



M-CAM: *Michigan's Competitive Edge in Advanced Manufacturing*



As the manufacturing industry in Michigan recovers from the Great Recession, the new jobs that are being created in this sector require workers who have advanced skills. Unfortunately, employers can't find qualified candidates to fill these positions.

In response, eight Michigan community colleges came together to form the Michigan Coalition for Advanced Manufacturing (M-CAM) to address the skill shortage and build their capacity to enhance and create training programs in the in-demand areas of welding/fabrication, CNC machining, production operation and multi-skilled/mechatronics. M-CAM is preparing participants for 21st century jobs in advanced manufacturing.

Bay College

Grand Rapids Community College

Kellogg Community College

Lake Michigan College

Lansing Community College

Macomb Community College

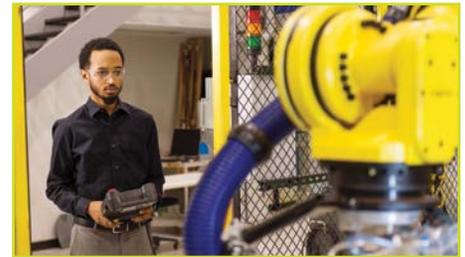
Mott Community College

Schoolcraft College



WELDING/FABRICATION

Welding/Fabrication: is the joining of materials, typically metals, using various fusing processes. Welding applications and techniques are commonly used in a wide variety of fabrication and maintenance fields.



MULTI-SKILLED/MECHATRONICS

Multi-skilled/Mechatronics: is a multiskill field that combines mechanics, electronics, and controls. Today's highly integrated electromechanical industrial systems require a systems level mechatronics approach for design, installation, maintenance and repair.



CNC MACHINING

Computer Numeric Control (CNC) Machining: is the automation of machine tools that are operated by precisely programmed commands. Use of CNC permits efficiency and repeatability for cutting, drilling, and shaping materials and products.



PRODUCTION OPERATION

Production Operation: involves the understanding of industry standards, quality processes and maintenance awareness in order to safely and efficiently operate machinery. Basic skills in computers, teamwork, communications, manufacturing safety, basic electrical, computer control, mechanical systems, and fluid power are required for working within today's manufacturing environment.

NOTE: All statistics are from the M-CAM Mid-Project Implementation Report, September 15, 2016, unless otherwise noted.

M-CAM prepares students to work in advanced manufacturing.



Michigan's competitive advantage, today and in the future, is its ability to maintain, develop and enhance the advanced manufacturing industry. M-CAM demonstrates the ability of the community college network in Michigan to work together to solve the state's workforce needs and prepare people for employment in the 21st century.

Funded by a \$24.9 million Trade Adjustment Assistance Community College Career Training (TAACCCT) grant through the U.S. Department of Labor, available to community colleges to train unemployed, under-skilled and incumbent workers seeking advanced skills for in-demand careers.

M-CAM's case management and career coaching model provides students with a variety of counseling and support services throughout the technical training. Services such as academic advising, educational planning, career coaching, job search and job placement assistance, and referrals for supportive services addressing barriers that often keep students from successfully completing training. The support services have led to increased student completion rates.

With the grant, the colleges were able to:

- invest in staff and faculty;
- add 13 new industry-focused credentials;
- upgrade or modify 63 certificate and degree programs;
- enhance student access to career counseling; and
- invest approximately \$5 million in new manufacturing equipment and instruction tools.

The results:

- M-CAM has engaged more than 3,000 participants since its inception in 2014.
- More than 70 percent of the students who completed an M-CAM program obtained employment.
- About 74 percent of the students who gained employment received a wage increase over their previous earnings.

M-CAM promotes clear pathways to well-paying jobs.



Student Outcomes

College certificates earned:

1700+

Professional credentials earned:

1,400+

Degrees earned:

80+



Nearly **75 percent** of participants who successfully complete their programs are employed by the end of the first quarter after they finish. More than **80 percent** of those employed are working in manufacturing-related industries.

Keith McCloud works at Norman Group, a plastic injection molding company, where he was hired as a multi-skilled technician after completing that program at **Macomb Community College**.

He has a bright future ahead and credits the instructors and the equipment there for his success.

