



From the Director ...

NCATC Friends and Colleagues,

Most of the world has been affected by the unprecedented COVID-19 pandemic. Community & Technical Colleges are in a unique position and face unique challenges as resource providers to their local communities and providers of high-quality higher education, workforce development programs, and work-based learning apprenticeships for our students and workers.

We are proud to announce the formation of the [CTE Coalition](#) of world-class industry partners and CTE organizations. NCATC long-time Strategic Partners—[NC3](#), [Tooling U-SME](#), [Haas CNC](#), [Lincoln Electric](#), [Festo](#), and others—have partnered to provide the resources necessary to keep your ATC and CTE programs moving forward in these unprecedented times. As you review the remote learning resources offered at the [CTE Coalition's website](#), be assured that we recognize this as an evolving challenge for schools and instructors. Please check the NCATC, NC3, and CTE Coalition websites periodically for additional guidance and resources that will continue to evolve in the coming weeks and months.

Finding the workforce with the right skills and knowledge is a challenge that businesses in America face every day. As technology progresses ever faster, the workforce challenge will continue to grow. And the human professionals in design, technician, and engineering roles in organizations will see changes to their job duties, will be challenged to acquire new skills and flexibility, and will learn new ways of collaborating with machines and technology.

NCATC will continue to expand, explore, and exploit all of the important emerging technology trends in advanced technology related and industry-driven workforce development needs for the 21st century together with all of our education, workforce, and strategic industry partners and members.

We are committed to minimizing the spread of COVID-19 while maintaining quality membership value and benefits. We appreciate your ongoing connections, memberships, and partnerships with NCATC during this difficult time in our Nation's history.

While the **2020 NCATC Summer Workshop** hosted by Gateway Technical College (GTC) in Racine, WI—originally scheduled for June 10–13, 2020—has been postponed until mid-2021 due to the threats of COVID-19, we will be offering several virtual *Future of Work* and *Industry 4.0* related sessions in the coming weeks and months for all NCATC members.

And please don't forget to save the date for the **2020 NCATC Fall Conference** hosted by Metropolitan Community College (MCC) in Omaha, NE, September 29–October 2, 2020.

As always, we encourage you to stay connected, via the regularly updated NCATC [website](#), social media (LinkedIn, Facebook, Twitter, etc.), and quarterly e-newsletters like this one.

J. Craig McAtee
NCATC CEO and Executive Director ♦



An affiliated council of



President's Message

Kathy Rentsch, Assistant VP for Workforce Readiness and Innovation, Quinsigamond Community College



On behalf of the Board of Directors, our community college members, and Strategic Partners, welcome to the National Coalition for Advanced Technology Centers (NCATC). I am honored to serve as NCATC President this year. As an affiliated council of the American Association of Community Colleges, NCATC catalyzes its network of higher education and industry-led Strategic Partner resources to advocate, provide advice on, and promote the use of advanced technology applications to enhance economic and workforce development programs and services. As we move into a new decade, our work is paramount to the American economy and its workforce. In the 2019 Manufacturing Industry Outlook, Deloitte noted that the limited labor market was a significant and ongoing constraint on industry growth as manufacturers struggled to fill key technical positions (*2019 Industrial Manufacturing Industry Outlook, My Take: Paul Wellener*; Deloitte). Recently the National Science Board underscored that our nation's "competitiveness, security and research enterprise" requires a strong STEM-competent technical workforce to advance innovation across multiple industry sectors (*The Skilled Technical Workforce: Crafting America's Science and Engineering Enterprise*, Report NSB-2019-23, September 2019, National Science Board). NCATC is strategically positioned to promote dialogue about emerging technologies and to showcase best practices in technical education like apprenticeships, competency-based education, the use of industry-recognized credentials to build curriculum and career pathways, and innovative techniques to engage adult learners and underserved populations.

