National Career Pathways Network

Connections

Volume 21-7: *National Science Foundation Advanced Technological Education (ATE) Program*

This is the print version of the newsletter released online.
For the online version, go here: http://www.cordonline.net/connections/21_7

NCPN
Educators and Employers: Providing Education with a Purpose

NSF ATE: Excellence in Technological Education

David Bond, Director, National Career Pathways Network

Through the National Science Foundation, the federal government provides over $60 million annually to ATE projects and centers that promote excellence in curriculum development and professional development in advanced technology areas. The goals of NSF ATE, Career Pathways, Tech Prep, and STEM initiatives are mutually supportive.

Through the six articles in this newsletter one can learn more about the ATE program in general and about specific examples of funded projects and centers. These articles are:

- *Advanced Technological Education Centers Build Career Pathways with Industry and Education Partners*
- *FLATE: Impacting Florida's Technical Workplace*
- *Where the Sparks Fly: Weld-Ed – National Center for Welding Education and Training*
- *Consortium for Alabama Regional Center for Automotive Manufacturing (CARCAM)*
- *The GTCM Model Curriculum Development Project (GeoTech Center)*
- *Protein Is Cash: ATE for STEM Career Paths in Biomanufacturing*

In addition to these articles, each year there are several NSF ATE presentations at the NCPN conference (this year there are twelve) and an extensive booth in the conference exhibit hall. These events and resources will enable you to learn how to be a part of the NSF ATE program in the future. Why not be part of one of the few government-funded programs that has not been cut? After all, we should all be about promoting excellence in technology and education.

Advanced Technological Education Centers Build Career Pathways with Industry and Education Partners

Lara Smith, Project Manager, Maricopa Advanced Technology Education Center (MATEC), Maricopa Community Colleges, Tempe, Arizona, and Madeline Patton, Freelance Writer and Editor

Educators looking for guidance from experts in technical education, connections to industry partners, and free high-quality curriculum need look no further than the Advanced Technological Education program.

The Advanced Technological Education (ATE) program focuses on the education of technicians for the high-technology fields that drive the U.S. economy. The National Science Foundation-funded program requires principal investigators, who are usually community college educators, to develop partnerships between academic institutions and employers to improve the education of science and engineering technicians at the undergraduate and secondary school levels. As a result of their ongoing conversations with people working in various facets of industry, ATE center leaders understand employers' expectations for technicians now and in the future.

For a glimpse of the breadth and depth of the activities of the 39 ATE centers, see http://www.atecenters.org. This interactive website and its accompanying publication, *ATE Centers Impact 2011,* explain the results of the centers' productive partnerships between community colleges, industry, secondary schools, and universities.

For students, the website offers videos of technicians explaining what they do on the job and what they like about their careers.

For educators, the website and publication provide contact information for the centers. All ATE centers want to share what they have learned and seek connections with secondary school educators and students.

As the flagships of the ATE program, the centers work on national and regional approaches to key issues in specific technology fields. They develop curriculum, provide professional development of college faculty and secondary school teachers, map career pathways to two-year colleges from secondary schools and from two-year colleges to four-year institutions, and test strategies for recruiting and retaining students in technical education programs.

By virtue of their federal funding, the curriculum materials and educational programs developed by ATE centers and projects are free or low-cost. ATE Central and TeachingTechnicians.org provide online searchable indexes to the plethora of innovative resources that ATE centers and projects have created and tested.

The centers also offer HI-TEC, an annual national conference where instructors, guidance counselors, industry professionals, and technicians can update their knowledge and skills. The conference focuses on preparing the technical workforce for high-tech industry sectors and explores the convergence of scientific disciplines and technologies.

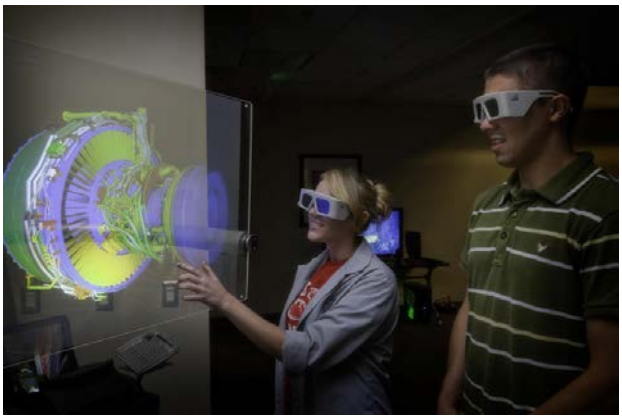
Save the date! The **2012 HI-TEC Conference** will be held July 23–26 at the Denver Marriott Tech Center in Denver, Colorado. Visit http://highimpact-tec.org/ for the latest information.

