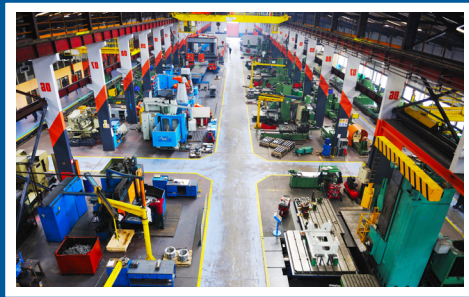
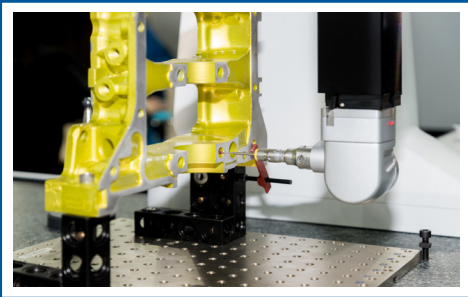
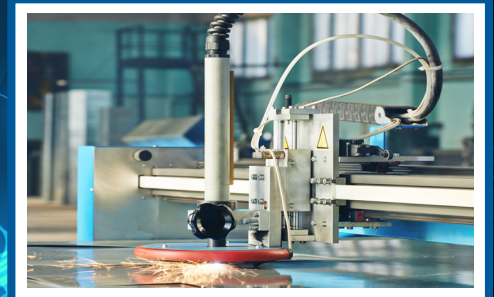
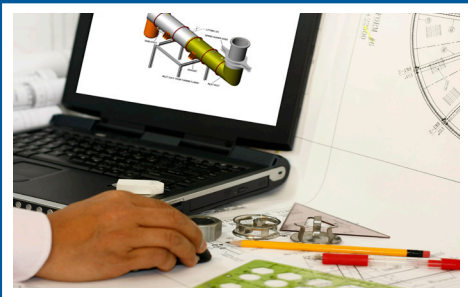


# ANNUAL REPORT

2016-17



University at Buffalo  
The Center for Industrial  
Effectiveness (TCIE)

## Year in Review

To our many stakeholders,

As we celebrate our 30th year as a conduit to improved performance, we have the same devotion to empowering businesses and organizations as we did with our first client, MRC Bearings in Chautauqua County, N.Y.

Various programs and outreach services have been added since then in the goal of providing current and powerful best practices, education, and technical solutions from the University at Buffalo (UB) School of Engineering and Applied Sciences (SEAS). This year has been no different.

Efforts to help close the manufacturing skills gap progressed in FY 2016-17 with a mission to spread knowledge about manufacturing's rapid evolution. UB's Center for Industrial Effectiveness (TCIE) was the force behind developing the nation's first comprehensive, 101-level web-based curriculum about the digital age of Industry 4.0.

Ten massive open online courses (MOOCs) were created, collectively forming the Digital Manufacturing and Design Technology specialization. Eight courses were posted on Coursera – the world's largest online educational platform – by the end of the fiscal year and the remaining two rolled out in July and August 2017, respectively.

The project was a collaboration with UB's SMART (Sustainable Manufacturing and Advanced Robotic Technologies) Community of Excellence, other UB affiliates and industry partners. Partial funding came from the Digital Manufacturing and Design Innovation Institute (DMDII), which is part of the Manufacturing USA network of public-private institutes developing manufacturing technologies and workforce solutions. More about the specialization is featured on page 7 of this report.

Our advocacy of the adoption of Industry 4.0 has also:

- Elevated UB's partnership with DMDII: TCIE hosted DMDII's Workforce Development Advisory Committee in October 2016.
- Spurred new relationships: A binational nonprofit organization and technical college in Querétaro, Mexico, contacted us for guidance in developing similar courses targeted for manufacturing company employees and university students. News of this cross-border relationship traveled 350 miles, reaching a coalition of companies and technical university in Durango, Mexico. The group approached us in its quest to establish a training center for manufacturing courses.

Despite focus on this "digital disruption," we still strive to strengthen all sectors. TCIE has new tools to help you build a top-notch team through our affiliation with the national ACT® program. The WorkKeys® job profiling service defines the most critical tasks of any job at any type of company, and the skill levels essential to performing them effectively. Cognitive WorkKeys assessments validate whether an individual possesses skills relevant to a profiled job by measuring competency in applied math, graphic literacy, and comprehending workplace documents.