As a community college leader with responsibility for workforce readiness programs, NCATC has provided me with a national network of colleagues seeking new ways to meet similar challenges. Whether your institution just cut the ribbon on a brand-new advanced technology center (ATC) or your college is committed to using existing facilities to promote advanced technology education, NCATC is your go-to network. In addition to accessing best practices from ATCs across the country, member benefits include discounted registration fees for the fall conference and summer workshop, reduced fees for technical consultation through our Member Assistance Program, and special pricing and discounts on products and services from strategic partners.

Together we are building the solutions! ♦

Developing the Next Generation of CNC Machinists

It's no secret that the American workforce is aging across all industries, and even more so in the manufacturing sector. According to technology giant [Cisco Systems](#), one-third of today's manufacturing workers are over the age of 50 and the average age of highly skilled workers is 56. The company projects a shortage of 875,000 highly skilled manufacturing professionals in 2020, and 2 million unfilled manufacturing jobs by 2025.

Clearly these statistics point to the importance of developing a new generation of skilled CNC machinists. While trade schools and colleges are among the primary conduits for filling this need, students may find it difficult to master the latest CNC technologies without access to current equipment. Fortunately, some machine tool OEMs and resellers are helping these schools by developing mutually beneficial relationships.

One example is a program instituted by Ohio-based manufacturing technology provider [Gosiger, Inc.](#). For a number of years this family-owned business has worked with educational organizations across the U.S. including 54-year-old [Clackamas Community College](#) in Oregon City, Oregon. Cynthia Risan, the school's Dean of Technology, Applied Science and Public Services, explains: "We educate students in manual machining, CNC machining, and renewable energy skills. In 2012, Gosiger came to us with a proposal: If we could provide space in our facility for two or three CNC machines and allow them to bring in potential customers for demonstrations, we could use the equipment in our manufacturing technology classes. We saw this as an excellent opportunity to expose our students to current CNC technology, so we carved out about 500 square feet of floor space and did some remodeling, and Gosiger brought in an Okuma CNC lathe and 4-axis Vertical Machining Center (VMC) as a start. At that time our facility was quite limited. We had only one CNC machine, an Okuma Cadet lathe, so having Gosiger bring in new Okuma machines helped us better equip our students for finding jobs in the manufacturing workforce."

Since then, both the manufacturing program and the relationship with Gosiger have grown significantly, according to Mike Mattson, Manufacturing Department Chair: "Clackamas County voters approved a bond to upgrade the college's buildings and equipment, with \$20 million allocated to expanding the Industrial Technology Center, which includes the manufacturing department. We now have a modern, 43,000 square foot facility with all new CNC equipment. Gosiger arranged significant discounts for us on nine new pieces of Okuma equipment."



This expansion in space and equipment enabled Clackamas to build a solid curriculum around advanced CNC machines. Gosiger also lends the school two to three additional current CNC machines for six- to twelve-month periods.

About 130 full-time and 300–400 part-time students take classes each year. The school offers a one-year certificate program that prepares students for entry-level machine operator jobs, and a two-year Associate of Applied Science degree program for those who want to be CAM programmers and skilled CNC machinists. The school also provides short-term CNC training for manufacturers who want to sharpen their machining skills.

According to Dean Risan, "Every student who completes the coursework and chooses to work in manufacturing receives multiple job offers from which to choose. Because they are well prepared to operate CNC machines equipped with current technologies like the Okuma OSP control, employers such as Boeing, Siemens, Benchmade Knife Company, Warn Industries, and many others know that these new hires can quickly get up to speed."

"This has been a win-win-win-win situation," Risan continues. "The College, Gosiger, the students, and the manufacturing community all benefit. On National Manufacturing Day in October 2018 we had the grand opening of our new manufacturing facility. Hundreds of manufacturing employers, students, high schoolers and industry partners gathered for the event and Gosiger was the main anchor.

"The relationship between Clackamas Community College and Gosiger has been and continues to be a healthy and positive one for all concerned. Together we're preparing a new generation of skilled machinists capable of making immediate contributions to their employers, and who will help to shape the future of manufacturing."