“The instructors were wonderful,” McCloud said. “They were patient. They took the time with me to make sure I understood what I was being taught.”

“The equipment there is the latest, so you’re a step ahead. You leave there already knowing how to maneuver through the particular system and how to operate in it.”

*“I am not done,” McCloud said. “I made the decision that I am going to continue in this field. I’m continuing my education, pursuing the automated systems technology degree at **Macomb Community College**. Once that is done I’m going to get my mechanical, electrical and robotic engineering degree, which is a lot of work.”*



CAREER PATHWAYS

M-CAM's career pathways model is designed to progressively develop the occupational, academic and life skills that students need in order to find well-paying, stable employment. The format allows participants to enter a short-term program, gain in-demand skills quickly, enter employment and then continue training to earn advanced degrees. With M-CAM career pathways tools – and conversations with career coaches – students can chart a personal career path in advanced manufacturing.

Opportunities for well-paying, stable employment

FOUNDATIONAL SKILLS

- Math
- Work readiness
- Job search

PRODUCTION PROGRAMS

- MSCC
- Forklift Certifications
- OSHA 30
- OSHA 10

SHORT TERM CERTIFICATE PROGRAMS IN WELDING, MACHINING, MECHATRONICS

- AWS
- NIMS
- Siemens
- PMMI

1-2 YEAR CERTIFICATE IN WELDING, MACHINING, MECHATRONICS

- AWS
- NIMS
- Siemens
- PMMI

ASSOCIATES DEGREES IN WELDING, MACHINING, MECHATRONICS

- AWS
- NIMS
- Siemens
- PMMI

BACHELOR'S DEGREES AND HIGHER IN ADVANCED MANUFACTURING

through partnerships with 4-year institutions

Professional, occupational, academic and life skills

M-CAM is a key partner in Michigan's workforce system.



“Over the next 10 years in the state of Michigan alone there will be more than 600,000 manufacturing jobs that will be required to be filled,” says Paul Aiello, director of Certified Education Training, FANUC America Corporation, a leading supplier of robotics and advanced automation.

“With employer partnerships, Macomb Community College and the other schools in M-CAM are providing the skills and knowledge and industry credentials to prepare students to fill those manufacturing jobs,” Aiello said.

While Detroit has always been viewed as a center of the automotive industry, the advanced manufacturing industry is now growing rapidly throughout the entire state. Michigan's competitive advantage lies in its ability to maintain, develop and enhance this industry.

M-CAM is a key partner in Michigan's workforce system and is committed to working at the state and local level with agencies such as the Michigan Workforce Development Agency (MWDA), Michigan Works! and the

Michigan Economic Development Corporation (MEDC) to maintain and expand advanced manufacturing in Michigan.

As the state's economic development agencies work to attract and retain advanced manufacturing industries, with M-CAM they can demonstrate two critical points:

