

National Association for Workforce Improvement (NAWI) and Vermont STEM Forum

Tuesday May 24

7:30 a.m. Registration/Continental Breakfast

8:20 a.m. Welcome and Keynote

Doug Webster, President, NAWI; Vermont Department of Education

Welcome: *Lawrence Miller, Secretary, Vermont Agency of Commerce and Community Development*

A Taste of Beakman's World with Paul Zaloom

Paul Zaloom is a comedic puppeteer, political satirist, filmmaker, and performance artist who lives and works in Los Angeles and tours his work all over the world. Zaloom has written, designed and performed 12 full length solo spectacles, including Fruit of Zaloom, Sick But True, his latest, Mother of All Enemies and, with Lynn Jeffries, The Abecedarium. Zaloom has appeared on the science educational TV show Beakman's World as Beakman, the wacked-out, weirdo scientist who answers viewers' questions about science, nature, and various bodily functions.

9:00 a.m. General Session Continued

Science Comes Alive!

Dancer Lida Winfield, Teaching Artist, Flynn Center for the Performing Arts will lead participants to create a movement piece illustrating the three theories of physics. Research confirms that involving students kinesthetically with scientific concepts significantly deepens their engagement in and understanding of the material. You will walk away with a teaching approach that you can apply the next day to a wide variety of topics. No prior experience with dance necessary or expected.

Dancer Lida Winfield, Teaching Artist, Flynn Center for the Performing Arts

9:30 a.m. 3 Concurrent Sessions A

Conceptualizing the Future: Product Design and Additive Manufacturing

In this presentation, you will learn about the Engineering and Design pathway that has been developed for high schools in Central Orange County, CA. This pathway uses S.T.E.A.M. to engage students, fuel their creativity, and teach them high-demand skills. Through a sequence of courses, students gain skills in product design and sketching, prototype development, CAD, and Additive Manufacturing. Industry and post-secondary educational partners provide mentoring and also challenge students with real-world design problems and feedback.

*Jean Gaudreau, Curriculum Specialist/Articulation Coordinator Orange County Department of Education
Central Orange County, California*

Helping Students through Accountable STEM Innovation

This session will demonstrate three significant innovations in STEM programming in a technical high school that meet all aspects of second generation education reform. We will visually illustrate our new online course modules for forensics and clean energy, we will describe our design for a STEM focused early college high school with Northeastern University, and we will exhibit our Innovation Academy for Emerging Technology. We will show the flexible forms of professional development that foster the concept of 'job' embedded PD. Our state level presenter will validate alignment of these innovations with our state Race To The Top reforms.

David Wheeler, Principal, Southeastern Regional Technical School, South Easton, MA

John McDonagh, Professional Development Liaison, Southeastern Regional Technical School, South Easton, MA

John Roper, Project Director for Voc-Tech Education Frameworks in Massachusetts

Nanotechnology in the Classroom

Want to teach Nano scale science in your classroom but don't know where to start? The Southwest Center for Microsystems Education had a whole array of materials, including lesson plans, kits and hands on exercise that will show your students how MEMS (micro electro mechanical devices) devices work and are fabricated.

Adrian Sebborn, Teacher, Southwest Vermont Regional Technical School District

Dr. Matthias W. Pleil, Principal Investigator, Southwest Center for Microsystems Education (SCME); Research Associate Professor of Mechanical Engineering, University of New Mexico

10:30 a.m. Break

10:45 a.m. 3 Concurrent Sessions B

Addressing the Demand for Information Technology Problem Solvers

In response to the urgent employer request for employees with problem-solving skills, educators at several colleges have designed a new course in IT Problem Solving. The course --also taught at Tech Boston Academy, a Gates Foundation High School -- is blazing trails from high schools to community colleges and four-year institutions. With student retention rates at 90%, you'll want to witness how this innovation in teaching and learning is engaging students. Sample problems include Green IT, Desktop Security, and Apps Inventor.