For more information, contact Bart Skye, Account Manager, Gosiger Northwest, 503-310-6029, Bart.Skye@gosiger.com; or Cynthia Risan, Dean, Technology, Applied Science & Public Services, Clackamas Community College, 503-594-3323, cynthiar@clackamas.edu. ◆



Professional Development Opportunity for Welding Educators

Welding Courses for Educators 2020

These courses are designed for Professional Development of Welding Educators teaching secondary and post-secondary welding programs. A description of each training module is listed below:

Module 1: Welding Metallurgy Covers introduction of concepts and fundamentals, and the best educational practice methods to teach heat flow, welding metallurgy, and the weldability of ferrous and non-ferrous commercial alloys. Lab work consists of welding metallurgy investigation on the welded samples and weldability testing for specific applications.

Module 2: Joining and Cutting Processes Covers the basics and principles of major joining and cutting processes. Advantages, disadvantages, equipment, consumables, techniques and variables for each process are discussed. Applications, criteria for consumable selection and how to establish process parameters are emphasized. Lab work involves equipment set up and operating of the welding and cutting equipment for specific applications.

Module 3: Design for Welding, Fabrication, Assembly, and Robotic Welding Covers in-depth review of concepts and fundamentals, and the best educational practice methods of the design for welding, fabrication, assembly and robotic welding. Lab work consists of programming and operating robots for GMAW welding.

Module 4: Weld Quality & Inspection, Welding Codes, Specifications & Safety Covers in-depth review of concepts and fundamentals, and the best educational practice methods of the weld quality and inspection methods, welding codes, specifications and safety. Lab work consists of setting up and operating the instruments and equipment for identification and characterization of weld discontinuities and defects.

Module 5: Laser Welding Covers the concepts and fundamentals of laser welding technology—basic optics, laser welding systems, welding process optimization and metallurgy of laser welds. Lab work consists of case studies that will involve optimization of laser welding equipment and identification and characterization of weld discontinuities and defects.

Module 6: Instructional Design & Teaching Strategies for Welding Instruction Covers development of a welding program from needs assessment through curriculum development, and teaching strategies to development and evaluation of student achievement. The module content includes welding program development, writing program and course objectives, use of advisory committees, curriculum development, learning theory, teaching methods, learning styles, laboratory teaching, organization, assignment development and evaluation methods.

Module 7: NDT Covers methodology to detect common metal defects and failure mechanisms, such as cracking and corrosion by utilizing different detection methods such as radiographic inspection, ultrasonic inspection and magnetic particle inspection.

Module 8: Additional Welding and Allied Processes Covers the basics and principles of less major joining, cutting, and allied processes. These processes are used in special applications where more traditional processes cannot be used due to material properties and specifications of the product. Advantages, limitations, equipment, consumables, techniques and variables for each process are discussed. Applications, criteria for consumable selection and how to establish process parameters are emphasized. Laboratory work involves equipment set up and operating for many of the processes.



Weld-Ed Training Opportunity

Participants will receive a complete set of training materials for classroom use. Participants are responsible for travel, lodging and meals.

There's a maximum of 20 participants per location. If course enrollment is less than 10, the course may be cancelled with full refund of registration fee. Notice of cancellation will be given one month prior to start of class. Secondary and post-secondary teachers are eligible to apply for Weld-Ed training. These courses will be awarded a Certificate of Attendance by the National Center for Welding Education and Training. Each module is worth 4 CEU and 40 professional development hours (PDH).