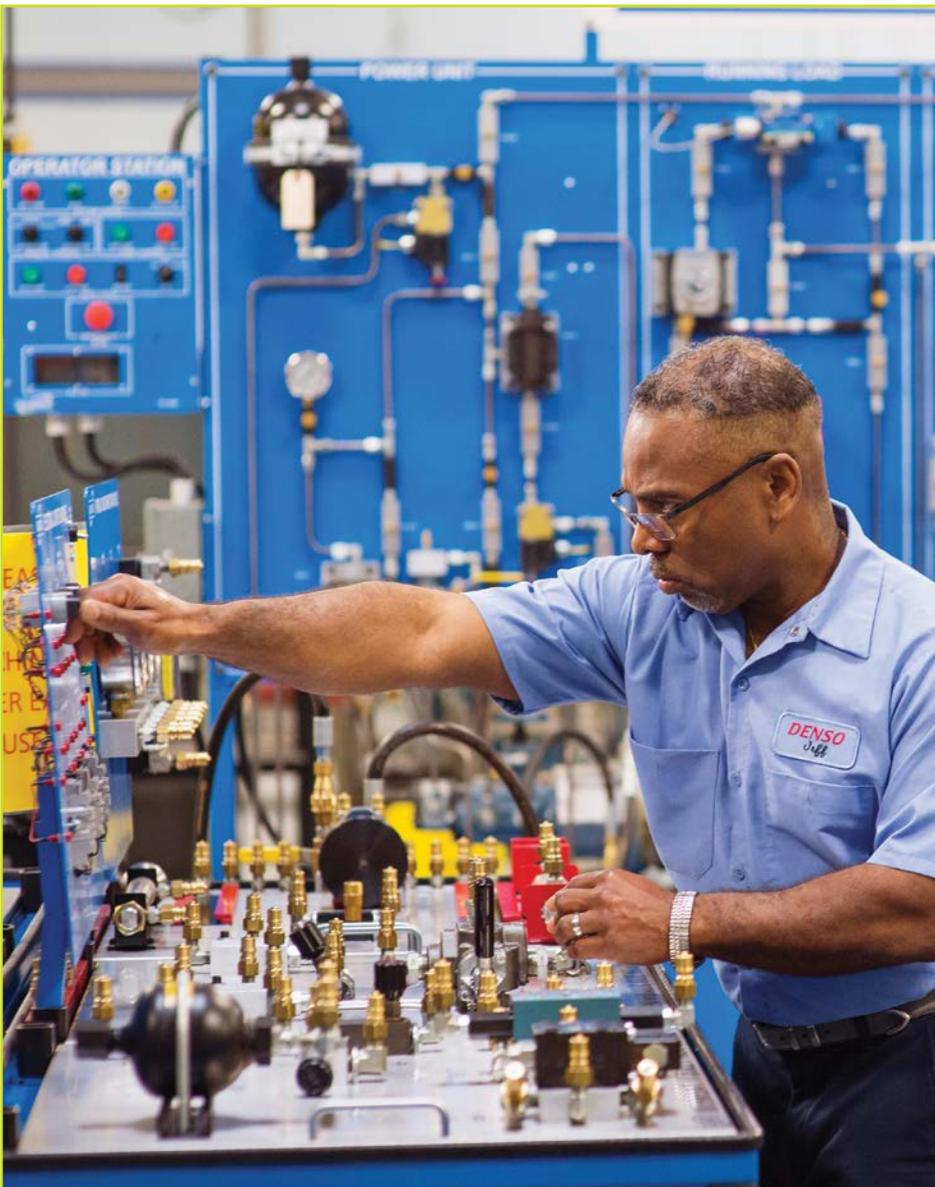
- Michigan is continually growing a workforce that is industry certified to work in advanced manufacturing; and
- Michigan has the educational processes in place to quickly respond to the needs of new manufacturers interested in locating in Michigan.

M-CAM is also helping to prepare the state of Michigan to meet the requirements of the Workforce Innovation and Opportunity Act (WIOA) by offering industry-focused training that results in skilled workers with credentials recognized by the advanced manufacturing industry.

POLICYMAKERS

*M-CAM represents huge opportunities for Michigan to up its game in manufacturing: as the state's economic development agencies work on strategies to attract and retain advanced manufacturing, they can partner with M-CAM to demonstrate **Michigan has the workforce that is ready to hit the ground running.***

M-CAM demonstrates the ability of the community college network in Michigan to work together to solve the state's workforce needs and prepare people for employment, producing better results together than they could have individually. M-CAM focuses on advanced manufacturing, but it is a model that could easily be used in other areas as well.