How Centers Work With Other Educators

While many of the inquiries that centers field from educators can be answered quickly by directing people to online resources or by mailing them copies of materials, ATE centers frequently serve as advisers to educators as they revise their technical education programs.

This spring, for instance, Ann Trausch and Bill Biggs, full-time faculty at Rogue Community College (RCC) in White City, Oregon, contacted Tom McGlew, eSyst Project Manager for A Systems View of Electronics (www.esyst.org), for advice on developing an online electronics technology degree program. eSyst is an ATE-funded project of the Maricopa Advanced Technological Education Center at the Maricopa Community Colleges in Tempe, Arizona.

"Some people think that we don't need to teach electronics because so many electronics manufacturing jobs are being outsourced to places like China, India, and Japan," McGlew said. "But if an electronics system goes down, we need someone here to get it back up and running. We need technicians who have holistic knowledge and can troubleshoot systems across various fields."



The eSyst curriculum uses a top-down approach that teaches electronics by troubleshooting entire systems rather than concentrating on components. The curriculum includes online labs. "When we teach from the systems perspective, students are able to see the big picture and how what they are learning can be adapted across different fields of technology. We are able to pique their interest and keep them motivated so that they follow through to completion," McGlew said.

After working with RCC educators to understand their goals and objectives, McGlew

- Walked them through the eSyst website and the systems-view implementation guide.
- Suggested adapting the Industry Skill Standards that MATEC created as placement tests within their targeted fields.
- Introduced them to the MATEC NetWorks ATE Resource Center's digital library of classroom and pedagogical materials that can easily be incorporated into their curriculum.
- Recommended they partner with MATEC NetWorks to produce webinars as an effective and efficient means of collaboration and dissemination.
- Agreed to review their draft grant proposals prior to submission.

Since implementing a hybrid approach that combines online instruction with in-person labs three years ago, the electronics technology program at RCC has averaged 100 full-time equivalent students. The Morris Family Foundation provides financial assistance for tuition, books, and fees for area high school students to attend the program. Five high school students graduated in June 2011 with either two-year degrees or certificates and their high school diplomas.

With McGlew's help the RCC faculty members are now seeking grant support to enrich the online content so the entire electronics technology program can be delivered online to students in remote locations. "The potential to reach out with

a fully-online, two-year degree in electronics—with the collaboration of new partners—will allow us to reach students in school districts, the military, and businesses that are looking for an opportunity to train individuals in the electronics field," said RCC Education Association vice president Ann Trausch.

Occasionally, requests for a center's assistance evolve into new partnerships. "When individuals and colleges seek long-term collaborations, we look for a strategic fit with long-term goals of the center. That allows us to best respond to requests," said Michael Lesiecki, MATEC executive director. "If the opportunity is strong, we can provide proposal advice, samples, and connections to other ATE centers and projects."

Educators from Hudson Valley Community College sought advice from MATEC while they were developing a proposal for an NSF ATE Regional Center grant. Eventually MATEC became a full-fledged mentor to the HVCC educators and the center was written into the proposal to provide products and services in micro-, nano-, and electronics technologies for the initiative that was funded as the Northeast Advanced Technological Education Center (NEATEC).

"The NSF likes that their prior funding of the MATEC National Center of Excellence is helping something else," Lesiecki added.

For more information, contact Lara Smith at lara.smith@domail.maricopa.edu.

FLATE: Impacting Florida's Technical Workforce

Marilyn Barger, Ph.D., P.E., P.I. and Executive Director, Florida Advanced Technological Education Center

The Florida Advanced Technological Education Center, FLATE, was established in 2004 through a National Science Foundation Advanced Technological Education award. FLATE is one of 39 Centers of Excellence nationwide focused on various aspects of improving science, technology, engineering, and mathematics education to meet the technician workforce needs of American advanced technology industries. FLATE's specific mission as Florida's go-to organization for high-tech manufacturing and advanced technical education is to provide leadership, best practices, and resources supporting Florida's high-performance skilled workforce. FLATE executes strategies of curriculum reform and development, outreach, and professional development for educators to reach its goals and verify its vision.