Jaime L'Heureux, Assistant Professor CIT, Bunker Hill Community College

Joyce LaTulippe, BATEC Curriculum Director

Paula Velluto, Professor CIT, Bunker Hill Community College

Building a Bridge to Engineering Careers: Transportation, Distribution and Logistics Problem Based Learning

Come to this session and learn how teachers developed high quality project-based lessons that give students insight to possible career choices within the Department of Transportation (DOT). Hear how students worked collaboratively as members of a research team to solve an engineering problem. Attend this session to gain access to more than 500 Transportation, Distribution and Logistics lesson plans that promote careers in transportation. All lessons were developed by teachers for teachers. In addition to being used in the CTE classroom, these lessons can easily be integrated into mathematics, science, social studies, language arts and special education. Most lessons are in a problem or project based learning format, and all are targeted for students in grades 6-12

Dr. Frances Beauman, Project Director, US Department of Transportation Career Development Initiative

Michael Acres, CTE Math Instructor, Delaware-Chenago-Madison-Otsego BOCES, Harrold Campus, New York State

Christopher Olds, CTE Instructor, Delaware-Chenago-Madison-Otsego BOCES, Harrold Campus, New York State

sTEem-at-work

sTEem-at-work puzzles are short, real world scenarios that integrate science, technology, engineering and math and engage students in critical thinking, innovation, and making connections. They have been developed as alternative / supplementary materials that can be used in all high school science and first level college courses. The puzzles are short snapshots of real world sTEem scenarios, providing enough information for the reader to "puzzle" out the solution using inductive and deductive reasoning, critical reading and interpretation skills. The "yes-no" answers allow teachers to focus on either the sTEem concepts within the puzzle (that vary for every puzzle), the problem solving strategies that can be used to come up with the answer, or the theme that runs in a group of puzzles. In addition to providing fun, applied contextual content, it is increasingly important that students gain an appreciation of the critical role that science and mathematics play in engineering and technological advancement.

Dr. Richard Gilbert and Marilyn Barger, Professor, University of South Florida, Chemical and Biomedical Engineering, Tampa FL

12:00 p.m. Lunch

Panel with National Science Foundation Advanced Technological Education Centers of Excellence: Creating STEM Career Pathways through NSF ATE Centers, *Karen Birch, Marilyn Barger, with special guest David Tuttle*. David is a manufacturing teacher at Platt Technical High School. He has established an award winning manufacturing program that has enrollments bursting at the seams.

1:00 p.m. 3 Concurrent Sessions C

STEMworks INDIANA: Enhancing STEM Workforce Opportunities

The STEMworks INDIANA initiative focuses on helping eligible high school students and dislocated workers in Central Indiana develop a successful pathway to desired, high demand, high growth employment opportunities in Science, Technology, Engineering, and Mathematics (STEM) fields. Tools and support have been provided to enable these individuals to identify their occupational interests, focus on appropriate educational pathways, transform into STEM career candidates, and become employed in gateway STEM jobs in Indiana, simultaneously enhancing the competitive position of local and regional employers. STEMworks INDIANA builds on work already underway in Central Indiana, but it also fills in gaps through which too many promising STEM career candidates fall.

David Nickolich, Ed.D, Indiana University Purdue University at Indianapolis

Charles Feldhaus, Ed.D., Indiana University Purdue University at Indianapolis

Young Women and STEM Careers - How to Recruit, Retain and Support Girls in Nontraditional Programs

What's missing from our high school and technical center STEM classrooms? Girls! Learn why girls shy away from careers in STEM fields, why this is an issue both for individual students and for the career fields as a whole, AND what you can do to change this trend. Gain insight into ways to spark interest in math and science, recruit female students, and retain and support them in your classroom and beyond. We will discuss successful approaches such as the Women Can Do Conference, Introduce a Girl to Engineering Day, and the Rosie's Girls Summer Program. Workshop participants will walk away with big picture suggestions as well as tactics to implement immediately.

Kelly Walsh, Program Coordinator and Gender Equity Consultant, Vermont Works for Women

Engaging Students in New Product Development: Virtual Ideation Platform

Many policymakers are emphasizing the need for "innovation," which is laudable as the core of America's economic strategy. However, without the necessary technological infrastructure, the call for innovation remains a futile effort. What is missing from the "innovation" model is the realization that metalworking technologies are the foundation of all manufacturing. Precision machining supports those efforts by supplying the requisite tools for production regardless of the "innovation." This presentation will explore the Virtual Ideation Platform (VIP) which involves several New England colleges as well as cutting edge companies from around the region. At the center of the VIP is the Precision Machining Program at CMCC which fabricates components, fixtures and tooling. This presentation will review specific projects and their impact on students, faculty and their respective curricula. The implications of the VIP model for economic and workforce development will be explored. A brief lesson on project lifecycle which is used as a framework for ongoing curriculum development under the VIP will be demonstrated.