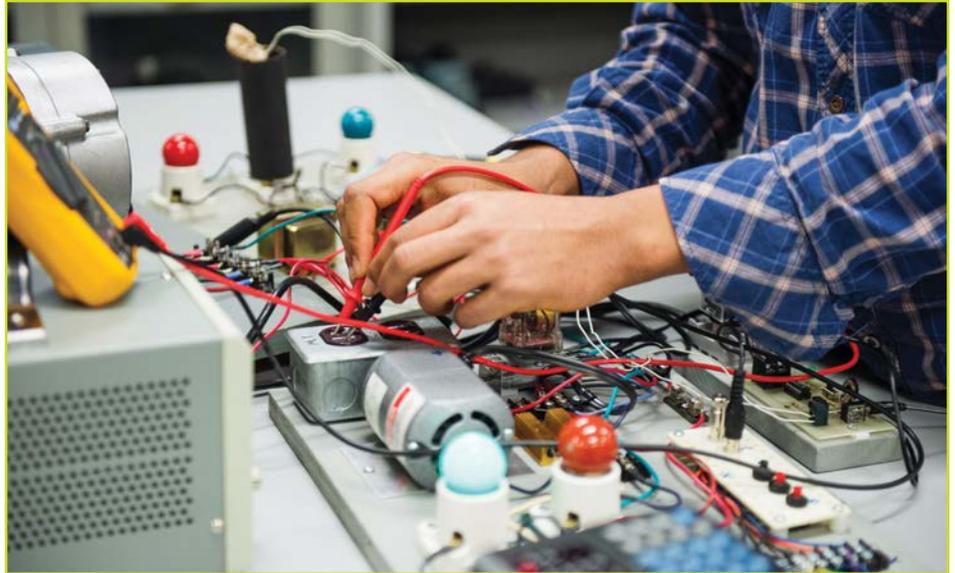


Over the past three years, Autocam Corp., a division of NN Inc., has hired 20 people who have either directly graduated or benefited from training through classes offered at M-CAM programs.

Autocam is one of several West Michigan manufacturers that are partnering with **Grand Rapids Community College (GRCC)** on curriculum development and attracting new workers to advanced manufacturing.

Working with **GRCC** allows Autocam to expand its recruitment efforts deeper into communities that it doesn't have the resources to access on its own, and to prepare for the 2022 time frame when it forecasts its need for labor will grow rapidly, according to Steve Heethuis, Training Director.

"We're all competing for the same talent, and for us to utilize programming that **GRCC** has already vetted, we can take their students and implement them in various roles here and continue their journey toward what they'd like to be doing professionally," Heethuis said.



POLICYMAKERS



“This is going to be very good for Michigan. It will help our companies grow and achieve long-term, sustained profitability. It will recruit and retain employment here. It will expand the base for advanced manufacturing amongst the entire Michigan manufacturing community.”

Bo Garcia, Dean of Community Education and Workforce Development, Lansing Community College

M-CAM colleges have aligned their training programs to industry recognized credentials



WELDING/FABRICATION: American Welding Society (AWS)



CNC MACHINING: National Institute for Metalworking Skills (NIMS)



PRODUCTION OPERATION:

Manufacturing Skill Standards Council Certified Production Technician (MSSC CPT)



MULTI-SKILLED/MECHATRONICS:

Association for Packaging and Processing Technologies (PMMI) and Siemens Mechatronic Systems Certification Program (SMSCP) Level 1



*“It was only a week and a half after ending the welding program at **Mott Community College** that I found a job,” said Amanda McCulley. “It’s a good job and it pays a decent amount and I love it; the people are great. Welding is something that is valuable anywhere you go. It’s a solid skill to have.”*

M-CAM serves its communities now and into the future.



M-CAM students come from very different walks of life. They are manual laborers, single mothers, former prisoners, veterans, line workers, grocery store clerks and people interested in making a career change. Despite these differences, they share a motivation to obtain the training that will help them become gainfully employed and launch a new career in the manufacturing industry.

Students gain real-life, hands-on experience on technology that is used today in the manufacturing industry, so when they leave their particular program they can walk into a job and start work day one.

“The M-CAM program at Lansing Community College has changed my life,” Phillip Dahlhofer said. “It’s allowed me to have a better job and to get off the assembly line into a better position at work where I have more of a future and better earning potential. I feel very excited about my future now because I have a position where I’m thinking, I’m problem solving and I’m working with a great team of people.”

The \$24.9 million TAACCCT grant increased the capacity of the colleges to serve their communities into the future. It enabled them to purchase new equipment, bringing their facilities up to workplace standards and allowing them to design industry relevant programs.

For example,

- **Bay College** doubled the size of its welding program adding state-of-the-art equipment. In addition, M-CAM led to the creation of a new mechatronics certificate program and an associate’s degree in mechatronics and robotic systems.
- The **Kellogg Community College** advanced manufacturing assembly training program was able to set up a real production cell.

Outcomes within this section are for the 40 percent of M-CAM students that have completed their studies and been exited from M-CAM services.