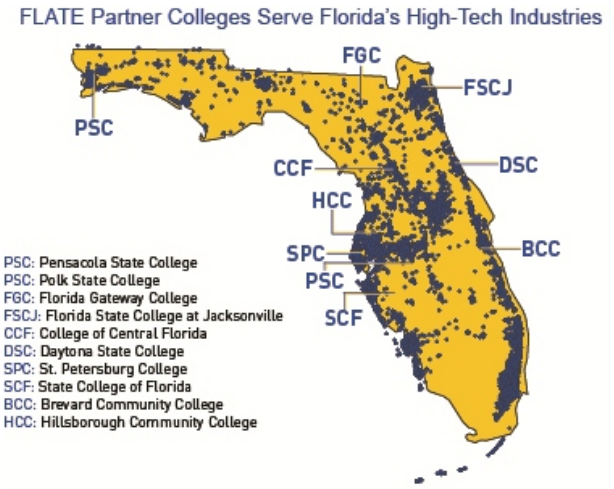
The engineering technology (ET) degree, with its certificate programs conceived, engineered, and coordinated by FLATE, is the first of its kind to offer a cohesive, comprehensive, statewide articulated AS degree program that focuses on a set of core courses that align with the National Manufacturing Skill Standards Council (MSSC) Certified Production Technician (CPT) certification, to provide value added benefits for industry. The engineering technology core and MSSC certification coupled with a second-year degree specialization prepares students for career employment in manufacturing and high-technology industries. The ET degree program fulfils a national need as expressed by the National Association of Manufacturers (NAM) and serves Florida industries by providing ready-to-work educational options. ET degree and certificate programs allow students the educational option of being ready for work more quickly and applying their earned certificates and MSSC credits toward completing AS degree later. To promote unified expectations for ET degree recipients, FLATE also

provided equipment grants to support the instruction of the ET core courses, enabling ET degree students statewide to engage in hands-on activities with real industrial tools so that they are ready to take their places in an educated and industry-ready workforce.

With the ET degree in place and signs of manufacturing in Florida on the rebound, the attention to student recruitment is of renewed significance. FLATE's *Made in Florida* outreach campaign is well established and strategically prepared to meet this challenge. It has reached over 53,000 Florida students and educators to date, and helps generate interest in and promote a positive image of manufacturing and careers in Florida. *Made in Florida* products and services include a comprehensive website at www.madeinflorida.org. This site provides support for K–20 STEM educators as well as curriculum products and dissemination for middle, high school, and college educators by providing materials ranging from coloring books to college curriculum. *Made in Florida* high-tech manufacturing facilities tours have served over 3,000 middle and high school students and their teachers. FLATE, working together with the Manufacturer's Association of Florida (MAF); Employ Florida's Banner Centers; and industry partners such as ConMed Linvatec, Hoerbiger, BASF, PCS Phosphate, and Atlantic Marine Florida LLC, produces an advertorial distributed to 400,000 or more Florida high school students annually.

The unified ET degree also drives a uniform expectation of the degree's instructional platform. Again, FLATE is prepared for the task. Student skill gaps between ET core courses and MSSC certification test results are under analysis with course content (if required) generated via its team of subject matter experts. In addition, professional development for educators including workshops for robotics camps, composites, and biotechnology, is provided via FLATE's STEM institutes including a STEM summer camp for K–12 teachers. FLATE provided professional development experiences for over 10,000 educators in 2010 including tours, presentations providing materials, and workshops. In summary, FLATE provides training to meet on-demand topics on time and on target.

FLATE's success is due in part to its employment of the Florida Sterling Management System used by industry. Florida Sterling is based on the national Malcolm Baldrige National Quality Award and is a comprehensive way for organizations to improve performance. Florida Sterling is considered to be a premier state model for continuous improvement and best practices in seven categories: leadership; strategic planning; customer and market focus; measurement, analysis, and knowledge management; workforce focus; process management; organizational results. FLATE's quantitative measure of its NSF goal-directed impact blended with Sterling evaluation drives the center toward improved satisfaction for industry partners and stakeholders. This evaluation process ensures that FLATE operates in a manner that is consistent with best NSF performance and industry management practices.



In conclusion, FLATE is committed to meeting emerging technology educational and workforce needs and demonstrating value for industry partners serving both rural and metropolitan areas. FLATE synergistically connects regional industry and workforce needs to targeted educational

endeavors at community and state colleges across Florida. FLATE's curriculum reform leadership, ongoing industry outreach, focus groups with its industry advisory committee, and partnership with the Florida Department of Education help FLATE develop an exportable model of goal- and results-oriented statewide collaboration that has extended economic impact potential.