Register at www.weld-ed.org



National Science Foundation
WHERE DISCOVERIES BEGIN

Preliminary Schedule

MODULE	COURSE	DATE	LOCATION	INSTRUCTOR	TO REGISTER
1	Welding Metallurgy	June 1–5	Illinois Central College, E Peoria, IL	Rick Polanin	https://cvent.me/vvMeLo
2	Joining & Cutting Processes	August 3–7	Yuba College, Marysville, CA	Dan Turner	https://cvent.me/lVgXG2
3	Design, Assembly, Robotics	June 29–July 3	College of the Canyons, Santa Clarita, CA	Tim Baber	https://cvent.me/1P0eXz
4	Codes Standards, Safety Inspection	July 6–10	North Dakota State College of Science, Wahpeton, ND	Joel Johnson	https://cvent.me/RqB4WI
6	Instructional Design & Teaching Strategies	TBD June 15–19	Columbus State CC, Columbus, OH College of the Canyons, Santa Clarita, CA	Rick Polanin	https://cvent.me/MQ5NEK
7	Non-Destructive Testing (NDT)	June 15–19	Chattanooga State Community College, Chattanooga, TN	Tracie Clifford	https://cvent.me/rMo52o
8	Additional Welding & Allied Processes	June 22–26	Weber State University, Ogden, UT	Mark Baugh	https://cvent.me/KbaZAS



Weld-Ed is a National Science Foundation ATE National Center of Excellence, with the stated mission of promoting post-secondary schools around the country in developing and implementing educational programs that support the creation of welding and materials joining technicians.

(866) 529-9353 | www.weld-ed.org | 1005 N Abbe Rd, Elyria, OH 44035

The Value of Credentials and Why They Must Evolve to Match Workplace Needs



The lightning speed at which manufacturing technology has advanced in just the last five to ten years is astounding, with new emphasis on data-driven manufacturing, lights out operations, Industry 4.0, IIoT, "smart" automation, and digital connectivity. The lament by industry about the lack of skills readily available for these new roles is loud and clear.

One of NCATC's strategic partners, NIMS (National Institute for Metalworking Skills), has been training, validating the

performance of, and credentialing workers for the manufacturing industries for 25 years. Their programs are geared to both companies and educational institutions. Just like the manufacturing sector is evolving, so must credentialing bodies to fill the new 21st-century jobs. Now, perhaps more than ever before, companies appreciate a prospective employee who possesses a portable, national, and industry-recognized credential. That credential is a confirmation to the employer that the prospect has gone through a rigorous training and testing process with a hands-on component, validating his or her skills.

Toni Neary, Director of Education for the Morris Group's Haas Division, concurs, saying, "As we are working to fill the skills gap, how do you ensure candidates really have the skills they show on paper? Credentials from organizations like NIMS are so important for the skilled trades. Credentials show that the individuals understand not just theoretical concepts, but also that they have the skill sets needed for a position. The Gene Haas Foundation supports NIMS at high schools, technical centers, and colleges and universities throughout the country with their annual scholarship funds because we know

the value of these credentials for students entering the workforce, and upskilling employees within an organization."

In line with the march towards all things "smart" in manufacturing shops and factories, NIMS has recently launched a revolutionary training, validating, and credentialing model based on Smart Training Principles and Standards through the use of a Smart Performance Measure System. And, just as flexibility is the hallmark in today's manufacturing environments, so too is this new model, which allows manufacturing companies and educational institutions to establish flexible, dynamic training programs that can keep up with the pace of technology. There is also a digital platform that allows its customers, many of them NCATC members, to customize roles, duties, and performance measures, building upon a common industry-defined standard that can be validated and certified. Further, any stakeholder in the process, whether it's the trainer, the trainee, or the organization, can access benchmarking tools to understand how those results compare to others in the network, and what the optimal results are for a certain given role or duty. Essentially, it is an Industry 4.0 network, but in the world of training and certification.

Montez King, Executive Director of NIMS, adds, "As schools and companies brought their challenges to us, we had to develop solutions, and those solutions had to align to smart manufacturing and Industry 4.0. We're even developing an Industry 4.0 credential with another of your partners, Festo. It is a thrilling time to be in manufacturing right now!"

