



GENEVA COLLEGE
PINKERTON CENTER
FOR TECHNOLOGY DEVELOPMENT



GENEVA COLLEGE
3200 College Ave.
Beaver Falls, PA 15010

HISTORY

The Geneva College Pinkerton Center for Technology Development (PCTD) was organized after many years of cooperative research and development projects with the former U.S. Bureau of Mines (USBM). Congress closed the Bureau in 1996, transferring some of its work to the Department of Energy (DOE). The cooperative arrangement continued with the DOE until being transferred to the National Institute of Occupational Safety and Health (NIOSH), a division of The Center for Disease Control (CDC), in 1998.

From 1986-89, the PCTD, in parallel with the research work with the USBM, developed a state-of-the-art computer-assisted design and engineering (CAD/CAE) laboratory with financial support from the Ben Franklin Technology Center of Western Pennsylvania. At this time, the PCTD began extensive work with regional and local industry.

Several organizations have recognized the work of the PCTD as a model for the way in which small colleges could support industrial partners in their community. In 1990, the Center was awarded first prize in the Consolidated Natural Gas Company's Annual Award of Excellence competition, and from 1989-94 was funded as a Center of Excellence by the Ben Franklin Technology Center of Western Pennsylvania. In 2001, the Geneva Business Development Center, Inc., under the auspices of a Department of Agriculture grant, provided funding to the PCTD for equipment prototype development. In 2003, NIOSH provided funding for development of a dust meter prototype. In 2005, the PCTD became one of the partner organizations in the development of a local Keystone Innovation Zone (KIZ), an economic development effort funded in part by the Commonwealth of Pennsylvania focused on developing and supporting medical instrumentation rehabilitation.

Since its inception, the PCTD has assisted over 80 companies, organizations and entrepreneurs with varying technical needs.

PINKERTON CENTER FOR TECHNOLOGY DEVELOPMENT

PAST PROJECT PARTNERS

- National Torch Tip
- Paletti Lift
- Nitor Technologies
- Testmark
- Custom Athletics
- Brighton Automation
- Economy Industrial Corporation
- Radco
- Shumaker Associates
- Control Data Technologies
- Leeds & Northrup
- Quaker Enterprises
- American Eagle Outfitters
- MicroMaster Corporation
- Economy Industrial
- CDI Corporation
- Berner Air Products
- U.S Bureau of Mines

OBJECTIVES

The Pinkerton Center for Technology Development (PCTD) at Geneva College provides engineering and other technical resources of the college to organizations that do not have the personnel or resources to investigate promising new ideas in technology related areas. The primary focus of this program is to provide engineering or technical support for small organizations, companies and entrepreneurs in this region. This is accomplished through the collaborative efforts of our science and engineering students and their instructors in a project-based learning environment.

RAPP TECHNICAL DESIGN CENTER



This 8,000 square-foot facility houses a machine shop, wind tunnel, CNC machining lab, computer design center and plenty of space for project development.



PROJECT CATEGORIES

- Finite element analysis (FEA)
- CAD/CAE/CAM
- Prototype development with a CNC machining center and 3-D printing
- Mechanism design and simulation
- Manufacturing process monitoring and fault diagnosis
- Statistical quality control and variation reduction
- Electronic circuit design, simulation, board layout and prototyping
- Logic design using VHDL and CPLD devices
- Microprocessor and micro-controller embedded systems
- Software/firmware development
- Data acquisition and control
- Equipment analysis and evaluation
- Sensor characterization and applications
- Particulate measurements
- Test and measurement equipment design
- Energy efficiency analysis
- Plant layout and drawings
- System engineering
- Mechanical component design and rapid prototyping
- Robotics
- Safety and warning system
- Chemical analysis and synthesis
- Water and wastewater treatment
- Water disposal and recycling
- Surveying and mapping (not property survey)

This is not an exhaustive list, and many projects require the application of more than one category.

ENGINEERING FACULTY OF GENEVA COLLEGE



MURAT TANYEL, PH.D. BIOMEDICAL, ELECTRICAL AND COMPUTER

Dr. Tanyel is a professor of electrical engineering. His publications include the textbooks *Introduction to Engineering Experimentation*, *Engineering Explorations with LabVIEW* and *Engineering Explorations with Maple*. Dr. Tanyel is a member of the Institute of Electrical and Electronics Engineers (IEEE) and the American Society for Engineering Education (ASEE),

and he has presented at numerous ASEE conferences.



MARK D. TRONZO, PH.D., P.E. MECHANICAL

Dr. Tronzo is an associate professor of mathematics and engineering. He has 18 years of experience as a practicing engineer. Professor Tronzo worked primarily in the compressor industry doing design and analysis in gas flow and stress analysis, among other areas. His research interests include several areas in applied math-

ematics, mechanical engineering and biomedical engineering.

ENGINEERING FACULTY OF GENEVA COLLEGE



DAVID W. SHAW, PH.D., P.E. MECHANICAL

Dr. Shaw is a professor of mechanical engineering specializing in thermal and reaction engineering and applied fluid and thermal instrumentation. He developed and implemented a system for measuring thermal conductivity and thermal diffusivity of methane hydrate deposits in a laboratory environment, which is being adapted for use in the field. Dr. Shaw

is a member of the American Society for Engineering Education (ASEE) and the American Society of Mechanical Engineers (ASME), and he was named 2006 Engineer of the Year, ASME Pittsburgh Section.