For more information, contact Marilyn Barger at mbarger@hccfl.edu.

Where the Sparks Fly: Weld-Ed—National Center for Welding Education and Training

Ramona Anand, Project Manager, Lorain County Community College/Weld-Ed (National Center for Welding Education and Training), Elyria, Ohio

Apparently no one informed the welding industry that there's a national recession taking place. The industry is currently scrambling to meet the hiring needs of at least 30,000 additional welding professionals a year in an effort to produce 238,000 new and replacement workers through 2019.

That encouraging prognosis comes from the "National State of the Welding Industry Report" published by the National Center for Welding Education and Training—or "Weld-Ed"—a national partnership of community colleges, universities, workforce agencies, and business and industry members representing welding and materials joining industry perspectives.

Weld-Ed's primary mission is to improve the quality of education and training services available to welding students, while expanding the number of higher-skilled welding technicians to meet present and future specialized workforce needs.

Created in 2007 through an initial grant from the National Science Foundation, the center has rapidly become a vital resource in the industry through its many ongoing support functions, which include:

Welding technician at Naval Shipyard

- **Curriculum**—Weld-Ed improves the education of associate degree students in welding technology through curriculum model development and enhancement. The Center's recently published "Welding Technician National Core Curriculum" is being offered to educators nationwide.
- **Professional Development**—Weld-Ed promotes and enhances faculty professional development and continuing education for welding educators through a variety of module-based educator training programs. The center also provides news, updates, educational innovations, emerging industry trends, and information on a variety of grant

opportunities offered by such organizations as the National Science Foundation, the U.S. Department of Labor, and the Association of Teacher Educators.

- **Research**—The center conducts market-driven research pertaining to education and employment trends to improve welding education programs, address recruitment and retention issues, expand workforce diversity, enhance existing curriculum, and advance laboratory science and application.
- **Recruitment**—Weld-Ed works alongside a growing list of business partners to further increase the number of welding technicians to meet ongoing workforce needs in an ever-expanding employment universe that includes heavy industry, aerospace, petroleum and energy, automotive, and specialized regional industries.

Through its many initiatives, Weld-Ed has successfully graduated more than 1,700 students from ten regional center partner institutions, and continues to play a vital role in the evolution and growth of the welding industry. The center's educational and business affiliates have become the foundation for its success, driving research, education, policy, and direction for students, educators, and industry professionals alike.

For more information, contact the author at ranand@lorainccc.edu.

Consortium for Alabama Regional Center for Automotive Manufacturing (CARCAM)

Beverly Hilderbrand, CARCAM Director/PI, Gadsden State Community College, Gadsden, Alabama

In 2009, CARCAM was profiled in the *Community College Times* as a successful example of how community college consortia can take a leading role in preparing students for the jobs of the future and educating the automotive industry about where they can find work-ready employees. CARCAM's mission is to provide a systematic model for educating a highly skilled employee pipeline for the automotive and advanced manufacturing industries. The center's focus is:

- To educate technicians for the automotive/advanced manufacturing industries,
- For colleges to collaborate with industry to continually develop and update relevant curriculum to meet manufacturing educational needs,
- To offer flexible career pathway options to recruit, retain, and prepare students and incumbent workers for careers in automotive manufacturing, and
- To provide industry-relevant professional development to advance the technical knowledge of faculty and incumbent workers.

CARCAM began in 2005 with five community and technical colleges partnering together to design an industry-led curriculum. CARCAM developed and implemented an associate in applied science degree, a full certificate, and a short-term certificate in automotive manufacturing technology (AUT) for Alabama's postsecondary system. The consortium has now expanded to eleven colleges across the state that jointly take a leading role in meeting current and future workforce needs. The AUT degree is designed to prepare students with multi-skilled abilities in automated manufacturing. These skills are highly portable and transferable to other sectors that demand high-tech, multi-skilled technicians to service and repair the robots and automated systems essential in today's manufacturing environment. CARCAM's community and technical partner colleges in Alabama are:

- Bevill State Community College, Hamilton

- Calhoun Community College, Decatur
- Central Alabama Community College, Alexander City
- Drake State Technical College, Huntsville
- Gadsden State Community College (center location), Gadsden
- Jefferson State Community College, Birmingham
- Lawson State Community College, Bessemer
- Shelton State Community College, Tuscaloosa
- Southern Union State Community College, Opelika
- Trenholm State Technical College, Montgomery
- Wallace State Community College, Hanceville

All of the partner colleges are collaborative grant contributors providing experienced faculty as co-PI's/senior team members as well as in-kind support. Collective partners provide support, guidance, technical assistance, and workforce insight. Key stakeholders outside the consortium include: the Governor's Office of Workforce Development (GOWD), the Alabama Department of Postsecondary Education, the State Department of Education (Secondary), the Alabama Automotive Manufacturing Association (AAMA), Alabama Industrial Development Training (AIDT), the Alabama Technology Network (ATN), and the Alabama Germany Partnership.