Credentials give both the employee and the employer knowledge and confidence. It's also reassuring to know that as industries evolve in their technologies and methodologies, credentialing bodies such as NIMS are keeping pace with the rapid change, offering real and current value to all participants.

For more information, contact Montez King, Executive Director, NIMS, at mking@nims-skills.org. ♦

Macomb Community College's Vehicle Engineering Technician Degree Combines Automotive, Engineering, and Software Technology Courses

Macomb Community College has launched a new degree program, Vehicle Engineering Technician (VET), in automotive technology to educate technicians who help engineers develop and test sophisticated vehicles that are automated, connected, and electrified. The program was developed by Macomb's Center for Advanced Automotive Technology (CAAT), a National Science Foundation Advanced Technological Education Center.

CAAT personnel work closely with hiring managers from vehicle manufacturers and suppliers to assess the industry's training needs. "In our discussions, we kept hearing the same thing over and over—the need for technicians with mechanical, electronic and software skills to work with engineers who are developing highly automated and electrified vehicles," said Benigno Cruz, director of Macomb's CAAT. "So, we got to work."

While the vehicle engineering technician program was designed using Macomb's existing automotive servicing program as the template, the two curricula are vastly different. In addition to basic knowledge of automotive mechanical systems, students in the new program will graduate with knowledge of electronics and electronic

components, vehicle networks and embedded software; an ability to interpret calibration files, and work with sensors and data

acquisition systems. This skillset is distinct from the skillset of typical service technicians, who maintain and repair vehicles. VET graduates, unlike automotive service technicians, must also be able to build and test prototype vehicles and work on vehicle systems that have no service manuals to consult.

Based on input from industry, CAAT developed curriculum using courses from Macomb's engineering technology department and information technology programs, as well as one course from product development. "The development of the VET program necessitated a collaborative, comprehensive approach," said Donald Hutchison, Dean, Engineering and Advanced Technology at Macomb Community College. "The only way we can continue to keep pace



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with needs of a transforming automotive industry is to stop thinking so linearly and combine technical concepts that were once mutually exclusive. It's important to realize that Industry 4.0 will continue to influence how we develop coursework going forward." (The integration of disparate technologies is the basis of what is being called the fourth industrial revolution, also known as Industry 4.0, where digital and physical technologies converge.)

Two new courses were also created to fill out the curriculum: a course on [connected, automated, and intelligent vehicles](#), and a course on [laboratory testing and data acquisition from vehicle systems](#). CAAT funded the development of both courses through its [seed funding](#) program, which allows experts from other educational institutions to develop new courses in emerging automotive technologies. These courses are made available for download from the CAAT's free [resource library](#). CAAT collaborated with Springfield Technical Community College to develop the course on connected, automated, and intelligent vehicles, and with the University of Alabama, Birmingham, to develop the testing course. Both courses were subsequently adapted to Macomb's standards and added to the college's curriculum in the Automotive and Engineering Technology departments.

The next evolution in this new program is already taking place. In the very near future, the VET program will be updated to remove some of the traditional Automotive "nuts and bolts" courses so that

there is more room to add a course in microelectronics, embedded programming and cybersecurity. "Industry's approval of the program has been very strong, and we are committed to ensuring their feedback is reflected in the curriculum, which is why we are already making changes," said Tim Pawlowski, Associate Dean, Applied Technology and Automotive at Macomb.

For more information, contact Sandy Webster at websters@macomb.edu or 586-445-7774. ♦



Macomb Community College students diagnosing vehicle systems



THIS EVENT HAS BEEN RESCHEDULED

NCATC Summer Workshop

The Future of Work ➤ Advancing Industry 4.0

Originally planned for June 10–12, 2020 • Racine, Wisconsin

NEW DATES: June 9–11, 2021

Hosted by Gateway Technical College



For complete details, visit ncatc.org

Plans for the NCATC fall conference hosted by Metropolitan Community College in Omaha, Nebraska, September 29–October 2, 2020, have not changed.