STUDENTS AND COLLEGES



- **Lake Michigan College** opened the new Hanson Technology Center, a 40,000 sq. ft. manufacturing training center with four lab spaces: Fab Lab; Advanced Manufacturing 1 and 2; and Welding Lab.
- **Mott Community College (Mott)** was able to purchase a new 3D printer capable of producing larger parts using more sophisticated engineering materials to advance its ability to work with employers in the design and manufacturing area. As a result, **Mott** is partnering with C3 3D - a design/engineering/3D printing firm that helps businesses benefit by using additive manufacturing to solve problems and quickly build solutions. In addition, **Mott** works with Adaptive Manufacturing Solutions, an innovation-focused company that works with individuals and businesses to support developing and moving new products to market. The college can do all of this by leveraging advanced students who also gain a richer set of skills as they support the design process and operate sophisticated 3D printers and other prototyping equipment.

About Our Students

There is broad variation in the age and life-experience “profile” of students. Six in 10 M-CAM students are either over 40 or under 25 years of age. Students in these two groups typically have very different “profiles” in terms of their work experience, understanding of manufacturing trades, and life responsibilities. Furthermore, students who faced significant life challenges, including housing instability, criminal history, and transportation challenges often viewed M-CAM as a vital “second chance.”



STUDENTS AND COLLEGES



"I came to **Schoolcraft College** because I was looking for a career change and the faculty has been tremendous," said Michelle Riley.

"I was working in finance as a purchasing analyst and I couldn't handle putting on dress clothes and work shoes anymore and looking at budgets and spreadsheets and sitting at a desk all day. One day I woke up and decided I needed something different.

*"I took a one semester class just to see if I liked welding and I fell in love and here I am. The faculty not only has a wealth of information in manufacturing, they've taken a genuine interest in me and my career. I couldn't get anywhere before without the proper training. Thanks to M-CAM at **Schoolcraft College**, employers are coming after me instead of me going after them."*



STUDENTS AND COLLEGES



Student Outcomes

About 74% of students who complete an M-CAM program receive a wage increase over their previous earnings. Placement wages vary by college but are generally well above Michigan's minimum wage.

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STUDENTS AND COLLEGES



Jerrittia Roseburgh was struggling to make ends meet for her five children and herself. She was working through a temp agency, but “finding different jobs that last for a month or two and then having to go and try to apply for another temp job just wasn’t cutting it,” Roseburgh said.

Then she found the CNC machinist program at **Grand Rapids Community College**.

“It’s excellent. I get hands-on training in class. I study hard. I’m learning machines – different varieties of machines and how to operate them. My instructor is good at what he does and he helps me as much as possible. Any questions that I have, he is right there to answer them.”

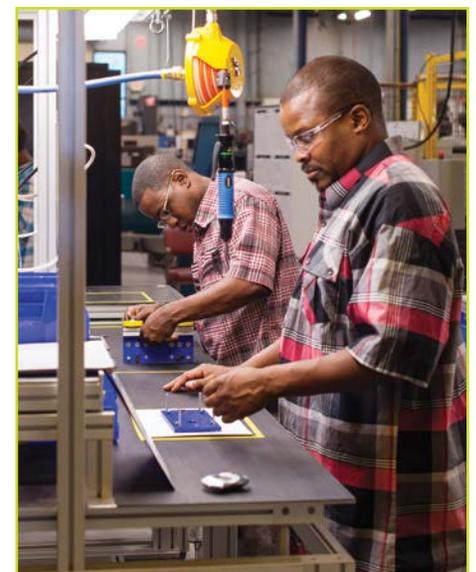
Roseburgh said the four-month program works perfectly for her as a mother of five children because they’re in school while she’s in school, and everyone does their homework together.

“I am feeling good about myself. I think this is boosting my confidence that I can do whatever it is I want to do. It is not just a man’s field of work, it’s a woman’s field of work as well.”



“When students come back to us and tell us that they have gotten a job or moved up in their career, it’s the best feeling as an instructor that you can have. There is no better compliment than knowing that your students are succeeding in the real world, and what you do makes a difference for them in their day-to-day life.”

