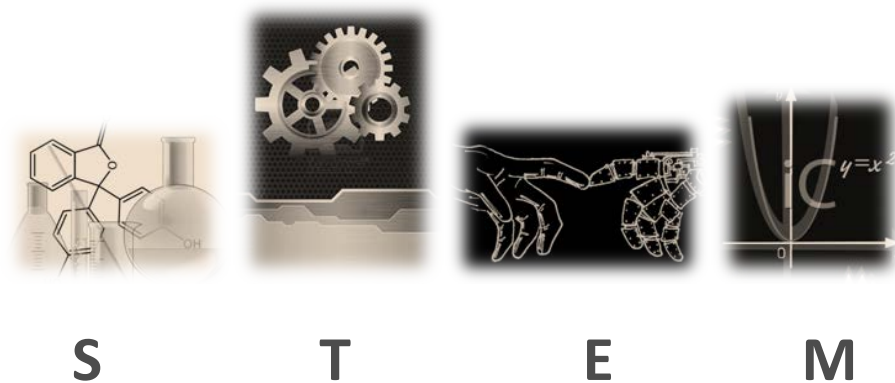




STEM – The Future is Now!

*Increasing Student Achievement
Through STEM Integration*

Summer Institute

July 8 – 11, 2012

**L.C. Smith College of Engineering and Computer Science
Syracuse University
Crowne Plaza Hotel and Conference Center**

Organized and Supported by

The New York State STEM Education Collaborative





The State University
of New York



Johanna Duncan-Poitier

Senior Vice Chancellor
for Community Colleges
and the Education Pipeline

State University Plaza
Albany, New York 12246

www.suny.edu

July 9, 2012

Dear Summit Participants:

It is my great pleasure to welcome you to the second biennial Summer STEM Institute of the NYS STEM Education Collaborative, *STEM: The Future is Now! Increasing Student Achievement through STEM Integration*. I commend the New York State professional associations of educators in Science, Technology, Engineering and Mathematics and their partners for their leadership in providing STEM learning experiences by and for practitioners. The State University of New York is proud to support the 2012 Institute through the Empire State STEM Learning Network and its partnership with the Collaborative.

The STEM disciplines are fueling today's economy. It is more important than ever that our teachers are themselves prepared to in turn prepare more students to succeed in these fields, from the earliest grades through college and career. The Institute's program supports this imperative with its interdisciplinary workshops that span the education pipeline continuum.

I wish all of you a successful Institute as you share best practices and experiences, and expand your network of colleagues with common interests in STEM education.

Congratulations to the NYS STEM Education Collaborative and all who worked so hard to plan the 2012 Summer STEM Institute!

A large, elegant handwritten signature in blue ink that reads "Johanna Duncan-Poitier".

Johanna Duncan-Poitier
Senior Vice Chancellor
Community Colleges and the Education Pipeline

To Learn
To Search
To Serve





SYRACUSE UNIVERSITY

On behalf of the L.C. Smith College of Engineering and Computer Science at Syracuse University welcome to the 2012 STEM Summer Institute. Educating students in STEM skills is crucial to the needs of the 21st century workforce and for success in school, work and life. This conference will provide professional development in the interdisciplinary teaching and learning of STEM from the elementary level through higher education as well as the opportunity to network with teachers, other professionals, students, and community leaders who share a common passion for inspiring future engineers, scientists and mathematicians

As we tell our students at the L.C. Smith College, there is no more important task for today's knowledge workers and researchers than to find ways to turn our immense intellectual capacities and our highly developed industrial base into problem-solving machines and mechanisms that will take on the challenges that lie ahead for us as a global society. It is the work of all of you, and your engineering, scientific, and mathematics colleagues worldwide, who will help to ensure the safety, security, prosperity, and a more joyful and rewarding life to the billions who are relying on us for this.

Your mission is important, and we are honored that you have to come to join us on the campus of Syracuse University. Enjoy yourselves, enjoy your colleagues, have stimulating and inspiring sessions and conversations, and continue your exemplary work in your fields of excellence. Have a wonderful conference!

Laura J. Steinberg

Laura J. Steinberg, Ph.D.
Dean



July 9, 2012

Dear Institute Participants:

It is the great pleasure of the New York State STEM Education Collaborative to welcome you to our second biennial Summer STEM Institute - *STEM: The Future is Now! Increasing Student Achievement through STEM Integration*.

The 2012 Institute provides professional learning experiences aligned to the tenet that STEM Education refers to utilizing the NYS MST Learning Standards in the teaching and learning of the Science, Technology Education, Engineering and Math (STEM) disciplines, in an innovative, integrated, collaborative, and applied fashion to a level of challenge sufficient for college and/or career readiness.

We hope that you will find the Institute experience to be as enriching and energizing as we did in planning it! Brought to you by member organizations:

Science Teachers Association of New York State, Inc. (STANYS)
New York State Technology and Engineering Educators Association (NYSTEEA)
New York State Society of Professional Engineers (NYSSPE)
Association of Mathematics Teachers of New York State (AMTNYS)

Our Institutional Partners:



NYS STEM Education Collaborative

Mission & Goals

Our Mission Statement: To define STEM and the STEM disciplines in a fashion that will serve as a model for New York State and throughout the nation.