Significant industry partnerships include several original automotive manufacturers (OEMs) and numerous suppliers such as Honda Manufacturing of Alabama (HMA), Mercedes Corporation, Toyota Motor Manufacturing of Alabama, Rockwell Automation, ZF Lemforder, Benteler Automotive, KTH Leesburg, and LLC.

Dissemination of the CARCAM brand has been accelerated by the excellent results of the science, technology, engineering, and mathematics (STEM) camps the grant has sponsored at member colleges annually since 2006. STEM camps have evolved from small events for high school students who were already accomplished in science and math to much larger events geared toward encouraging capable (but often undecided) students to investigate technology education and technician careers. The one-week summer camps are also effective in reaching underrepresented student populations and increasing their interest in technical careers.

To date, CARCAM has had approximately 1,300 students attend STEM camps, with 75% of the attendees being female and/or minority. At the camps, students experience a college campus environment, observe engineering classes, visit robotic labs and build hands-on projects, and participate in team-building activities. Through interaction with college faculty and staff and on-site industry tours, camp participants learn about the courses they should take in high school and college to prepare for technical careers in manufacturing.

Camp coordinators survey the students utilizing pre- and post-camp surveys to assess whether they learned anything new at STEM camp and whether the camp experience altered any of their thinking about community college and technical education. Per the survey results, STEM camps are effective at helping high school students know more about their community colleges, and also indicate that an impressive number of responders report they would be more likely to consider technical careers as a result of their STEM camp experiences.

An outstanding outcome of CARCAM has been its breakthrough contribution in terms of bringing faculty across Alabama to work together, thereby creating a new network of education, teaching, and learning resources. CARCAM has built relationships with industry partners as well as other training and education organizations throughout the state as

well as other ATE centers nationally. The current focus on redesigning curriculum to serve incumbent workers and bring new associates into the workforce via distance learning and hybrid modularized courses available 24/7 will allow greater availability and flexibility for educational resources.

For more information, contact the author at bhilderbrand@gadsdenstate.edu.