Kevin Kreitner,
Industrial Maintenance
Instructor –
Advanced Manufacturing,
Lake Michigan College



STUDENTS AND COLLEGES



*“This was absolutely the best decision of my entire life. With the certificate that I received at **Schoolcraft College** through the M-CAM program, I am now a CNC machine operator at Sensor Manufacturing. It allows me to feel good about myself and the fact that I can go to work every day and make a difference.”*

Bryan Hall

*“I’m very impressed with the M-CAM program here at **Bay College**. They were able to find me a job before I was even finished with the schooling. I’ll be able to go anywhere and if I do have to move, there’s welding jobs all over the place. I actually have a talent now that I found I’m good at. Compared to my previous line of work, it’s a cut above, a skill.”*

Traci Hallmann



*“I work for AST as a quality inspector. I graduated in June 2015 from **Kellogg Community College**. The instructors there are very knowledgeable and encouraging. The program was interesting and because of the knowledge I gained I was able to excel and move from an operator to a quality inspector. There is no way I’d be where I am today without this program.”*

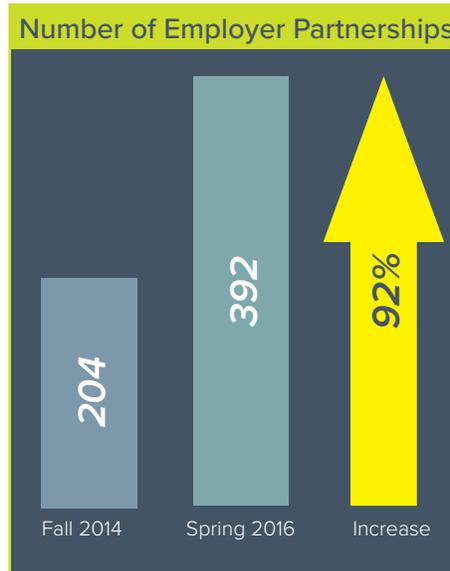
Anthony Gibbs



M-CAM collaborates with Michigan employers.



Employer relationships have increased by 92 percent, reflecting the deliberate efforts of M-CAM colleges to actively engage new employers in this project.



“With folks that come out of the Kellogg Community College M-CAM training program, the training curve is lessened. We’re able to get back into greater efficiencies much faster and efficiencies mean profitability,” said Erick Stewart, president, Stewart Industries.

“Their attention to detail, process orientation and attention to quality is already embedded in them. So, it’s just learning our methods and our philosophy and they’re ready to rock. They’re typically proficient within that first week and then ready to be challenged during that second and third week,” said Stewart.

“M-CAM is fantastic for the local community because the type of skill sets we’re looking for are scarcer than hen’s teeth. Those skill sets need to be honed right here in our community, and part of that is through the applicants we get from the M-CAM program at Lake Michigan College.”

James K. Todd, HR Director, Hanson Mold

EMPLOYERS



Top Employer Roles

Posted job listings at college

75%

Provided information on the needs of employers

69%

Actively coordinated with M-CAM job developers to hire students

50%

Interviewed participants at college

43%

Provided worksite access for training, tours, demonstrations

36%

Participated in a job fair

35%

Provided labor market/industry information

34%

Critiqued student resumes

30%

Identified necessary skills & competencies for M-CAM training

30%

Provided mock interview(s) for students

28%

Offered tuition assistance to M-CAM employee students

28%

M-CAM has nearly 400 employer partners that participate in planning and curriculum development, provide work-based learning opportunities and coordinate job placement.

EMPLOYERS



Ally Equipment Solutions, Flint, Michigan, specializes in the design, build and installation services of custom material handling equipment. It partnered with **Mott Community College** to tailor a CNC machining course for several of its manual machinists.

