ **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, Expert Choice, Project2007, Rational Rose, Sybase PowerDesigner, SQL Server, the Visual Studio .net suite, and more. Other general applications offered in the lab include: Microsoft Office 2007 suite, Corel Office 2000 suite, Macromedia Web development and animation tools, and Java development software. Registered students can use their home PCs to remotely run any software available in computer labs via a Web-based virtual lab connection.

- **Psychology Laboratory**

- ✓ **Hardware** – The Psychology laboratories include twelve rooms equipped with 50 work stations. Students and faculty members conduct online and offline research experiments in a number of formats and modalities. The lab has several specialized systems for research. There is a **behavioral observational suite** that allows for unobtrusive viewing of participants via one-way mirrors. The suite is equipped with a multimedia development station. All have access to digital video and audio equipment for creating and analyzing stimuli for experiments. The **cognitive neuroscience lab** contains a specially designed sound-attenuated chamber with two individual booths and is set up to record event-related potentials (ERP). ERPs are scalp-recorded brain waves time locked to a particular stimulus.

- ✓ **Software**

Lab workstations are networked to the main computer hub and have access to all available network software, including SPSS for statistical data analysis.

- 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. This software was developed by Penn State Behrend faculty.
- Five systems are equipped with E-Prime Professional 2.0 from Psychology Software Tools, which allow students and faculty members to design and run experiments appropriate for all populations.
- SCAN 4.3 is a program designed for the recording and analysis of EEG and event-related potentials. It is used with a Neuroscan 64-channel amplifier system located in the cognitive neuroscience lab.
- Software for multimedia development includes Adobe Premier and Pinnacle Studio for the creation of digital still and video images for teaching and research. Students and faculty have direct access to the college's Web servers for Web-based research projects. Access to Macromedia products including Dreamweaver and Photoshop is available via the campus network.
- Web-based surveys are conducted with the licensed version of Zoomerang.

- **Science Computer Laboratories**

- ✓ **Hardware** – The School of Science computer labs are located throughout the science complex. The total number of work stations is well in excess of one hundred. The computers are used for data collection, data analysis, modeling, simulations, and student programming exercises. Workstations and servers run a combination of Linux, Apple, 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** – Software available on the machines include: Arcview, Celestra, R, Skygazer Virtual Astronomy, Maple, Matlab, Minitab, Labview, Visual Studio, Netbeans, IDL, Alchemy, XPP, OpenDX, Xwin32, and others. In total, the lab machines have access to over 150 software packages.

- **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.
- ✓ **Confocal Microscope:** Provides high resolution, three-dimensional images of materials. Primarily used in the life sciences.
- ✓ **Real Time PCR:** Measures levels of gene expression.

PROMOTION OF ENTREPRENEURSHIP AMONG THE COLLEGE'S FACULTY, STAFF, AND STUDENTS

- **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.
- ✓ **Visual Composites LLC:** Launched in 2008, Visual Composites is a faculty-managed and owned business commercializing a patent developed by the School of Engineering and a research firm, Storm Development. The technology being commercialized enables the design and manufacturing of advanced silicon carbide ceramic components which can be used for industrial processing heating systems; hydrogen fuel cells; and industrial and commercial heating, ventilation, and air conditioning.
- ✓ **Embedded Controls Corporation:** Ron Krahe, faculty member and company president: Ron has been designing and programming computer-based controls for over fifteen years.
- ✓ **ATAN Consulting:** Chris Coulston, faculty member and company president, is providing electronic embedded software design and automated decision support systems to regional business clients.

- **Other Programs and Affiliations**

- ✓ **Coursework:** The college has developed 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. The Interdisciplinary Business with Engineering Studies (IBE) major prepares students to enter the business side of technical companies. The focus modules enable them to be productive immediately upon entry to the firm. The entire program provides a sound foundation for management in technical organizations. The program provides opportunities for internships, working with industry partners, and working on a new product development project as the capstone experience.

In addition to a core set of courses in business that allow for the IBE degree to be accredited by AACSB, students also are required to be proficient in engineering mathematics and science as well as a broad array of engineering courses. Students also choose a focus module which is approximately 15-18 additional credits in one of five areas: accounting/finance, operations and supply chain, technical sales, quality control, and product design and manufacture.

- ✓ **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. 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 funding for the Erie Keystone Innovation Zone (KIZ). The funding supports innovation and entrepreneurship in the region. The KIZ focuses 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.

- ✓ **Commercialization & Innovation Collaborative (CIC):** Established in 2006 and convened by the Northwest Pennsylvania Industrial Resource Center, 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 necessary to move the client forward. Based on this information, the team assigns a case manager—or coach—who outlines a general plan to assist the client. Once the case manager fully understands the extent and needs of the client, the case manager refers the client to the CIC steering committee which meets regularly to discuss pending projects, clarify roles among economic development groups, and identify available resources for assistance.

Contacts:

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

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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.

New Product Development & Technology Start-Up Assistance

Penn State Behrend's Business and Technology Innovation Center assists students, faculty members and regional businesses on a project basis with issues involving intellectual property protection; new technology product development and existing product reengineering; prototyping; beta testing; primary market research; competitive intelligence; and grant: identification, education, and application strategy development. Contact the Innovation Center at 814-898-6563.

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 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

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 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.