AMTNYS, ASEE, NYSSPE, NYSTEEA and STANYS will work collectively and collaboratively to deliver STEM Education in the spirit and vision of the NYS MST Frameworks and Learning Standards. We must take this approach to skillfully and completely address the concerted state and national cry for STEM Literacy.

Our Overarching Goals

- To transform the NYS MST Learning Standards into an effective and meaningful STEM Education Learning Standards delivery.
- To explore the possibility of holding a mutually supported STEM Education Collaborative Conference or Symposium by 2010 that will encourage and facilitate the sharing of successful and innovative classroom STEM practices by presenters representing AMTNYS, ASEE, NYSSPE, NYSTEEA and STANYS.
- To carry forward our NYS STEM Education Collaborative foundational work with enlightening debate and constructive discussions through various means of communication and a (yet to be determined) conducive timeframe.
- To work together to ensure that accepted research and practice based STEM principles are applied in the development of revised or new MST Standards.
- To mutually support, connect and strengthen science, technology, engineering and math P-16 instruction. All three disciplines would still maintain their separate learning standards, integrity, scope and depth but would be delivered within a cross connected methodology.
- To influence support funding, school policy, teacher training and preparation methods, with our mutually envisioned STEM Education approach.
- To foster the modification of existing assessments, with changes in written language and references, to bring about STEM connections, without changing the primary purpose and thrust of each.

Member organizations:



**STEM Education Cooperative Summer Institute
Syracuse University and Syracuse Crowne Plaza Hotel and Conference Center
July 8 - 11, 2012**

Schedule of Events

Sunday

Reception/dinner: 5:30 - 8:00 Crowne Plaza 20th Floor

Monday

Plenary session: 8:30 - 10:00

Snack break - Life Sciences Atrium

Session 1: 10:30 - 11:45

Lunch: noon to 1:00

Session 2: 1:15 - 2:30

Snack break - Life Sciences Atrium

Session 3: 3:00 - 4:15

Reception: 6:00 Crowne Plaza 20th Floor

Dinner: 7:00 Crowne Plaza Conference Center

Tuesday

Session 4: 8:30 - 9:45

Snack break - Life Sciences Atrium

Session 5: 10:30 - 11:45

Lunch: noon to 1:00

Session 6: 1:15 - 2:30

Snack break - Life Sciences Atrium

Session 7: 3:00 - 4:15

Dinner on your own

Wednesday

(Crowne Plaza Conference Center)

Session 8: 8:30 - 9:45

Session 9: 10:00 - 11:15

Plenary - bringing it together - 11:15

Buffet Lunch or boxed lunch to go - noon

ADDITIONAL INSTITUTE INFORMATION

Institute venues - refer to the map in your conference packets

Link Hall - Sims Hall - Huntington Beard Crouse - Hall of Languages - Life Sciences Complex

Physics Bldg, Stolkin Auditorium - Ernie Davis Dining Center (619 Comstock Avenue)

Syracuse Crowne Plaza Conference Center (710 E. Genesee Street)

Vendors are located in Life Sciences Atrium

OPENING PLENARY PANEL

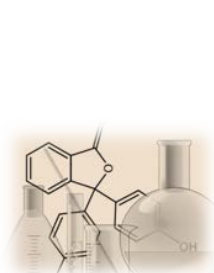
MONDAY, JULY 9

8:30 a.m.

Physics Building - Stolkin Auditorium

Launch *STEM: the future is now! Increasing student achievement through STEM integration* with a distinguished panel of experts including representatives of the STEM disciplines, spanning K-20.

- **Michael Jabot, Ph.D., professor, College of Education, SUNY Fredonia**
- **Michele Williams, Interim Executive Officer and Director, Early College High School Initiative, SECME (a national alliance for diversity in STEM education)**
- **Ellen Falk, math teacher, North Salem Middle High School, AMTNYS appointee to STEM**
- **Will Jaacks, leader, Next Generation Science Standards Leadership Team for NYS, NYSED**
- **Karin Dykeman, technology teacher, Liverpool High School, 2010 CNYTEA Teacher of the Year**
- **Moderator: Margaret Ashida, director, Empire State STEM Learning Network, SUNY System Office of the Education Pipeline**



Session 1
Monday July 9
10:30 a.m. to 11:45 a.m.

1a Gate Keeping: Teaching Mathematics from a Multicultural Perspective

Link 110

Marcia Burrell, SUNY Oswego

How do we ensure the rigorous teaching of mathematics for all while preparing a diverse population for success in the STEM fields? The use of technology to provide access to mathematics for all students is a way to increase the pipeline and provide multiple perspectives in terms of teaching mathematics for students who access topics differently from the "traditional" student.