TCIE will continue to react to an evolving business landscape and support your pursuit of improved enterprise performance.

Sincerely,

*Timothy Leyh*

Executive Director



## TCIE Tools

### Operational Excellence



TCIE's skilled resource teams are highly effective agents, stressing a systemic and data-driven approach. A sampling of our services includes strategic planning, assessing gaps and identifying improvement opportunities, translating data, and implementing ISO, Lean and Six Sigma methodologies.

### Engineering Solutions



TCIE serves as a gateway to accessing high-quality research and development ventures provided through distinct faculty, talented students and state-of-the-art testing labs from all SEAS disciplines. Our technical assistance includes services such as facility layout and workflow analysis, finite element analysis and systems engineering.

### Professional Development



Facilitators with broad industry experience lead business improvement programs that range from workshops to certification courses. Engagement options include public enrollment and corporate contracts, through the formats of classroom-based learning, a blend of class and web-based learning, or a one-on-one approach of online education with private mentoring.

### Strategic Partnership for Industrial Resurgence (SPIR)

SPIR helps pay for technical expertise needed by New York State companies with fewer than 500 employees. Grant funds subsidize faculty and/or student projects, aimed at increasing competitiveness, such as developing an innovation, introducing new technologies, or advancing product development and testing. Companies apply by contacting TCIE with their technical assistance needs. Grant funds may cover up to 50 percent of the total project cost.



"Tremendous synergy and creative excitement have pulled team members together from the different disciplines across campus to focus on topics that will have far-reaching implications for society in the coming decades."

Liesl Folks, PhD, MBA  
Dean, School of Engineering and Applied Sciences

## UB School of Engineering and Applied Sciences (SEAS)

UB is a premier research-intensive public university and a flagship institution in the 64-campus State University of New York (SUNY) system. SEAS, led by Dean Liesl Folks, is the largest and most comprehensive public school of engineering in New York. Annual research expenditures are \$59 million.

In 2016-17, new research and academic programs were driven by data and data analytics. Several new graduate programs in high-growth areas were created, including advanced manufacturing, computational data-enabled science and engineering, data and information fusion, data sciences, and sustainable transportation and logistics.

The engineering departments are: Biomedical; Chemical and Biological; Civil, Structural and Environmental; Computer Science; Electrical; Industrial and Systems; Materials Design and Innovation (a collaborative effort with the College of Arts and Sciences); and Mechanical and Aerospace.

TCIE and SEAS support a university-wide initiative to boost the number of students who participate in experiential learning opportunities. Our three placement options – Graduate Student Engineering Projects, the Black Belt Certification Program and the Engineering Fellows Program – assist industry in solving problems, often leading to local employment opportunities upon graduation.

## Cutco: Giving a Voice to All

The management team at Cutco Cutlery in Olean, NY, always strives to improve operations of its kitchen cutlery company. While pockets of success have emerged, employees have too often been recruited for new quality initiatives that disappear before momentum takes hold. But a recent approach – the Lean methodology of reducing waste – is showing staying power.

Adoption of a TCIE-Jamestown Community College full-fledged Certified Lean Professional training program is fostering a more consistent mindset for making processes better. It's forcing greater attention to analysis among everyone, rather than managers fixing issues that were incorrectly assumed as problems. Increased communication among workers is disintegrating silos. And perhaps most resoundingly, Lean is empowering long-time employees who have felt their voices were underutilized in the past.



*"There were several times when we would address a topic and I thought I knew there was a way we should go about something. But as I hear points from all different perspectives of people from the job at hand, it completely changes the way I approach the problem."*

*Chris Taylor, auto machine grinder, Cutco Cutlery*



## Startups: Growing a Business with Students

Not too long ago Rohan Shah was a student at UB, juggling undergraduate computer science studies with the launch of a technology company, interactiveX. The December 2015 graduate could have left UB without looking back. Instead, he engaged UB engineering students in work integral to developing his young company.

Shah utilized the SPIR grant to subsidize the employment of five students. They flexed their software development abilities and devised solutions for the company's software platform. Buffalo Automation, another Buffalo, NY-based startup, also leveraged the

problem-solving skills of engineering students to advance its self-piloting watercraft technology. In both cases, the companies took advantage of SPIR funds to offer higher pay rates in attracting higher-skilled talent.

