



## **Innovative Programs in Pennsylvania's Career and Technical Centers**

## INTRODUCTION

Pennsylvania's workforce is changing rapidly with emerging industries that include energy production, biomedical technology, information technology, and other fields in which applied knowledge and skills are in great demand. As a result, schools throughout the commonwealth are developing new programs to prepare high school students with the technical and academic skills needed for employment in these fields.

Many cutting-edge opportunities are being offered under the purview of Pennsylvania's regional Career Technology Centers (CTC). This report looks at five Career Technical Education (CTE) programs offered across Pennsylvania that are creative and on the cutting edge of the connection between industry and education.

In addition to being strongly influenced by their local employer communities, most of these programs also have very close connections with postsecondary institutions, where students have opportunities to earn accelerated college credits while they are still completing their high school education. Of course, some of Pennsylvania's CTE programs have not yet adopted partnerships with postsecondary institutions beyond establishing program-to-program articulation agreements and still provide more familiar CTE offerings. Such programs develop high levels of skill in fields such as automotive technology, carpentry, and cosmetology. These programs lead to valuable occupations and are constantly upgrading their curricula and technology to stay current with workforce expectations. However, new programs and new partnerships between CTCs and postsecondary education are also emerging to address the rapidly changing workforce.

The programs profiled in this guide represent a variety of initiatives and opportunities for students to take advantage of the training and preparation offered by CTE, which offers more than most people may realize.

Key elements identified in the educational collaborations profiled in this report include:

- Leadership that scans the economy to identify emerging workforce needs
- Extensive discussions with employers in the conceptualization of new programs
- Development of constructive relationships between CTCs and postsecondary partners
- Identification and recruitment of instructors with strong workforce experience and the ability to develop instructional expertise
- Creative approaches to curriculum and program design
- Thoughtful marketing of programs to potential students and employers

Continue reading to discover just a sampling of the innovative programs taking place inside Pennsylvania's CTCs.

## PREPARING TOMORROW'S INFORMATION TECHNOLOGY LEADERS

### INFORMATION TECHNOLOGY PROGRAM

York County School of Technology

#### OVERVIEW OF INITIATIVE

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In September 2013, York County School of Technology launched an integrated information technology program for high school students. This program, created by combining three stand-alone information technology (IT) programs, was developed in response to the demand for more versatile, well-rounded IT employees in the local workforce.

Prior to the new IT program, students at York County School of Technology selected one of three distinct IT programs and remained in that program for the duration of their time at the school. The redesigned program offers students a broader education with two years of foundational courses (eight classes, one per marking period) followed by two years of instruction in a specialty area. As a result, first- and second-year students gain a foundation in the fundamental areas of IT, including computer repair, programming, networking, and management. Third- and fourth-year students take more specialized courses by selecting an area of concentration in Computer Networking, Computer Repair Technology, or Computer Programming. In addition, students may earn certifications that allow for the waiving of certain college classes at Penn College and Harrisburg Area Community College.



This program strives to meet several goals. First, students who complete the Information Technology program will be better prepared to make postsecondary training and/or career choices because of the cross-training obtained during the foundational coursework. Second, the program is designed to create a pipeline of skilled workers for local employers, many of whom are small- to medium-sized businesses that seek versatile IT employees who can accomplish a range of tasks. Finally, because students undergo a more intensive interview

process with the instructors prior to acceptance into the program, those who enter the program are aware of, and agree to, the program's high expectations. This may result in a higher level of student engagement and a higher program retention rate.

#### IMPLEMENTATION PROCESS

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School administrators indicated that the support from local businesses and input from the program's strong, active advisory boards were key elements in the redesign of the IT program. Previously there were separate Occupational Advisory Committees (OAC) for the school's three IT programs. An early step in the process was to combine these OACs into one group.