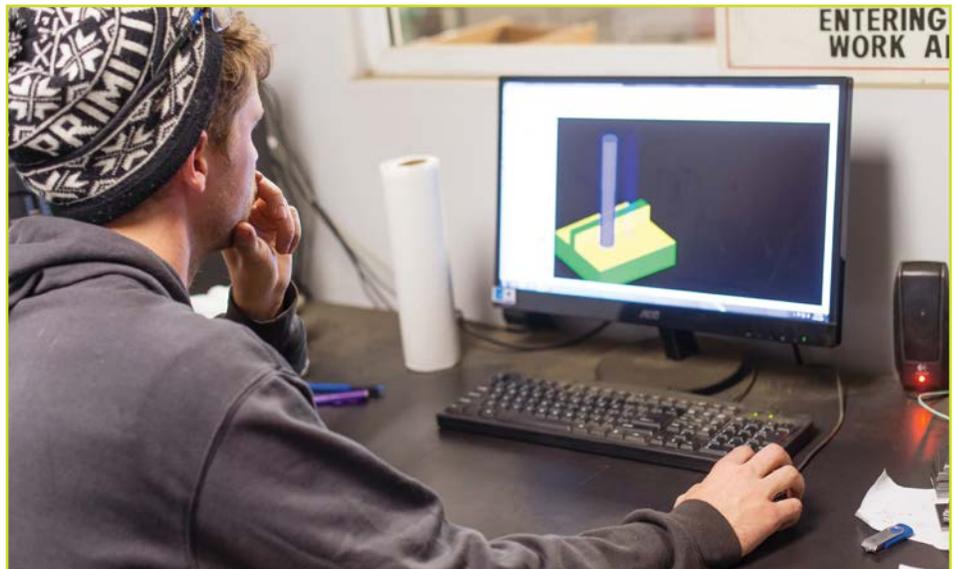
“The instructors came to our facility and did the training, so our guys actually could do some work while they were getting training on the machines that we have here,” said David King, CEO, Ally Equipment Solutions. “That was a big plus.”

As a result, the employees now have CNC certification and are earning higher, more competitive wages. Ally was able to bring work in-house that it had outsourced as well as open a new stream of business.

“Previously, we were outsourcing our CNC work. It was costly and we were pretty much in the dark. We couldn’t predict the timing. The company we outsource to might tell us it will be two weeks, but if they fall behind, we’re lost. If we can keep it in-house, we can see where it is at that moment and if something comes up we can let the customer know,” King said.

“Having certified CNC machinists also opened up a lot of new business. Before, when we were on the manual machines, we could do ‘onesie/twosie.’ Now we can do production where we can do production of 100 to 200 parts at a time.

“We perform duplicate work for a lot of our customers. If a month from now, they want a duplicate job, we already have it programmed into our machinery. That saves time and engineering and it saves a lot of money and costs, too,” King said.





“Our graduates, the people who are taking the training and education in these areas, are very much ready to enter the workforce. In fact, in many cases, we have employers who actually attend the graduation of some of these students and hire them literally on the spot. This is an extraordinary part of the program. Because it was developed with input from area manufacturers, they are eagerly awaiting these students and the skills they possess.”

Dr. Jim Jacobs, President, Macomb Community College

The M-CAM project was fueled by the 2008 economic downturn which resulted in rapid layoffs in manufacturing in Michigan, and the need for a collective vision and strategy to address the new manufacturing industry.

As Michigan rebounded and manufacturers retooled and modernized for the future, they lacked qualified candidates to fill the high tech manufacturing positions. To address this challenging environment, eight community colleges banded together with employers, workforce agencies and community partners to provide educational offerings, alternative modes of delivery and to upgrade equipment to employer standards to deliver a skilled workforce.

With full support and commitment from their respective college presidents, each M-CAM college committed to adopting key certifications in welding/fabrication, CNC machining, multi-skilled/mechatronics and production operation to promote successful employment to meet the emerging needs of employers.

This grant provided an opportunity for the M-CAM colleges to establish a peer learning network which allows them to incorporate best practices and establish models to improve their ability to better serve their respective communities in the future. These models, best practices and lessons learned can now be expanded to the additional 20 community colleges in Michigan as a means to increase cross-college collaboration and partnerships throughout Michigan to better support the state’s workforce and economic development agenda.





m-cam.org • 586.445.7517

**Bay
College**

906.786.5802

**Grand Rapids
Community College**

616.234.3800

**Kellogg
Community College**

269.565.2828

**Lake Michigan
College**

269.927.4103

**Lansing
Community College**

517.483.1857

**Macomb
Community College**

586.498.4108

**Mott
Community College**

810.232.2555

**Schoolcraft
College**

734.462.4680

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