The GTCM Model Curriculum Development Project

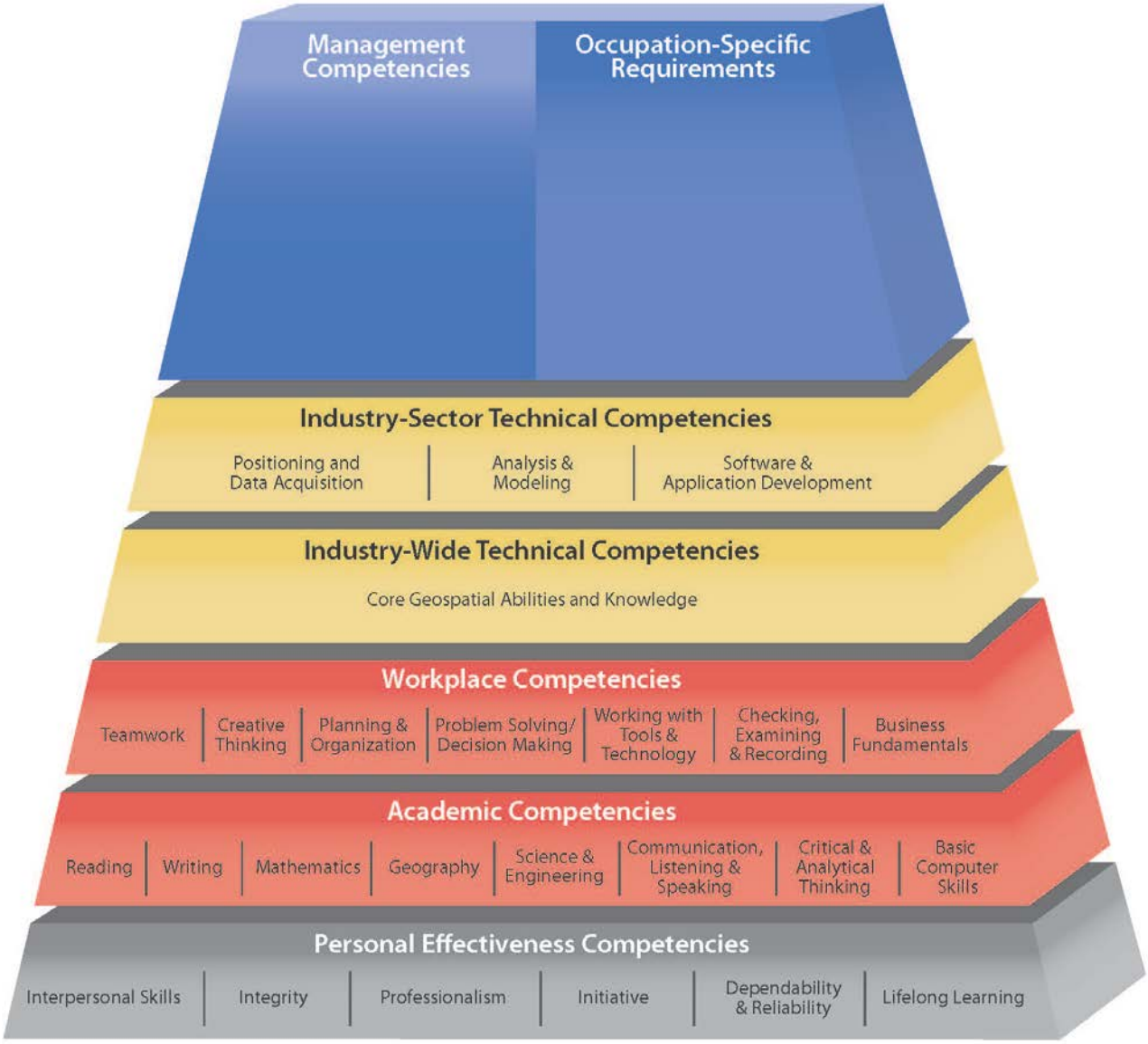
Phillip Davis, Director and Principal Investigator—GeoTech Center

The GeoTech Center resulted from a national study in 2007, led by Deidre Sullivan of MATE, which found that the geospatial technology industry had grown large enough to justify its own discipline-specific NSF Center of Excellence. We proposed in October 2007 and were funded beginning September 2008. We received $5M from NSF ATE for four years (2008–2012). The mission of the center is to empower colleges and expanding the geospatial workforce. Our major achievement has been the adoption of the Department of Labor's (DOL) Geospatial Technology Competency Model (GTCM), which was published in 2010 on DOL's Competency Model Clearinghouse. The GTCM fulfills President Bush's vision of the geospatial technology industry as being one of the nation's high-growth, high-technology strategic industries.

The GTCM provides geospatial educators with the first-ever federally endorsed *national* model for curriculum development. The GTCM is a concise and comprehensive list of competencies required by workers in the geospatial industry, ranging across all industry sectors and levels of expertise, from technician to scientist. Using the GTCM, educators can develop geospatial curriculum that not only meets their local business needs, but imparts to their students lifelong skills that will serve them throughout their professional lifetimes, regardless of their geographic locations. It may also provide for better alignment between college and university geospatial curricula.

To turn the GTCM into useable curriculum, the GeoTech Center has recently undertaken its GTCM Model Curriculum Development Project. This project has the goal of developing curriculum outlines for (1) a model GTCM-aligned certificate and (2) model GTCM-aligned courses within the certificate. These model curricula will be developed by large numbers of geospatial educators selected for their experience and expertise in both technology and education through a consensus process. The result will be a SCORM-compliant learning course pack that allows any educator to download and install the model course pack into their SCORM-compliant course management system (CRM), such as Moodle, Blackboard, WebCT, D2L, and others.

Sharable Content Object Reference Model (SCORM) is a collection of standards and specifications for web-based e-learning. It defines communications between client side content and a host system called the run-time environment, which is commonly supported by a learning management system. SCORM also defines how content may be packaged into a transferable ZIP file called "Package Interchange Format." It allows us to build learning modules and courses in Blackboard and export to Moodle and other Course Management Systems (CMS).



The course packs will be a ready-to-use (and modify) course outline that includes syllabi, learning objectives (required and recommended) from the GTCM, sample assessment tools, textbook recommendations, and suggested learning resources. Faculty will be free to use as much or little of the recommended course pack material as they see fit. It is expected the material will be localized to represent differences in local employer needs and student outcomes.