Lack of clearly defined curricula for the newly created foundational courses presented an initial challenge. In preparation for the new program, the four teachers in the IT department reviewed the task lists of each of the three existing programs and identified knowledge and skills that would form the integrated foundation of the program. A critical part of curriculum development was identifying the appropriate required Classification of Instructional Programs (CIP) Codes that align with the standards set in Pennsylvania.

The instructors also created a screening process for the program, which provides an opportunity to interview prospective students and provide them with a better sense of the requirements and expectations of the program.

## RESULTS

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In the first year of program implementation, school administrators reported an increase in overall program enrollment and retention. In addition, there was an increase in attendance among freshmen enrolled in the program, with many students reportedly having perfect attendance.

Instructors indicated that at the completion of the foundational courses, students seemed to have a stronger sense of direction when choosing a specialty. They also noted an increased sense of community within the program since all of the students now have classes with all of the instructors over the first two years. Additionally, the instructors themselves have a higher level of interaction and camaraderie because of the new program structure.

## NEXT STEPS

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Instructors and administrators are planning to enhance the program by offering CISCO networking systems and offering certifications that match the needs of local businesses. They are also looking for sponsors to help expand the equipment available for students.

The instructors are working with an oversight committee and local businesses to identify more opportunities for students to engage in work-based learning experiences. Currently, there are four in-school IT cooperative (co-op) positions available, but the number of students who are able to complete co-ops with local businesses is limited. This is due in part to age restrictions (many positions require students to be at least 18 years of age) and transportation limitations.



## LESSONS LEARNED

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The instructors at York County School of Technology agree that collaboration and flexibility are key elements to the success of this new program. They continue to meet together twice a month for common planning time. During these sessions, they review the overall development of the program and talk about student performance, including how to accommodate students who may wish to change specialties.

The instructors strongly believe that an integrated foundation of IT skills is typically needed in order for students to find employment in a small business environment and to be ready for postsecondary education. The comprehensive IT program meets and exceeds the expectations of the Pennsylvania Department of Education's "task lists" for computer science programs, providing students with a broad foundation of hardware, software, and networking skills.

## **CONTACT INFORMATION**

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York County School of Technology  
Dr. David Thomas, Director  
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## KEEPING UP WITH CHANGING HEALTH CARE EMPLOYMENT NEEDS

### BIOMEDICAL TECHNOLOGY PROGRAM

Lenape Tech

#### OVERVIEW OF INITIATIVE

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Students at Lenape Tech have the opportunity to enroll in the BioMedical Technology Program, one of only a few such programs in the state. This three-year program, which is part of the school's health care occupations cluster, prepares students for postsecondary education and careers in the health sciences.



More than just an introductory health program, students gain a substantial background in biotechnology, anatomy and physiology, medical terminology, pharmacology, immunology, microbiology, genetics, forensics, and bioethics. Hands-on training in laboratory techniques used in the clinical, biomedical research, and forensic settings are a significant part of the program.

The program is designed as a college preparatory sequence of courses, and students in the program are typically enrolled in honors-level academic classes. Students complete the core program in two years; a third year is dedicated to independent study. Pharmacy Technician certification training and an online epidemiology component are also offered.

Upon graduation, some students choose to pursue postsecondary education at a bachelor's degree-level or above, while others may complete an associate's degree or a diploma program that provides opportunities for entry-level employment in health care professions in smaller systems and medical practices within surrounding communities. With that in mind, the program also includes components that foster preparation for job opportunities typically available in residential and rural communities, such as medical technologist, surgical technician, practical nurse, or veterinarian technician.

#### IMPLEMENTATION PROCESS

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The current program has evolved over time from previous health occupations programs, with intentional adaptations made to meet changing workforce needs. A Chemical Technology Program, started in the 1990s, became a Medical Technology Program in 2004 with a focus on health careers other than nursing. In response to the growth in the biotechnology field in nearby Pittsburgh, administrators modified the program to the current BioMedical Technology program, designed to include clinical practice and biomedical research.