Diane Dostie, Dean of Corporate and Community Services Central Maine Community College

Robert Simoneau, Associate Professor, Keene State College

2:00 p.m. 3 Interactive Concurrent Sessions D

Promoting STEM Education and Careers to increase the Technology Pipeline

Moderator: Dr. Karen Birch, Connecticut College of Technology, Next Generation Manufacturing

Creating Real-World Problem-Based Learning Challenges in Sustainable Technologies to Increase the STEM Pipeline

Moderator: Dr. Nicholas Massa, Professor and Program Coordinator, Springfield Technical Community College

STEM Work Based Learning Including Building Employer and High School Capacity

Moderator: Cary Brown, Internship Coordinator, Norwich University

2:45 Break

3:00 STEM Education – What Will STEM Look Like in 5 Years?

Bill Church, Vermont BioSciences Alliance, facilitator

The Future of STEM Education: *Dr. Stephen Uzzo, Vice President, New York Hall of Science* -

Dr. Uzzo focuses on projects related to Science, Technology, Engineering and Mathematics (STEM) learning including sustainability and network science, Connections: the Nature of Networks, is faculty of the New York Institute of Technology (NYIT) Graduate School of Education, where he teaches STEM teaching and learning. He was on the launch team for MTV, was Chief Engineer for Video/ Computer Graphics Production and Distance Learning Networks for the NYIT Video Center, served on the best practices group for NBC Summer Olympic Games in Barcelona, served on numerous advisory boards for educational institutions, as well as facilitating major technology initiatives amongst K-12 public/private schools, higher education and government to improve STEM literacy.

4:30 p.m. NAWI Reception

6:00 p.m. Paul Zaloom from the TV series ‘Beakman’s World’

Wednesday May 25

7:30 a.m. Continental Breakfast

STEM Curriculum: *Project Lead the Way, The STEM Academy, Engineering the Future, Engineering by Design*

8:30 a.m. Keynote - Kim Green, Director, National Association of State Directors of Career and Technical Education (NASDCTE)

9:00 a.m. 3 Concurrent Sessions E

Biochar: Creating Carbon Negative Energy and Enhanced Sustainable Agriculture

This new yet simple technology creates energy while saving carbon for use in agriculture. More than 3 billion people can be impacted by the biochar process using nearly 100% recyclable materials. Biochar uses include creating home heating systems that do not emit carbon and using pyrolysis to cook with reduced health risks caused by standard combustion processes. The presenters will show how students can learn the biochar process and engage them in creating a carbon negative world using this newly utilized technology.

Jock Gill, Founder, Pellet Futures

Marshall Webb

Workforce Development Using a Hybrid Experiential and Distance Learning Model for Water and Wastewater Technicians

The Water Training Institute (WTI), established with funding from the NSF's Advanced Technological Education program, currently offers an on-line associates degree through Western Kentucky University that

integrates an employer-based experiential component for water and wastewater treatment technicians. The curriculum was developed to incorporate relevant state and industry certifications and is being evolved to a modular format. This presentation will focus on the work-based learning that has been achieved through industry partnerships.

Jana Fattic, Water Resource Management Academic Program Director, Architectural & Manufacturing Sciences Department, Associate Director, Center for Water Resource Studies, Western Kentucky University

When Will We Ever Use This? – Making the S.T.E.M. Connection

Are your students taking enough high level math, science, engineering and technology courses to compete in the global workplace? The National STEM initiative encourages us to focus more emphasis on these subjects. How can we do this? In this interactive workshop learn how to incorporate more STEM into your high school curriculum and to provide your teachers with new, fun ideas that will help students see the relationship between their courses and future career pathways.

Janice M. Tkaczyk, M.Ed. CAGS, Director Counselor and Academic Relationships, Universal Technical Institute

10:00 a.m. Break

10:15 a.m. 3 Concurrent Sessions F

Teaching the Net Generation

The Internet has broken down the traditional bricks-and-mortar walls of academia. Students are empowered by this flattening of the world and have an expectation that they can work, learn, and study anything, anytime, and anyplace and from any device. Another consequence of this flattening is that students are no longer just consumers of content, but are prolific content creators – uploading and sharing content via blogs, wikis, YouTube, social networks, and microblogs. This presentation will provide a broad, high-level view of the richness of content available via the Internet and how it is altering the expectations educators have of their students and students have of their educators.