The GeoTech Center is holding a series of faculty development workshops around the country in 2011 and 2012 to develop the courses as well as educate faculty on the GTCM and its use in both academic and vocational geospatial technology programs. We believe this effort is valuable to both for-credit academic and non-credit adult and secondary-education vocation programs.

For more information, contact the author at pdavis@delmar.edu.

Protein Is Cash: Advanced Technology Education for STEM Career Paths in Biomanufacturing

Sonia Wallman, Executive Director, NBC², Portsmouth, New Hampshire

High school students need to know about new advanced technology STEM career paths available right down the street or near their neighborhoods. Students (and their parents) need to know that attractive opportunities for careers in science, technology, engineering, and mathematics (STEM) can be found in cities and towns throughout the nation.

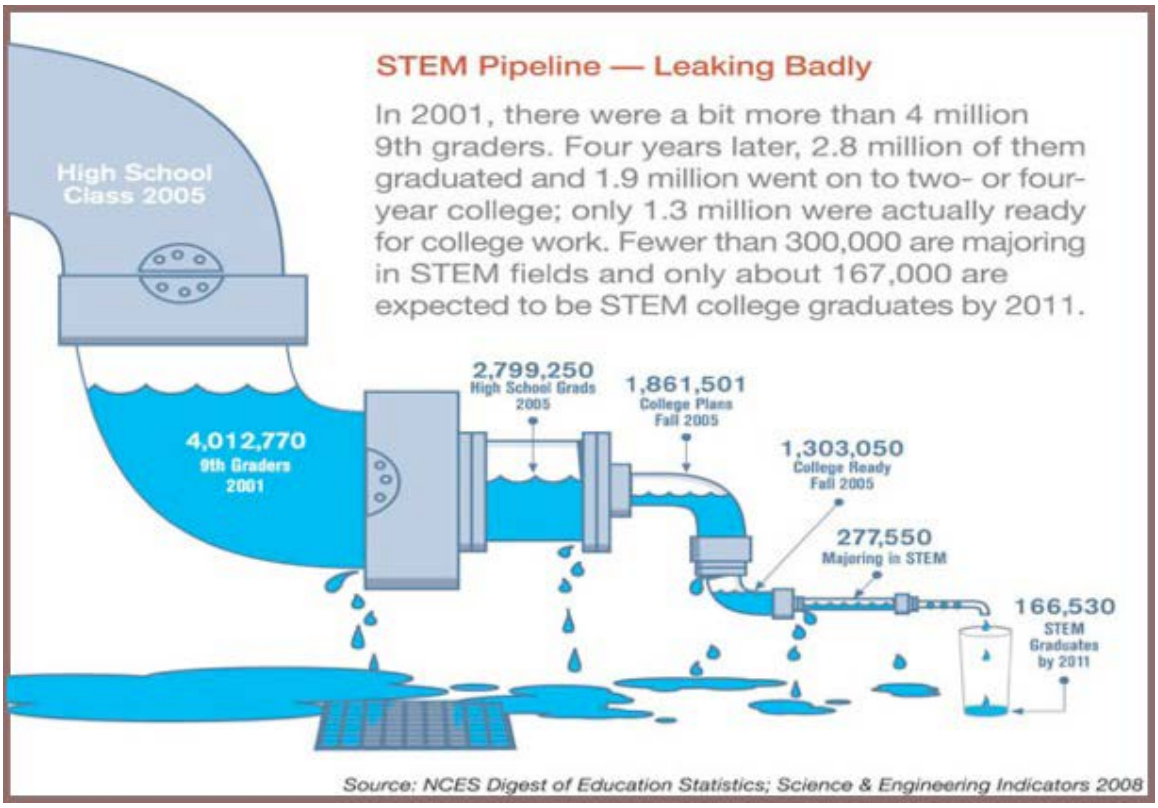
The NSF ATE Northeast Regional Biomanufacturing Collaborative (NBC²) fosters support for career pathways in one of the most promising STEM fields. We work with our partners in education, training and the workforce throughout the northeast and the nation. Over the years of our operation from September 2005, we have published laboratory manuals of SOPs used for hands-on biomanufacturing education and training. This fall we will launch our industry-written *Introduction to Biomanufacturing* textbook, followed by our biofuels production and analysis textbook and laboratory manual by Elmar Schmid. We are working towards a Virtual Biomanufacturing Production Facility with the support of and to be shared with industry.