*"It (SPIR) helps us deal with all of the paperwork, paychecks and those HR things that, especially being a startup, are time consuming and take you away from building the thing you need to build."*

*Rohan Shah, founder, interactiveX*

## Girl Scouts: Restructuring an Organization

In 2013, the Girl Scouts were faced with having to make widespread changes to halt and reverse membership declines. The national organization launched a Customer Engagement Initiative to merge people, processes and technology. To avoid the types of disruptions that plagued other councils during the transformation, Girl Scouts of Western New York Chief Operating Officer Alison Wilcox sought TCIE expertise. Work began with a comprehensive review of the entire organization, so as not to view membership through an isolated lens.

The intensive approach – inclusive of staff and volunteers – earned the local council the nickname “business process queens” among the Girl Scouts of the USA organization, and spurred confidence that future changes would be met with broad buy-in.

*“Through this process we’ve developed a strategic plan for gaining buy-in for changes, whereas in the past that happened as an afterthought. We know that change is always difficult, so we’ve done as much groundwork as we can to help ease the transition.”*

*Christine Kirwan, director of volunteer experience,  
Girl Scouts of Western New York*



## UB and SUNY Procurement: Improving Operations

For nearly a decade, a TCIE subject matter expert has used the data-driven Lean Six Sigma method to help standardize processes and increase capacity of the UB Office of Business Services, which is responsible for all purchases across the university. TCIE’s assistance recently spread beyond the confines of UB, to helping a coalition of State University of New York (SUNY) administrators and procurement leaders from 12 SUNY campuses in Western New York.

After numerous years of talk, accompanied by starts and stops, TCIE was tapped to provide unwavering direction in SUNY’s goal to adopt a universal electronic procurement (e-procurement) system. Guidance led to selection of a system that results in savings through increased strategic sourcing, more efficient and standardized processes, and an optimized online shopping experience.

*“Thom (Marra) has a very good temperament for being able to draw out of people the information we need. He’s very patient. He’ll ask the question one way. If he doesn’t get the answer he needs, he asks it another way, and then another way.”*

*Daniel Vivian, assistant vice president of procurement, AP,  
inventory and travel services, University at Buffalo*



## Our Mission

The mission of TCIE is to be on the front line of building the economy, by strengthening employers and communities through excellence in service.

As a leading university extension service organization, we collaborate with diverse partners and provide a broad array of programming for our stakeholders.

## Our Values

### Integrity

Building our reputation by being

- › Accountable
- › Credible
- › Ethical
- › Respectful

### Service

Delivering results and fostering diversity by

- › Being responsive
- › Adding value
- › Providing solutions
- › Collaborating

### Excellence

Exceeding stakeholder expectations by

- › Achieving results
- › Demonstrating initiative
- › Leveraging our resources and expertise
- › Insisting on sustainable improvements

### Innovation

Fostering a culture of creativity by embracing

- › Change
- › Risk-taking
- › Lifelong learning
- › A supportive environment

## Impact

TCIE annually assists hundreds of public and private organizations in enhancing and sustaining their strategy and execution. We do so by delivering operational excellence services to drive continual improvements, engineering solutions from SEAS to ignite innovation, and professional development offerings to strengthen employee performance and skill sets. The performance measures below provide a glimpse into our achievements.

**337** Businesses Served

**1,588** People Trained/Certified through Professional Development Programs

**279** Business Process Reengineering Projects

**37** Undergraduate/Graduate Students Placed

**24** Markets Served

**\$1,911,291** Total Revenue

## Strategic Partnership For Industrial Resurgence (SPIR)

We are able to reduce the cost for companies in New York that receive technical expertise through the State University of New York's Strategic Partnership for Industrial Resurgence (SPIR) grant. Below are metrics highlighting the impact of SPIR-subsidized projects.