JOHN W. STAHL, PH.D. CHEMICAL

Dr. Stahl is a professor of analytical and physical chemistry and chemical engineering. He is a member of the American Chemical Society (ACS), the American Institute of Chemical Engineers (AIChE) and the International Union of Pure and Applied Chemistry (IUPAC). Dr. Stahl is the editor and co-author of *Energy and the Development of Scientific Ideas*, and has published articles in *Electrophoresis*, *Pure and Applied Chemistry*, and *Analytical Chemistry*.

PARTICIPATING DEPARTMENTS AND PROGRAMS

- Biomedical
- Business
- Chemical Engineering
- Chemistry
- Civil Engineering
- Computer Engineering
- Computer Science
- Electrical Engineering
- Math
- Mechanical Engineering
- Physics
- Technology Services (support role only)

ENGAGING LOCAL INDUSTRY

Geneva engineers often work with industrial and governmental clients through the PCTD. Students have participated in the research, development and design of a variety of projects including enhancing the reliability of an artificial heart pump, designing a virtual reality system and conducting the seismic retrofitting of an existing bridge.

BRINGING THE FACTORY TO THE CLASSROOM

- Industry-sponsored senior design and class projects
- Faculty research and consulting
- Industry experts invited as guest lecturers

BRINGING THE CLASSROOM TO THE FACTORY

- Plant tours
- Service-learning opportunities
- Internship/independent studies

PROJECT INITIATION

Projects can be started by contacting PCTD and setting up an initial meeting. If the project is beyond the Center's capabilities, the client company will be referred to another university or community/regional resource that can better meet its needs.

Projects that appear feasible will require a meeting with a tentative design team to discuss specifications, costs and urgency of completion. Undergraduate students carry out most project work as part of their required coursework, and long lead-times are often required for project completion. Much shorter lead-times are possible if compensation is provided by the client organization.

Once a project has been selected, a team of students, faculty and staff will meet periodically (usually every two or three weeks) with representatives of the client organization. The purpose of these meetings is to review project progress and discuss any problems that may have appeared or changes in direction that may be necessary to meet design constraints. The design team will provide written reports and demonstrations of work in process at those meetings.

ENGINEERING FACULTY OF GENEVA COLLEGE



CHRISTOPHER JOBES, PH.D., P.E. MECHANICAL AND COMPUTER

Dr. Jobes is a professor of mechanical engineering specializing in kinematics, machine component design, mechatronics, and robotics and automation. He has spent 27 years working as a research engineer for the National Institute for Safety and Health (NIOSH) primarily in underground coal mining equipment safety programs. Dr. Jobes is a member of the Society of Automotive Engineers (SAE) and is a past chairman of the Pittsburgh Section of the American Society of Mechanical Engineers (ASME).



MARK T. KENNEDY, P.E. ENVIRONMENTAL

Professor Kennedy is an associate professor of environmental engineering and teaches courses in fluid mechanics, water and wastewater treatment, and environmental monitoring. He has been a practicing environmental engineer since 1990, consulting primarily in water and wastewater treatment process design, odor control, water quality studies, solids processing, combined sewer overflow studies, facilities planning and industrial pretreatment. He is a member of the Water Environment Federation and Pennsylvania Water Environment Association.

ENGINEERING FACULTY OF GENEVA COLLEGE



ANTHONY C. COMER, PH.D. CHEMICAL

Dr. Comer is an associate professor of chemical engineering and teaches courses in thermodynamics, chemical engineering processes and reactor design. He has over 20 years of industry experience with Allied Chemical, Sun Refining & Marketing, and BP Oil. Dr. Comer is a member of the American Institute of Chemical Engineers (AIChE) and has made presentations at their annual meetings.

He has also had a number of articles published in *Polymer* and the *Journal of Applied Polymer Science*.



JAMES S. GIDLEY, PH.D., P.E. CIVIL AND ENVIRONMENTAL

Dr. Gidley is a professor of civil and environmental engineering and the chair of Geneva College's Department of Engineering. He has published articles in *The Journal of Resource Management and Technology*, *Water Resources Research* and *Transportation Research Record*. Dr. Gidley received the 1986 State-of-the-Art of Civil Engineering Award: American Society of Civil

Engineers for the paper "Environmental Aspects of Waste Utilization in Construction," which was published in the *Journal of Environmental Engineering*.

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CONTACT INFORMATION

PHONE

Mr. William Barlow	Director	724.847.6519
Mr. David A. Clark	Co-Director	724.847.6638
Mrs. Karen Mlynarski	Administrative Assistant	724.847.6715

FAX

724.847.6714

EMAIL

Mr. William Barlow	wdbarlow@geneva.edu
Mr. David A. Clark	daclark@geneva.edu
Mrs. Karen Mlynarski	kmlynars@geneva.edu

MAIL

Geneva College
Pinkerton Center for Technology Development
Attn: William Barlow
3200 College Avenue
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WILLIAM BARLOW



BIOMEDICAL, ELECTRICAL AND COMPUTER

Professor Barlow is an associate professor of electrical and computer engineering. His interests include embedded systems, circuit design, robotics and power electronics. He possesses over 20 years of new product development experience with Moore Products Co., Marsh Bellofram, Eaton Cutler-Hammer and Medrad Interventional/Possis. Professor Barlow is a

member of the Institute of Electrical and Electronics Engineers (IEEE). He has received product design awards and holds multiple patents.

DAVID A. CLARK



Mr. Clark is the co-director for the Pinkerton Center for Technology Development at Geneva College. He obtained Bachelor of Science degrees in mechanical engineering, electrical engineering and applied mathematics from Geneva College. Mr. Clark had 13 years of industrial experience working at Ellwood City Forge in Ellwood City, PA.