1b Flexible Ways of Thinking Metric in Math that Help Students in Chemistry

Sims 331

Sally B. Mitchell, East-Syracuse Minoa Schools

Jean Hallagan, SUNY Oswego

The purpose of the session is to stimulate discussion beyond teaching for procedural understanding and more toward a vision consistent with the CCSS-M that promotes student understanding of the structures of mathematics and the metric system so that they can apply this information in the chemistry classroom.

1c A Temperature Probe Activity that Generates Data and Leading Questions

Link 103

Jane Cushman, SUNY College at Buffalo

Participants will: 1) collect data from hot water and various cup materials, e.g. Styrofoam, ceramic, and paper, 2) analyze the data, and 3) generate a conclusion and leading questions for their classes.

1d Interdisciplinary Science and Engineering Partnership (ISEP)

Link 114

Joseph Gardella, Kelly Baudo,

Catherine Lange, Joseph Zawicki

SUNY Buffalo

Young minds soar when research scientists and community partners unite to bolster science education. Teachers gain new skills and knowledge to share in the classroom. Students benefit from hands-on learning and exposure to interdisciplinary research and problem solving. Learn about this exciting project in Buffalo, New York.

1f LEGO Robotics and the Common Core Standards

Sims 237

Laurie Yager, Mohawk Regional Information Center

See how LEGO Robotics and FIRST LEGO League can excite your students about STEM while meeting the new Common Core Standards.

1g Student-Led Energy Audits - Connecting STEM Content to a Real-World Problem

Sims 337

Todd Rogers, the NEED Project

Students learn to use light meters, investigate plug and phantom loads, and evaluate data gathered through their investigations. They learn about building science, weatherization strategies, HVAC equipment, and building temperature controls. This is a hands-on session where we will gather data on energy use at the session location.

1h Advanced Computer Programs for Military Applications

Sims 241

Misty Blowers, Jason Moore

Chad Salisbury, Jeffrey DeMatteis

Air Force Research Laboratory (AFRL)

Many exciting and new advances in technology allow researchers and developers to provide unique capabilities to the military. Various research areas will be presented and an overview of how scientist and engineers help the war fighter will also be discussed. In addition, we will talk about AFRL's outreach programs and how we support our local schools and community.

1i Using Standard Science Research Methodology to Create Apps for the iPhone and iPad

Link 200

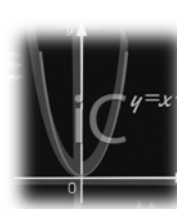
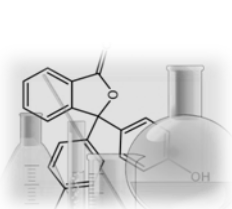
Randi Zimmerman, Legacy High School for Integrated Studies

Ingrid Montealegre, the Graduate Center, CUNY

The partnership between the CUNY GK12 fellow and an inner city urban school teacher can successfully lead to the development of STEM curriculum that engages students and elevates rigor. We will utilize photos, video, and student work to demonstrate an increased level of engagement and the development of higher order thinking skills.

LUNCH Ernie Davis Dining Center

**PLEASE PATRONIZE OUR VENDORS WHO HELPED MAKE THIS INSTITUTE
POSSIBLE - LIFE SCIENCES BUILDING ATRIUM**



Session 2
Monday, July 9
1:15 p.m. to 2:30 p.m.

2a Promoting STEM education by bridging K-12 and university mathematics

Sergei Abramovich, SUNY at Potsdam

HBC Gifford Auditorium

Arcadii Z. Grinshpan University of South Florida

The session will show how computer-enabled experiential approach to K-12 mathematics can be connected with the applied, project-based teaching of undergraduate university mathematics as a way of encouraging students to participate in the STEM workforce of the future.

2b Using LEGO Mindstorms to Develop Hands-on STEM Lesson Plans for Students in Grades 4-6

HL 500

James Carroll, Raghuraman Ramanathan,

Mary Margaret Small, Clarkson University

Brian Trzaskos, Northern New York Robotics Institute/LEGO Systems, Inc.

DOUBLE SESSION
Cont'd to Session 3

The results of a NYSED funded Learning Technology grant conducted by Clarkson and the Saint Lawrence-Lewis BOCES involving grade 4-6 mathematics and science teachers using LEGO MindStorm kits and LabVIEW software in conjunction with third party probes for data collection, analysis and visualization will be discussed and demonstrated (hands-on).

2c Academic Research 101: Overview and Tour of the Syracuse Biomaterials Institute

James Henderson, Syracuse University

Meet in Life Sciences Atrium

Would you like to see and learn about a modern academic laboratory? Do you wonder about the opportunities your students might have to take part in research in college? Here you will have an opportunity to learn about and tour the facilities of the recently established Syracuse Biomaterials Institute.

2d Developing the Next Generation Science Standards

HBC 200

Kenneth Huff, Williamsville Central School District

Participants will be provided an overview of the Next Generation Science Standards development process.