An advisory committee of various stakeholders, including local biotechnology professionals and faculty from Penn State, the Community College of Allegheny County, and Butler County Community College, provided guidance on the program's new configuration.

## RESULTS

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As a result of the program, an increased number of students are attending college and several have successfully completed four-year college degrees in related fields.

Throughout the program, students experience several dynamic out-of-school learning opportunities, including a visit to Allegheny General Hospital, where they observe open-heart surgery and participate in a tour of the animal research facility at the University of Pittsburgh. In addition, the program's highly active Occupational Advisory Committee (OAC) provides guest speakers.



## NEXT STEPS

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The program is fully functional and it is expected to continually develop and evolve. Students who successfully complete the program may receive biotechnology credits at the Community College of Allegheny County. In future years, Lenape Tech plans to expand its dual-enrollment opportunities.

A third year of core instruction to provide advanced learning opportunities is planned. In addition, a NOCTI exam is under development, and new articulation agreements for early college credits are being explored.

## LESSONS LEARNED

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Administrators at Lenape Tech emphasized that the development and implementation of this type of program requires flexibility and a substantial time commitment. They also underscored the importance of an active and professional OAC whose members can provide valuable input regarding new technologies and work-based experiences for students. The recruitment and hiring of instructors with extensive related work experience is another important element to the program's success.

## CONTACT INFORMATION

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## SETTING THE STAGE FOR POSTSECONDARY SUCCESS

### **BERKS COUNTY TECHNICAL ACADEMY**

Berks Career and Technology Center and Reading Muhlenberg Career and Technology Center in partnership with Reading Area Community College and Bloomsburg University

#### **OVERVIEW OF INITIATIVE**

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The Berks County Technical Academy is a partnership among Reading Area Community College (RACC), Bloomsburg University, Berks Career and Technology Center (BCTC), and Reading Muhlenberg Career and Technology Center (RMCTC). As stated on the RACC website, the Academy “offers students a pathway for developing advanced skills and college credits toward an associate’s and/or bachelor’s degree while still in high school at no cost.”

High school students who participate in the Academy are jointly enrolled at RACC and one of the two CTCs. The college curriculum is delivered at the CTCs and is taught by CTC teachers serving as adjunct RACC instructors; however, these credits are easily transferable to other colleges upon completion of an Associate’s Degree because they appear on a RACC college transcript. Students may complete up to 18 college credits, tuition-free, during their sophomore and junior years of high school. Students then earn up to 12 additional college credits during their senior year by attending classes on RACC’s campus during the school day. Tuition during students’ senior year is currently being subsidized by the CTC and this is contingent on the continued availability of local and state funds.

Each of the Technical Academy programs leads to a specific two-year degree at RACC. While in high school, students may complete as many as 27 college credits from RACC; this is nearly half of the required credits needed for an associate’s degree. After high school graduation, students who participated in the Technical Academy can easily transition to full-time status at RACC and complete an associate’s degree. Further, through a partnership with Bloomsburg University, Technical Academy students can complete a bachelor’s degree, without leaving the RACC campus.

Extensive collaboration exists between teachers at the CTCs and RACC college professors, ensuring that teachers at both CTCs use the identical curriculum, textbooks, and assessments that are being used at RACC. One difference, however, is that the RACC courses offered at the CTC may be taught by semester or across a full year depending on what works best for the CTC instructor; identical classes taught at RACC all operate on a semester basis. Other than pacing, the same expectations are held for content and student performance.

#### **IMPLEMENTATION PROCESS**

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The Academy concept originated from RACC’s mission to create more opportunities for local students to pursue postsecondary education. RACC engaged the administrators from BCTC and RMCTC to work together and create a pathway for students to access the college’s programs.

