

Resources and Partnerships for Community College Engineering and Technology Programs

Prof. Karen Wosczyzna-Birch, CT College of Technology/Regional Center for Next Generation Manufacturing

Dr. Karen Wosczyzna-Birch is the Executive Director and Principal Investigator of the Regional Center for Next Generation Manufacturing, an National Science Foundation Center of Excellence. She is the State Director for the College of Technology, a seamless pathway in technology and engineering from all 12 public community colleges to 8 public and private universities. Dr. Wosczyzna-Birch has expertise with both the recruitment and persistence of under represented populations, especially women, to pursue careers in engineering and technological disciplines. She has presented at numerous conferences throughout the United States and was an invited speaker at the international Gender Summit in Belgium in 2016.

Wendy Robicheau, Connecticut College of Technology-Regional Center for Next Generation Manufacturing

Wendy has been Project Manager with the College of Technology – Regional Center for Next Generation Manufacturing since 2012. In that time she has developed a passion for making middle and high school students, faculty and counselors aware of the educational and career pathways that are possible in STEM and manufacturing through various outreach programs. She enjoys organizing outreach initiatives such as student symposiums, counselor workshops, and any other opportunities to spread the word about career pathways in STEM.

Wendy has published and presented papers for the IEEE Integrated STEM Conference as well as other national conferences through her work with the National Science Foundation Advanced Technological Education Program. She has also participated in Women in STEM initiatives such as the CWEALF Girls and STEM Expos as well as their Roundtable Discussion on the Retention and Success of Women in STEM and enjoys participating in this important movement.

Currently, Wendy is pursuing her Master's Degree in Student Development in Higher Education at Central Connecticut State University with the goal of creating initiatives that expand students' knowledge of educational and career pathways in STEM. Her focus is on students from populations that are typically underrepresented in STEM fields, including females.

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College of Technology and Regional Center for Next Generation Manufacturing Model

The Regional Center for Next Generation Manufacturing (RCNGM), a National Science Foundation (NSF) Manufacturing Center of Excellence, was created in 2004 with funding from the NSF's Advanced Technological Education Program to educate manufacturing technicians with necessary skills required by industry. Connecticut's twelve public community college, part of the Connecticut State Colleges & Universities (CSCU) system, continuously partner with other community colleges, public and private universities, and industry throughout New England and at the national and international levels to provide support and expertise to students and educators in engineering and technology programs.

The Connecticut College of Technology (COT), a consortium of all twelve public community colleges in Connecticut, eight public and private universities; technical and comprehensive high schools; and representatives from industry, oversees the RCNGM. Eight of the community colleges have new Advanced Manufacturing Centers (AMC) that were recently expanded through a U.S. Department of Labor grant. The COT was established in 1995 through state legislation to create seamless pathways in engineering and technology from certificates and A.S. degrees to B.S. degrees. The pathways have multiple points of entry and exit for job placement and stackable credentials for degree completion, including national certifications that have increased enrollments and created program stability. There are currently twenty-four technology options that have been created based on the needs of industry.

The COT is led by its Site Coordinators Council that meets monthly and consists of an Executive Director, faculty, and deans from all member institutions and representatives from industry and government. The leadership model and monthly meetings are a key to the success of the COT and RCNGM as all members within the State are a part of all conversations. The COT Site Coordinators Council identifies and reviews new programs and program modifications based on industry needs. Site Coordinators also share best practices and activities from their respective institutions, allowing others the opportunity to incorporate these practices. The COT and RCNGM are able to continuously respond to challenges that arise in Connecticut concerning engineering and technology education and workforce development. In 2018, the COT and RCNGM were able to develop and implement an expedited process for replicating existing technology programs among all twelve state community colleges. A new Manufacturing Instructor Position was also created in response to the need for experienced technicians as instructors in community colleges manufacturing classrooms and laboratories.

Partnerships and Funding Opportunities

This COT model, coupled with the RCNGM, has led to various other partnerships and funding opportunities, such as, the NSF funding in 2004 to create the RCNGM, the New England Board of Higher Education's 2012 State Merit Award, a SIEMENS NX Software grant for all twelve community colleges, a project grant from the Advanced Robotics for Manufacturing Institute,

and partnerships and grants to increase student and faculty mobility between the United States and France. Some of these initiatives are not often found in community colleges and provide programming for students who choose begin their education at the certificate or A.S. degree levels. The RCNGM also partners with local high school programs and other local college programs funded by the National Science Foundation to strengthen the educational and career pipeline for students starting at a younger age through peer guest speakers and undergraduate research experiences. The RCNGM also partners with other NSF grants and entities such as Manufacturing USA Institutes, specifically with three of the institutes, working to create collaborations among government, academia, and industry that focus on workforce development.

In addition to the programs that can be advertised to demonstrate that community colleges can provide undergraduate research and travel abroad programs, the RCNGM has also created Educator Guides and career profile videos as a marketing initiative. The *Manufacture Your Future 2.0* and the *You Belong: Women in Manufacturing* DVDs are distributed nationally to high school and community college educators, counselors, and administrators to increase knowledge of career opportunities in manufacturing. These guides and videos are also available online and were created as a resource for anyone to share.

Engineering and Technology Program Development

The RCNGM also focuses on program and curriculum development in order to produce a skilled workforce in response to industry needs. The RCNGM has conducted a biannual survey of manufacturing workforce needs in Connecticut, which educators use to identify curricular needs and to support new academic program proposals or funding proposals. One community college was able to use the survey to create new programs including an additive manufacturing certificate to be offered in its new manufacturing building that includes a metal 3D printer. The survey also identified the need for employees with a stronger set of professional skills, which has been used to create more workshops for students.

Since the creation of the RCNGM, enrollment in the COT engineering and technology programs has increased by 269% while overall community colleges enrollment has decreased. The enrollment of students from underrepresented populations in COT programs has increased 272% for minorities and 46% for females. Partnerships with local industry are critical to curriculum development as well as getting the message out that there are careers available in their respective fields.