**21** SPIR Projects

**91** Client Jobs Created

**3,243** Client Jobs Retained

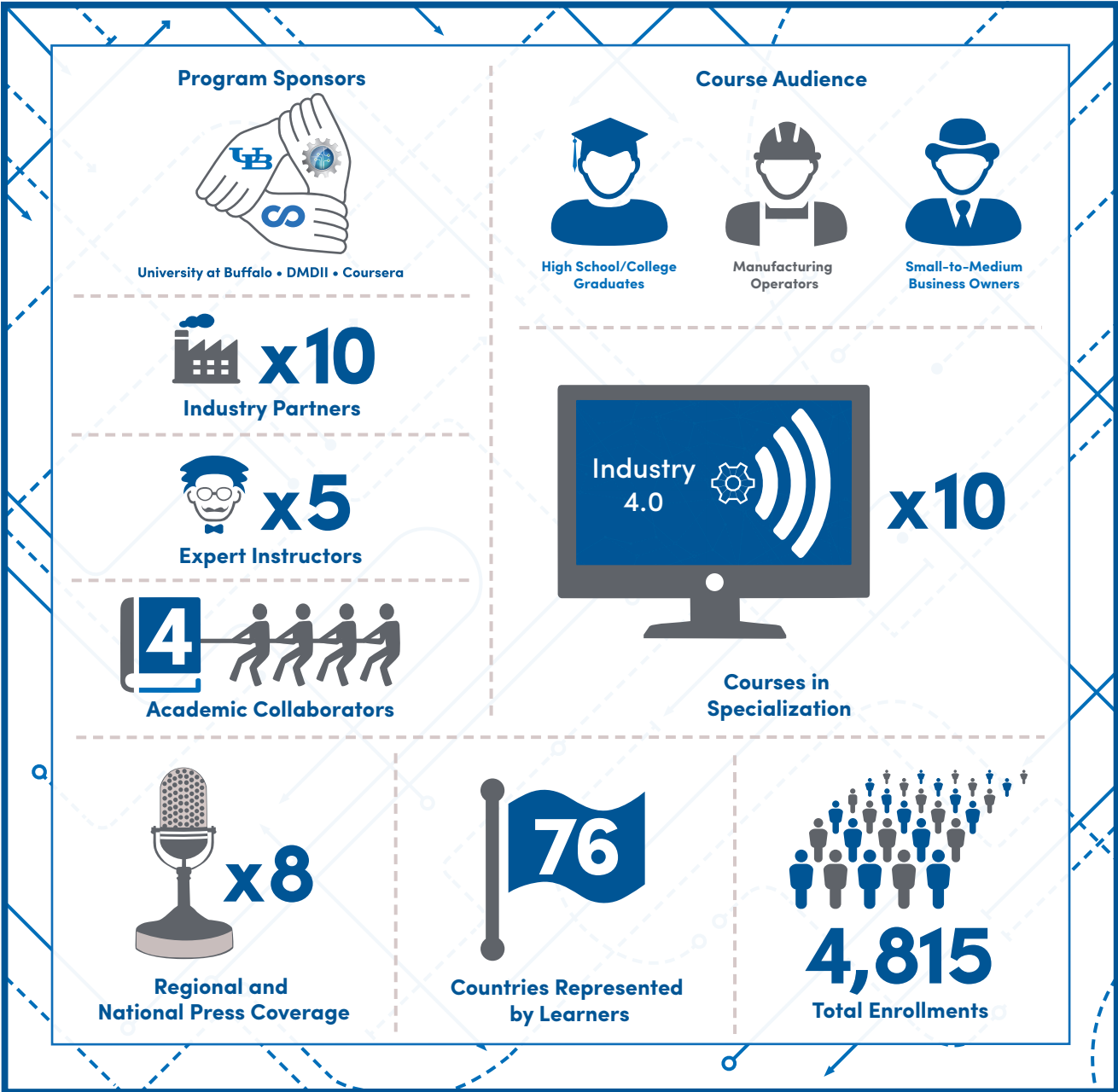
**\$56,850,000** Client Increased Revenue

# Spreading Industry 4.0 Knowledge

In January 2017, UB began rolling out a “101”-level series of massive open online courses (MOOCs) about manufacturing’s newest era, Industry 4.0. Collectively, the 10 courses make up the Digital Manufacturing and Design Technology specialization and are available on the Coursera platform.

The specialization provides a foundation in how digital advances are altering the capabilities of manufacturers, by connecting different parts of the manufacturing life-cycle through data. In the final course, learners create a roadmap to achieve personal goals related to a digital manufacturing and design career.

The infographic below gives a look at the specialization’s composition, creators, target audience, and early outcomes.





 University at Buffalo  
**The Center for Industrial  
Effectiveness (TCIE)**

For more information, please contact:

Timothy Leyh  
Executive Director  
716.645.8800  
[www.tcie.buffalo.edu](http://www.tcie.buffalo.edu)