2e Robotics and Kids: Fun STEM Integration for All Grade Levels

HBC 306

Andrew Leary, CNY Robotics and FIRST

This presentation will discuss and demonstrate using inexpensive robotics in the classroom as learning tools, including Lego Minds Storms NXT robotics kits. Various FIRST programs that have been specifically designed for STEM disciplines at various age levels, including competitive robotic teams will also be presented.

2f Using GeoCaching to motivate students in STEM

HL 107

Elliot Patnode, Canandaigua Academy

Joanne Roe, Cornell Cooperative Extension

In this session participants will learn the educational component of Geocaching. Geocaching uses geo-spatial science to develop an appreciation for location as well as distance. Principles of engineering, technology, and mapping will be covered. The fun of a treasure hunt goes high tech with interest geared to middle school students.

2g Looking at Fuel Efficiency

HL 421

Jean Hallagan, SUNY Oswego

Rodney Warren, Kerri Jones, Lydia Bury

This session sets algebraic tasks for eighth or ninth grades in a STEM setting. Participants launch homemade wooden cars to compare fuel efficiency, then they compare fuel efficiency of real vehicles.

2h STEM by Design

Link 110

Stacia Snow, Tech Valley High School

Laura Lehtonen Capital Region BOCES

DOUBLE SESSION

Cont'd to Session 3

The session will explain how project-based learning aligns with the design process and the New York State MST standards. Presentation will include how STEM can be taught across all disciplines, but specifically in the humanities, providing real world project examples and student work. Participants will conduct a mini-project simulating the design process.

2i STEM: The Root for Global Success

HBC Kitt

Auditorium

Nita Brown, Rochester City School District

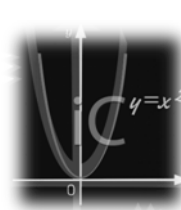
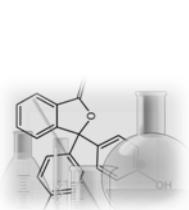
This session is designed to teach students (via educators) the pervasiveness of science, technology, and engineering in our everyday lives within the framework of critical current events (e.g. the Arab spring, 2011 London riots, Wall Street protests) taking place around the world and at home.

2j Online, On Demand STEM Resources and Tools

Link 202

Lawrence Gallery, NYSErNet, Inc.

Unlike the Internet, R&E Networks worldwide make available to teachers and students STEM resources such as simulators, scientific instruments, and other educational resources and tools that can run at optimal performance only on this kind of dedicated R&E connectivity. Several live demonstrations are planned, some of which can be hands-on.



Session 3
Monday July 9
3:00 p.m. to 4:45 p.m.

3a NASA in Your Classroom; Increasing STEM Impact
Shirley Campbell, NASA

Link 202

NASA provides a wealth of information that can be used in the elementary classroom. Lesson and unit plans, online tools, and professional development (PD) to increase the integration of STEM topics across the curriculum as well as in STEM topic areas. An overview of NASA content and PD sources will be provided.

3b Using LEGO Mindstorms to Develop Hands-on STEM Lesson Plans for Students in Grades 4-6

HL 500

*James Carroll, Raghuraman Ramanathan,
 Mary Margaret Small, Clarkson University
 Brian Trzaskos, Northern New York Robotics Institute/LEGO Systems, Inc.*

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3d STEAM-Ed at Pine Grove Middle School - A Trans-disciplinary Model of STEM Education

Life Science Bldg. 001

*Kelly Sajnog, Jason Fahy, Tim Patterson,
 Tina Oakley, Taylor Hunt, Nicole Sassano
 Kevin Michaud, Sue Sobon
 Pine Grove Middle School - East Syracuse Minoa School District*

STEAM is defined as S – physical and social science; T – incorporation of technology; E – principles of engineering and design; A – English language arts and expression through a variety of media; M – application of mathematics.

STEAM Education at Pine Grove Middle School, a partner in CNY STEM Hub Initiative, is an integrated trans-disciplinary approach to teaching and learning shifting the industrial paradigm to 21st century learning. This session will include a program overview, samples of student work, along with Q and A. Visit steam-ed.org for more information.

3e STEM & Common Core State Standards Part 1

Link 101

*Carrie Herron
 James Reynolds
 Galway Central School*

Explore ways to collaborate and team teach the new math core curriculum with all your colleagues. Activities and labs will be presented to help you teach concepts and make interdisciplinary connections. STEM activities and co-teaching models are demonstrated with a variety of cross-content area units, not just science and math. *Parts 1 & 2 are different -- attend one or both!*

3f Drop Tube: Momentum and Force

Link 104

Nev Singhoti, Cornell Center for Materials Research
Cornell faculty, graduate students
Kaleigh Muller

Students will be informally introduced to the concept of momentum and force. Students practice the scientific method through data collection and analysis. The hands-on activity is geared towards the fourth grade science standards.

3g LC Smith College of Engineering and Computer Science tour
Life Sciences Atrium

3h STEM by Design

Link 110

Stacia Snow, Tech Valley High School
Laura Lehtonen Capital Region BOCES

DOUBLE SESSION
Cont'd from Session 2

The session will explain how Project-based Learning aligns with the design process and the New York State MST standards. Presentation will include how STEM can be taught across all disciplines, but specifically in the humanities, providing real world project examples and student work. Audience will conduct a mini-project, simulating the design process.