In order to implement the partnerships, administrators at BCTC and RMCTC had to align their secondary and postsecondary curricula. At BCTC, the Academy pathway was created from programs with existing articulation agreements in place between the CTC and RACC, specifically the Mechatronics Engineering Technology program and the robotics and automation technology program. Most of the curriculum development work involved sequencing the

secondary curriculum in a manner that would allow students to complete the five or six RACC courses by the end of their second year in the program so they could go to the RACC campus in year three to complete the additional three courses.

At RMCTC, preparation to participate in the Computer Technology and Business Management partnership primarily involved the alignment of curriculum. When the partnership was established, RMCTC did not have a “companion” program to be able to participate in the Mechatronics Engineering Technology program partnership. Therefore, RMCTC administrators made the decision to close a program to create space, purchase equipment over a three-year time period, renovate the facility, and adopt a curriculum that aligned with the Academy. In 2014, RMCTC opened a program titled Engineering & Automation Technology and enrolled its first class of students. RMCTC will begin transitioning these students when they are seniors to RACC’s campus at the start of the 2016-2017 school year.

The Academy was officially launched at the start of the 2013-2014 school year, although BCTC piloted the program one year earlier. As of 2014, four programs were offered through the Technical Academy: Mechatronics Engineering Technology, Computer Technology, Business Management, and Electronic Health Records and Healthcare Information Technology. All of these programs lead to an Associate's Degree.

## **RESULTS**

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BCTC started the Technical Academy as a pilot in the 2011-2012 school year with 12 students enrolled in Mechatronics Engineering Technology program. Since that pilot year, enrollment in the Technical Academy programs has grown to approximately 100 students in the 2014-2015 school year. In 2013-2014, 68 students were registered in and successfully completed one or more college courses through the Technical Academy and 98 students completed one or more Technical Academy courses during the 2014-2015 school year. The Technical Academy has quickly become a highly sought after program by academically proficient students in BCTC’s 16 participating school districts.

At RMCTC, 38 students were enrolled in the Technical Academy at the start of the 2015-2016 school year, with the first class of enrollees from the 2013-2014 school year transitioning to RACC during the afternoon session. All but two students have remained in the program, maintaining a GPA (2.5) acceptable for continued participation. Enrollments have shown steady increases with a three-year goal of reaching 75 to 100 students.

## **NEXT STEPS**

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The immediate next steps will focus on continued development and marketing of the program. Staff at RMCTC and BCTC are working to attract a broad range of students to the Technical Academy, including eighth and ninth grade students who are making a decision about attending a CTC. Since enrollment in the Technical Academy requires that students have a minimum 3.0 grade point average, they are also reaching out to academically high-achieving students who might not otherwise consider attending a CTC, but can benefit from the level of coursework the Academy offers.

The next opportunity to expand the Technical Academy may occur in Machining through a degree program RACC is currently developing. The CTCs are anticipating the potential for enrolling students into this program at the start of the 2016-2017 school year.

## LESSONS LEARNED

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Administrators agree that ongoing dialogue is an important component of a partnership between a community college and CTCs. They also note the importance of establishing operational procedures to provide structure and consistency for students and staff, and the priority of preparing staff to teach the RACC courses in a manner consistent with the college's assessment and grading protocols and timetables.

## CONTACT INFORMATION

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### RACC

Dr. Anna Weitz, President

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### BCTC

Dr. James Kraft, Administrative Director

[www.berkscareer.com](http://www.berkscareer.com)

### RMCTC

Mr. Gerald Witmer, Director

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### Careers in 2 Years

[www.careersin2years.com](http://www.careersin2years.com)

After interviewing 96 companies in their region, the **Greater Reading Economic Partnership** (GREP) uncovered a critical workforce need: 47 percent of employers identified a lack of skills as a workforce challenge and business constraint, and 27 percent identified a lack of technical skills. In response, GREP developed a marketing campaign called "Careers in 2 Years." According to its website, "The campaign is designed to raise awareness about career opportunities and address perceptions that technical education doesn't provide successful career pathways. We want students to consider attending a career technology center and a technical education career path... Reading Muhlenberg Career and Technology Center, Berks Career and Technology Center, and Reading Area Community College all offer customizable training and retraining programs for companies or individuals on state of the art equipment."