NBC² hosts *Protein Is Cash* workshops from Troy, New York, to Portsmouth, New Hampshire, and from Lexington, Kentucky, to Mesa, Arizona, and in other maturing and nascent biotechnology / biomanufacturing clusters. The workshops teach teachers hands-on about biomanufacturing, including specifics on the production of biopharmaceuticals and biofuels. NBC² also provides networking to biomanufacturing industry sites and to opportunities for work and for further education in biomanufacturing. Associate degrees in biotechnology / biomanufacturing are often articulated with local bachelor's degree programs. Biomanufacturing jobs often include full reimbursement for further education. S-STEM (Scholarships in Science Technology Engineering and Math) grants at community colleges help offset the expenses of a STEM associate degree.

Protein Is Cash takes into consideration career paths in metrology, or instrumentation / calibration, upstream processing or cell culture, downstream processing or purification, quality control, and quality assurance. Also considered are facilities, validation, process development, and environmental health and safety (EH&S). Company lectures and tours give an in-depth understanding of local possibilities in biomanufacturing and the bioeconomy. Morning lectures include a global and national view of biotechnology research, process development, clinical trials and biomanufacturing—all part of an emerging bioeconomy.

The NBC² is partnered with Bio-Rad, which provides the kits and equipment for biopharmaceutical production upstream and downstream processing of green fluorescent protein (GFP), biomanufacturing quality control and biofuels production, and analysis used in *Protein Is Cash*. Bio-Rad's kits meet requirements for AP biology and chemistry and technology-oriented high school courses and programs.

A study on the STEM pipeline funded by the U.S. Department of Education and published in 2009 suggests that of 4 million ninth graders in 2001, only 2.8 million graduated from high school in 2005. Of the 2.8 million high school graduates, only 1.9 million had plans to go to a two- or four-year college and only 1.3 million were ready for college work. Fewer than 300,000 majored in STEM fields in college and only 170,000 were expected to graduate with stem degrees in 2011. An illustration from the study follows:



Source: Digest of Education Statistics, NCES 2009

The NBC[2] *Protein Is Cash* workshops will help to "stem" the flow of students from the STEM pipeline, especially throughout high school, by provoking an early awareness of attractive STEM career pathways in biomanufacturing available in their neighborhoods. Awareness is half the battle—word of mouth carried by students can be the great accelerator of this process. On August 31, 2011, the NBC[2]'s *Protein Is Cash* workshops had been to 10 locations in 7 states, making 180 high school teachers aware of the wonderful and well paid biomanufacturing career paths available near their high schools and the nearby community colleges and four-year articulated educational institutions ready to educate and train students for these career paths. It is expected that teachers graduating from these workshop with 40 professional development credits will impact the lives of at least 18,000 students. We hope that each student impacted will also spread the word so more people in their communities know about biomanufacturing career pathways. Finally, Hudson Valley Community College in Troy, New York; Middlesex County Community College in Edison, New Jersey; Middlesex Community College in Lowell, Massachusetts; and Bluegrass Community Technical College in Lexington, Kentucky, will continue to provide professional development *Protein Is Cash* high school teacher workshops at their locations in their states, thereby growing the biomanufacturing career pathways awareness in a self-replicating fashion throughout each state.

Over the next four years we hope to help seed the infrastructure to grow the bioeconomy throughout the nation. Soon, professing to have an interest in a career in biomanufacturing to support a growing bioeconomy will be as common as having an interest in a more traditional career path.

For more information, contact the author at swallman@biomanufacturing.org.

Connections

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Connections is published by the National Career Pathways Network, an organization of educators and employers dedicated to the advancement of Career Pathways, Tech Prep, and other CTE initiatives. NCPN assists its members in planning, implementing, evaluating, and improving workforce education programs. NCPN was founded by CORD, a national nonprofit organization that has been leading change in education for over twenty years.

Questions about *Connections?*
Contact: Mark Whitney, NCPN, P.O. Box 21689, Waco, TX 76702-1689; 254-772-8756 ext. 315; or mwhitney@cord.org

Visit NCPN on the web at www.ncpn.info.

Future events of interest to our members and attendees!

The **2012 HI-TEC Conference** will be held July 23–26 at the Denver Marriott Tech Center in Denver, Colorado. Visit http://highimpact-tec.org/ for the latest information.

The **2012 NCPN Conference** will be held October 17–19 at the Convention Center in Richmond, Virginia. Visit ncpn.info for the latest information.