3i Spark Students' Interest in STEM with *Teachers TryScience*

Sheila Appel
IBM Corporate Affairs and Community Relations

Life Sciences Bldg. 011

Learn how to take advantage of Teachers TryScience, a web site for teachers that provides free and engaging lessons, along with teaching strategies and resources, which are designed to spark students' interest in science, technology, engineering and math (STEM). The site also features collaboration tools to enable teachers to discuss and share effective instructional practices.

3j Improving STEM Teaching and Learning: Presidential Teaching Awards

Kenneth Huff
Williamsville Central School District

Life Sciences Bldg. 105

Discover a new method of mentoring nominees for the Presidential Award for Excellence in Mathematics and Science Teaching (PAEMST). Attendees will learn how to successfully submit an application for the PAEMST.

Monday, July 9, 2012

Reception 6:00 p.m. - Crowne Plaza Hotel 20th Floor

Dinner 7:00 p.m. - Crowne Plaza Hotel Conference Center

Keynote Speaker: Dr. Bharat K. Soni, Chair & Professor
Mechanical Engineering

University of Alabama at Birmingham (UAB)

Computational Simulations and Higher Dimensional Visualization - Integrating
Tomorrow's Technology into Today's STEM Education

Session 4
Tuesday July 10
8:30 a.m. to 9:45 a.m.

4a The Missing E: Ways to incorporate engineering-based activities and concepts into science education

Link 101

Kristin Angello

Society of Women Engineers

The presenter will discuss the types of skills that are critical in the engineering field including the need for literacy and writing. Attendees will spend some time in groups brainstorming how to incorporate these skills into lessons, labs and projects. Attendees will then share their group's ideas. The intent is that attendees will leave with ideas as to how to help their students build engineering-related skills.

4b The Science, Math, and Technology of Measurement

Sims 337

Clark Greene

Buffalo State College

Measurement is all around us in our technological world. Yet as an integrative STEM subject, it is found nowhere in schools. From dozens of different measurement units to many different measurement tools and techniques, individuals rarely consider measurement as a topic. This is a lab based presentation where participants will engage in 15 separate and distinctly different measurement activities ranging from viscosity and specific gravity to sound levels and optics.

4c How to promote college readiness in a problem-based environment for STEM

HL 500

Marcy Raymond, Reynoldsburg Ohio e-STEM Academy

Dustin Pyles, Ohio STEM Learning Network

DOUBLE SESSION
Cont'd to Session 5

The essential question is: How do we promote college readiness in a problem-based environment for STEM? Many traditionalists argue that you can't with so many projects going on. This session will assist participants in the understanding and organization required to promote college readiness through the use of College Ready Tools.

4d LC Smith College of Engineering and Computer Science Tour
Life Sciences Atrium

4e STEM in Multiple Settings: The After School Corporation (TASC)

Sims 237

Saskia Traill, TASC

Based on research, The After-School Corporation (TASC) launched Frontiers in Urban Science Explorations (FUSE), which employs a two-fold approach to changing minds, influencing culture, and shaping practice. This presentation will briefly investigate the results and evolution of the FUSE model and how it is being adapted to reach communities across the state. Participants will then learn strategies for building partnerships and engaging community leaders in informal STEM education as well as working through the challenges of implementing high-impact STEM education in after school programs with training and technical assistance.

4f Get Connected: A Hands-On Approach to STEM Distance Learning

Link 202

Michaela Labriole

Anthony Negron

New York Hall of Science

Distance learning can broaden the impact of STEM teaching and engage reluctant students in STEM lessons, but it also brings its own set of challenges. Explore recent research on distance learning, as presenters guide you through practical strategies on topics ranging from hardware to virtual classroom management.

4g Using real-world data and inquiry projects to improve climate literacy of secondary teachers and students

Link 011

Susan Powers, Jan DeWaters,

Suresh Dhaniyala,

Mary Margaret Small,

Clarkson University

DOUBLE SESSION
Cont'd to Session 5

Participants will be actively engaged in hands-on computer-based activities and exploration of earth science and energy data and its analysis to support climate literacy instruction in earth and environmental science classes at the secondary levels.

4h Modeling Isn't Just for the Runway

Sims 331

Ray Siegrist, SUNY Oneonta

DOUBLE SESSION
Cont'd to Session 5

Participants will collect data from simple experiments and use mathematics to find the best model. Constant, linear, quadratic, logistic, hyperbolic, and exponential models will be created. Bring a graphing calculator.

4i Car Crash Test: Using the Engineering and Design Process

HBC 306

Jan Stark, Port Jervis HS

DOUBLE SESSION
Cont'd to Session 5

This activity demonstrates the practical application of the engineering and design process. Students maintain a STEM Portfolio(ELA), design and make a car crash vehicle utilizing various software (Technology) test for speed and impact (Science) and do various computations (Math).