## TRAINING CURRENT AND FUTURE ENERGY SECTOR EMPLOYEES

### EMERGING ENERGY AND INFRASTRUCTURE PROGRAM

Central Pennsylvania Institute of Science and Technology

#### OVERVIEW OF INITIATIVE

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The Central Pennsylvania Institute (CPI) of Science and Technology's Emerging Energy and Infrastructure Training Program provides training for careers in fields related to natural gas processing, renewable energy, advanced manufacturing, water quality management, and other industries that utilize state-of-the-art electrical, mechanical, and process control technology. The program develops technical, academic, and employability skills that are in high-demand, and engages students with quality, hands-on industrial training and a well-crafted curriculum.

The Emerging Energy and Infrastructure Training Program includes career programs, continuing education, and certificate programs in water and wastewater, natural gas, solar power, and wind power. The program also includes offerings in industrial maintenance, electromechanical, and mechatronics. Innovative learning methods employed by the program include the utilization of industrial quality, hands-on training equipment supported by one-on-one interaction with instructors, well organized written curricula, and a curriculum companion website which offers relevant animations, videos, virtual trainers, and online skill building exercises.

Through this program, CPI provides a much-needed pipeline of qualified technicians and, equally important, is having a direct impact on the quality and effectiveness of the current workforce, helping companies be more successful and competitive.

#### IMPLEMENTATION PROCESS

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Regionally, manufacturing is in high demand due in large part to Marcellus Shale hydraulic fracturing ("fracking") for natural gas extraction. In fact, it is estimated that as many as 70 percent of the job openings in central Pennsylvania are for skilled technicians. As a result of this demand, local industries contacted CPI requesting training and assessments for their current employees. This was the impetus for the Emerging Energy and Infrastructure Program.

The program was launched after several years of planning, including an assessment of CPI's strengths and the industry's needs. This analysis allowed program developers to pinpoint precisely what industry needs CPI could address.

Started as an adult education program in 2012, the first high school students were accepted in February 2014.

#### RESULTS

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As of 2013-2014, the program was still in early stages of implementation, so it was too early to report completion of high school students in the program. However, adult education program completers already have a high job-placement ratio and students are sometimes hired before finishing the program. Further, the adult education program courses are helping to change the industry's perception of CTE. Previously, many of the high-tech industries only hired recent graduates with four-year college degrees however, CPI's Emerging Energy and Infrastructure

Program graduates have developed a reputation of being work-ready, highly trained technicians, despite not having a bachelor's degree.

## **NEXT STEPS**

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In February 2014, the first high school students were enrolled in the program and, with continued marketing, enrollment increases are expected to continue. The programs must continue addressing regional industry needs. With that in mind, additional solar, wind and water/waste programs will be considered and, if feasible, developed.

Administrators plan to enhance marketing efforts for the program and also seek additional specialized industry experts to fill adjunct teaching positions.

## **LESSONS LEARNED**

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Those interviewed noted that a strong foundation for the program should be built without overextending the school's resources. Additionally, it is critical to obtain necessary equipment and hire outstanding instructors. Even with extensive planning and ideal equipment, the program will not succeed unless the instructors are highly skilled.

## **CONTACT INFORMATION**

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Central Pennsylvania Institute of Science and Technology  
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## PROVIDING A JUMP START ON A POSTSECONDARY DEGREE

### THE TECHNICAL LEADERSHIP PROGRAM

Lehigh Career & Technical Institute, Bloomsburg University, and Lehigh Carbon Community College

### OVERVIEW OF INITIATIVE

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This innovative program provides Lehigh Career & Technical Institute (LCTI) high school students an affordable opportunity to begin working toward a Bloomsburg University Technical Leadership Bachelor of Applied Science Degree.