Gordon Snyder, Director of the National Center for Information and Communications Technologies, Springfield Technical Community College in Massachusetts

More than Filling Potholes: Preparing for 21st Century Transportation Careers

Funded by a Transportation Education Development Pilot Program (TEDPP) grant from the US DOT, a Vermont partnership has tested and is replicating a hands-on curricular approach to preparing high school students for jobs and career paths in the growing transportation industry. The curriculum and its implementation bring together a unique set of partners who have tested its applicability in a CTE Center as well as an alternative program, Community High School of Vermont. The panel will provide an interactive overview of programming and will share experiences, challenges, and successes. It will highlight the experiential learning opportunity provided by the Agency of Transportation, an integral program component that is leading to job and career opportunities.

Karen Glitman, UVM Transportation Research Center

Dana Lesperance, Community High School of Vermont

Gil Newbury, VT Agency of Transportation

Eugene Reid, Canaan Career Center

Donna Aguiar and Glenn McRae, UVM Transportation Research Center Outreach Team

Utilizing Edible Car Contests to Give Students a Taste of STEM

An edible car contest is an effective project for engaging students of any age in STEM. Illinois Valley Community College has been offering edible car contests, with support from National Science Foundation grants, for six years. Presenters will demonstrate how to organize a contest to promote age-appropriate STEM topics. Teams of session participants will build edible cars from materials presenters will provide. Join the fun and learn to organize, publicize, and assess similar, cost-effective contests.

Dorene Perez, Program Coordinator of Computer Aided Design/Computer Aided Engineering, Illinois Valley Community College

Jim Gibson, Program Coordinator of Electronics, Illinois Valley Community College

Sue Caley Opsal, Anatomy and Physiology Instructor, Illinois Valley Community College

Rose Marie Lynch, Communications Instructor, Illinois Valley Community College

11:15 a.m. 2 Concurrent Sessions G

CYBER-STEM, A New Paradigm for 21st Century STEM education

CYBER-STEM is a cohesive and comprehensive strategy that leverages the Internet, digital devices, digital media, and social media to engage and support a new generation of students from a variety of cultures in STEM education. Presenters will illustrate and demonstrate applications and platforms that are being used to deliver the CYBER-STEM program to Connecticut middle, high and college students.

Michael Mino, Innovation and Development Consultant, CT College of Technology

Karen Birch, Connecticut College of Technology, Next Generation Manufacturing

Mission Possible: Assessing Student Mastery of Standards through Performance-Based Competitions

In this statewide competition, students integrate and apply academic and technical skills to demonstrate their mastery of CTE standards as well as their career and college readiness. Students use critical thinking, collaboration, and innovation skills to address real-world challenges faced by local business and industry. Students must respond rapidly to develop a product that addresses the challenge and then defend their analysis of the problem and their solution by responding to rigorous professional-level questions raised by business and industry judges. Some past challenges include using 3-D Technology to design and print a Smart Socket appropriate for a particular hotel's decor, create an animation clip to promote healthy eating habits, and develop the Peoples' Week Campaign for McDonalds Restaurants of Hawaii. The competition is a great way to integrate all of the components of a CTE system, increase business and industry involvement, and meet Perkins requirements.

Dr. Barbara White, Associate State Director for Career and Technical Education, Hawaii

Special Roundtable Sessions:

Project Lead the Way:

STEM Curriculum Programs Engage and Prepare Students for Engineering and Biomedical Careers

The PLTW classroom is filled with the latest design software, advanced materials, and cutting-edge equipment. It's a place that's buzzing with project-based assignments, like programming robots and analyzing DNA. Where facts and figures are turned into ingenuity and inventiveness, and the four walls of the classroom open-up to reveal real-world challenges and opportunities from energy and the environment, to housing and healthcare, to transportation and technology. Attendees are introduced to the PLTW Engineering and Biomedical Sciences Program and participate in a hands-on project that students in a PLTW Innovation Zone complete.

Carolyn Malstrom, PLTW Director, Northeast Region

Transportation Systems Academy

Gil Newbury will give a brief overview of his winter road maintenance course and demonstrate some of the hand-on teaching exercises used to convey the mechanical and chemical processes of snow and ice removal.

12:30 p.m. Lunch Cruise on the *Spirit of Ethan Allen*

2:30 p.m. NAWI Business Meeting

3:30 p.m. Adjourn