4j Wind Turbines in the Classroom

Sims 241

Raymond Pitcher, Kidwind Herkimer CSD

DOUBLE SESSION
Cont'd to Session 5

The students will explore different materials and blade configurations to construct wind turbine blades. They will test their designs by building the blades and measure the amount of electricity that their designs will produce. A brief overview of the status of wind will be presented.

Session 5
Tuesday May 9
10:30 a.m. to 11:45 a.m.

5a Making Sense of Results

HL 421

Susan D'Auria,
Visitation Academy and Endeavor
Science Teaching Certificate Project

Through the use of Cuisenaire Rods, attendees will discover ways to lead students to understand equivalent fractions and how the same amount of "stuff" can be a different fraction of a larger or smaller amount of "stuff". Through the Nature of Science, attendees will see that "how" and "what" their students are doing are just as important as the results they achieve through their experience.



5b After School Programming

Sims 337

Taino Palermo,
YWCA of Syracuse & Onondaga County, Inc.

The YWCA Before and After School Programs throughout Onondaga County incorporate STEM programming in our after school programs utilizing the national Girls Inc "Operation SMART" curriculum and the TASC curriculum "FUSE" (Frontiers in Unbounded Science Exploration). We successfully implement STEM activities and lessons in all our programs with huge success and will share best practices, strategies, and ideas for STEM-based partnerships, collaborations, and program staff development.

5c How to promote college readiness in a problem-based environment for STEM

HL 500

Marcy Raymond, Ohio STEM Learning Network
Margaret Ashida, Empire State STEM Learning Network

The essential question is: How do we promote college readiness in a problem-based environment for STEM? Many traditionalists argue that you can't with so many projects going on. This session will assist participants in the understanding and organization required to promote college readiness through the use of College Ready Tools.

5d PBS and Hands-on STEM for Tomorrow's Workforce
Debbie Stack, WCNY TV/FM - Public Broadcasting Station in Syracuse

HBC 200

PBS offers quality STEM educational programming and WCNY-TV in Syracuse is building an education center where hands-on STEM activities will be offered in Enterprise America, a hands-on career and entrepreneurial-focused program. Learn about it as well as PBS STEM television programming, receive sample curricula and participate in a hands-on STEM activity.

5e Computational Math, Science, and Technology (C-MST) Education

Link 200

*Osman Yaşar, Peter Veronesi,
Leigh Little, Jose Maliekal, Soun Vattana,
SUNY Brockport
Mike Meise
Rochester City School District*

We want to discuss C-MST professional development opportunities for teachers. C-MST is an integrated approach to STEM education. It is in support of the Technological Pedagogical Content Knowledge (TPACK) framework recently proposed by Teacher Educators. Computational thinking skills are now being recommended by K-12 math and science standards as well as by a pending AP course by the College Board and the National Science Foundation.

5f The Common Core - Aligning Literacy and Numeracy in the STEM Disciplines

Link 110

*Joseph Zawicki, SUNY Buffalo State College
Michael Jabot, SUNY Fredonia*

This session will focus on the Common Core Standards. Literacy and numeracy in the content areas, as well as an update on the Common Core Standards in Science will be addressed.

5g Using real-world data and inquiry projects to improve climate literacy of secondary teachers and students

Link 011

*Susan Powers, Jan DeWaters,
Suresh Dhaniyala,
Mary Margaret Small,
Clarkson University*

DOUBLE SESSION
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(Math).

5J Wind Turbines in the Classroom

Sims 241

Raymond Pitcher, Kidwind Herkimer CSD

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Cont'd from Session 4

The students will explore different materials and blade configurations to construct wind turbine blades. They will test their designs by building the blades and measure the amount of electricity that their designs will produce. A brief overview of the status of wind will be

presented.

Lunch at Ernie Davis Dining Center

Session 6
Tuesday July 10
1:15 p.m. to 2:30 p.m.

6a NASA in Middle School Classrooms; Increasing STEM Impact

Link 202

Shirley Campbell, NASA

NASA provides a wealth of information that can be used in middle school classrooms. Lesson and unit plans, programs, online tools, and professional development to increase the integration of STEM topics across the curriculum as well as in STEM topic areas.

6b New Visions Engineering Academy

Link 103

Elizabeth Genovese-Barvinchak, Broome-Tioga BOCES

The New Visions Engineering Academy is a high school program that integrates technology, engineering, English, economics and government. Explore the dynamic engineering profession with a focus on problem solving, teamwork and communication skills. Learn about Project Blue Horizon where students design payload for high altitude balloon launch with early career engineers.

6d Let's Give Them Something (Real) to Talk About: Using Anchoring Activities to Guide Authentic Interdisciplinary Inquiry

Link 105

Jeffrey Rozelle, Sharon Dotge, Syracuse University

Myriam Ibarra, Elizabeth Unislawski, Syracuse City School District

This presentation will describe the idea of “anchoring activities” (Schwartz et al., 2008)--complex natural phenomena that provoke student curiosity and provide multiple entry points for student investigation—and argue for their strength in promoting authentic interdisciplinary inquiry. We will provide a hands-on example and describe its use with high school students.