Lehigh Carbon Community College (LCCC), located on the same campus as LCTI, offers LCTI junior and senior students dual-enrollment classes that apply to an Associate's Degree in Applied Science, Associate's Degree in Science, or Associate's Degree in Art. Upon completing their Associate's Degree, students receive a 60-credit block transfer into Bloomsburg University's Technical Leadership program, avoiding the loss of credits that typically limits advancement of students in Associate's Degree in Applied Science programs. The Bachelor's Degree in Applied Science is delivered through courses taught on the LCCC campus as well as online courses. This seamless and affordable pathway, starting as early as students' junior year of high school, allows participants to earn a Bachelor's Degree without leaving the LCTI/LCCC campus. Further, because most of the Bachelor's Degree in Applied Science Technical Leadership program courses are offered in the evening and online, the schedule is convenient for working professionals who may experience career advancement as they progress through the program.

As stated in a 2013 Bloomsburg University brochure, the Technical Leadership program, offered through the university's Department of Instructional Technology, "provides the knowledge and skills necessary to assume leadership roles in workgroups and project teams - skills necessary



for career advancement in a rapidly changing, globalized workplace."

Leadership traits highly sought by employers are integrated into the program, including: effective communication and collaboration; team leadership and project management; staff training and development; workplace and cultural diversity; financial and supervisory knowledge; and conflict management and

resolution. LCCC advisors, faculty, and staff work closely with Vince Basile, director of the Bachelor's Degree in Applied Science program at Bloomsburg University. Mr. Basile maintains office hours on the LCCC campus several days each week during which he meets with community partners, LCTI students, and parents.

## IMPLEMENTATION PROCESS

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The program emerged from the desire of LCTI administrators to provide more opportunities for students to continue on to a four-year degree. It was built upon existing agreements between LCTI and LCCC as well as the LCCC four-year agreements. Bloomsburg was selected as the four-year university partner for the program based on the school's focus on offering coursework that incorporates leadership, communication, and project management skills.

In developing the program, representatives from Bloomsburg worked with LCTI staff to assess when and how students make decisions about postsecondary education. They also evaluated skills and qualities needed in the workforce. Their goal was to create a program that would work for every student.

The first cohort of students began the program in fall 2012.

## RESULTS

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In May 2014, the first cohort of students was awarded their Bloomsburg University Bachelor's Degree in Applied Science degrees. These students are reportedly satisfied with the program that is provided on the LCCC campus.



## NEXT STEPS

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As a relatively new and unique program, administrators plan to expand efforts to market the program to increase awareness and enrollment.

Bloomsburg University is exploring the creation of similar partnerships with other CTCs and community colleges in the Pennsylvania.

## LESSONS LEARNED

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Administrators agree that ongoing and open communication among all partners, both informally and through regularly scheduled meetings, is essential for a true sense of partnership to develop. In addition, all partners must maintain a team philosophy and prioritize the needs of the program and students.

## CONTACT INFO

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Bloomsburg University  
Mr. Vincent J. Basile, Program Director  
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Lehigh Carbon Community College  
Ms. Virginia Mihalik, Transfer Counselor  
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Lehigh Career & Technical Institute  
Ms. Sandra J. Himes, Executive Director  
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## CONCLUSION

To be competitive in today's challenging economy, students need to prepare for college-level studies and a career. Pennsylvania's CTE programs focused on preparing students with a strong academic foundation and technical skills that are aligned to regional workforce needs. CTE blends college-readiness with relevant and meaningful career and workplace skills.

Programs such as those profiled in this report are designed to meet the dual mission of developing students who are prepared for college-level work and successful careers. These programs are the result of intentional and focused research and collaboration among multiple stakeholders, most notably the CTC, regional employers, and postsecondary partners. It is likely that all emerging industries will require similar collaboration to create educational solutions that prepare skilled workers for the jobs of today and tomorrow.