6f Sketchup: Creating interactive 3D worlds
Randal Tyner, Glens Falls City School District

Link 011

DOUBLE SESSION
Cont'd to Session 7

Google Sketchup is a 3D design tool without ceilings. While elementary students can master the basics, Sketchup is increasingly used by professional architects, video game designers, landscapers, and concept artists. Attendees will develop an understanding of basic Sketchup skills, as well as an overview of how teachers in GFCSD are

using it with students as a way to conceptualize content in history, literature, geography, and science. The session will include hands-on training in Sketchup.

6g Makers' Fairs: Connect the Community and Engage the Youth Without Breaking the Budget

Life Sciences 105

Mary Eileen Wood, Dr. Nelson Ying
Tri Region Science and Engineering Fair

DOUBLE SESSION
Cont'd to Session 7

Learn hands-on how the Maker Movement encourages all generations to explore design in the context of play and creates partner networks. The excitement of learning on demand in real-time experiences with engineering, imagination, and investigation will fire using these great

new tools to enlist STEM advocates as allies.

6h LC Smith College of Engineering and Computer Science Tour
Life Sciences Atrium

6i Investigating Embryonic Development through In-class Shell-less Chick Culture

Susan Curran, Syracuse City School District
Philip Buskohl, Russell Gould, Jen Richards, Cornell University
Sheena Scouten, Ernie Davis Middle School

Life Sciences 001

The chicken embryo is an ideal medium to communicate the rapid and complex process of development. Using a shell-less culture technique, the students monitor and measure the morphogenesis of the heart, limbs, and vasculature. This system is intrinsically inquiry based and is a valuable addition to circulatory system and reproduction curricula.

Session 7
Tuesday July 10
3:00 p.m. to 4:15 p.m.

7a NASA in High School Classrooms; Increasing STEM Impact
Shirley Campbell, NASA

Link 202

NASA provides a wealth of information that can be used in high school classrooms. Lesson and unit plans, programs, online tools, and professional development to increase the integration of STEM topics across the curriculum as well as in STEM topic areas.

7b Zero Energy Demonstration Home Used to Engage Students and Teachers

Link 103

Craig Clark, Alfred State College, Jeff Stevens Alfred State College

The Zero Energy Demonstration Home build entirely by Alfred State students includes working across six programs. Showcasing green construction, small wind energy, photovoltaic systems, and solar thermal and geothermal energy, the home has a high end monitoring system using Siemens controllers and is used to educate high school students, teachers, and the public. Data is available for science and math teachers.

7c Save the Rain: Clean the Lake

Link 105

Matt Marko, CH2M Hill

The concept of "revive Onondaga Lake" includes reviving the lake and our relationship to it as we work together towards lake restoration. Learn about ways to engage students in understanding historic and current conditions that impact Onondaga Lake restoration and in participating in its restoration.

7d Software for All – Start Writing Applications Now Sciences 011

Life

Jeff Beyer, Clairus, LLC

Software and applications are everywhere today. There are literally thousands of resources available to help students program computers. All you need is an idea, computer, and ambition. Students can write and sell an application now. In this session, we will introduce students to the basics of computer programming.

7e Magnetic Mad Libs

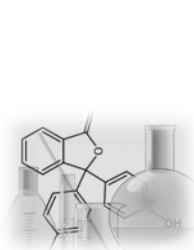
Link 103

Kaleigh Muller

Nev Singhota

Cornell University - Cornell Center for Materials Research

How is a song from iTunes stored on the computer? Students constantly use hard drives, but few understand how they work. In answering the question, "how do hard drives work?" kids will see concrete examples of abstract math (binary) and science (magnetism) concepts that might otherwise seem academic and pointless.



7f Sketchup: Creating interactive 3D worlds
Randal Tyner, Glens Falls City School District

Link 011

DOUBLE SESSION
Cont'd from Session 6

Google Sketchup is a 3D design tool without ceilings. While elementary students can master the basics, Sketchup is increasingly used by professional architects, video game designers, landscapers, and concept artists. Attendees will develop an understanding of basic Sketchup skills, as well as an overview of how teachers in GFCSD are using it with students as a way to conceptualize content in history, literature, geography, and science. The session will include hands-on training in Sketchup.

7g Makers' Fairs: Connect the Community and Engage the Youth Without Breaking the Budget
Mary Eileen Wood, Dr. Nelson Ying
Tri Region Science and Engineering Fair

Life Sciences 105

DOUBLE SESSION
Cont'd from Session 6

Learn hands-on how the Maker Movement encourages all generations to explore design in the context of play, and creates partner networks. The excitement of learning on demand in real-time experiences with engineering, imagination, and investigation will fire using these great new tools to enlist STEM advocates as allies.

7h LC Smith College of Engineering and Computer Science Tour
Life Sciences Atrium

7i STEM Careers and 21st Century Skills
Sara Silverstone, Biodrill Technical Solutions
Empire State STEM Learning Network

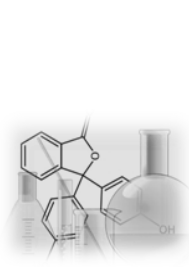
Life Sciences 001

'STEM' and '21st Century Skills' are two of those broad concepts that are often included in mission statements and project titles, however teachers often have little opportunity to really explore their meaning and application to day-to-day classroom teaching. This interactive session will be a review and discussion of Bureau of Labor Statistics future employment projections and their implications for STEM learning, as well as 21st Century Skills and how we teach them in the classroom.

7j "The Lava of Syracuse" A real time lava pour
Robert Wysocki, Syracuse University Sculpture Program
Dr. Jeffrey Karson, Syracuse University Earth Sciences
Syracuse University Lava Project

Link 101

800 pounds of lava will be poured as a part of the ongoing experiments being conducted by the Syracuse University Lava Project, a joint research venture between the SU Sculpture Program and the SU Department of Earth Science. Explanation prior and during the pour with a question and answer session immediately after the pour. Please see: <http://vimeo.com/33081501>



**Wednesday sessions
Syracuse Crowne Plaza Hotel
Conference Center
701 East Genesee Street**

**Session 8
Wednesday, July 10
8:30 a.m. to 9:45 a.m.**

A - Stem Activities to Teach Science to ELL Students in Middle School

***Gioya DeSouza-Fennelly
IS 143M***

Inquiry based STEM projects incorporate strategies to promote science literacy for ELL students.

B - 21st-century Science Fairs: Your “hook” to engage community partners and put STEM on the local “front burner”

***Mary Eileen Wood, Dr. Nelson Ying
Tri Region Science and Engineering Fair
With science fair director, students, sponsor, and/or judges***

Cost effective, local community options for pre-collegiate hands-on access in the STEM fields are crucial. We must make science and engineering appealing and feature the attainability of good careers as we increase engagement in classroom studies and fill the STEM workforce pipeline. Panelists share how 21st century science fairs can do that!

C - Creating an Interactive Math and Science Classroom

***Dana Morse
Texas Instruments***

Engage and enhance the math and science classroom with the educational technology tools from Texas Instruments. Build academic confidence and encourage exploration of new concepts.

D - Syracuse University Center of Excellence Tour

E - STEM Enrichment Program: A partnership with a rural public school district and a teacher preparation program

Michael Nehring, SUNY Oswego

Learn about a unique partnership that gets young children excited about STEM. For two years, graduate and undergraduate students from SUNY Oswego's Department of Technology, have developed and implemented STEM activities as part of an after-school enrichment program conducted at New Haven Elementary School.

F - Core Curriculum and STEM Initiatives Part II

James Reynolds, Carrie Herron
Galway Central School

Explore ways to collaborate & team teach the new math core curriculum with your science colleagues. Activities and labs will be presented to help you teach concepts and interdisciplinary STEM connections. Go Green Activities that gets kids up and moving, problem solving, and exploring alternative energies while using skills from all their classes are included. Parts 1 & 2 are different -- attend one or both!

G - Connecting the M to STE

Robert Rogers, SUNY Fredonia

The presenter will provide applications of middle and high school mathematics topics to medicine, chemistry, computer science, nanotechnology, and engineering. Some of the topics included are lithotripsy, quantum computing, geometry of fullerenes, Internet security, and telescope design and construction.

H - Providing Water Supply to the American Troops in Afghanistan

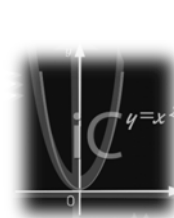
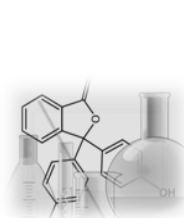
Sean Skehan, CH2M Hill
Matt Marko/CH2M Hill

This session will present a slide show and discussion about the technology used while drilling water supply wells, providing water treatment, and the logistical challenges of doing this in a war zone.

I - Fun with Science Inquiry - Sneak Content Area Curriculum into Fun and Engaging Inquiry Science Labs

Linda Trippany
Syracuse City Schools Lincoln Middle

By using science notebooks in conjunction with Inquiry Science you will be able to integrate and differentiate any academic discipline you need into any science lesson you have to teach. Participants will be completing labs as they learn how to use the Inquiry Method to engage and entice today's students.



Session 9
Wednesday July 10
10:00 a.m. to 11:15 a.m.

A - Science Connections- OHM OCES

Matthew Bashant, Oneida Herkimer Madison BOCES

The OHM BOCES Science Center is redefining its Science Program by disseminating and developing science content in the following ways: all teachers across the consortium have access to course content online 24/7; all new kits are STEM focused; and, the online infrastructure allows the teachers to author for the critical school-to-home connection.

C - Achieving student learning in all areas of STEM with Mousetrap Vehicles!

Chuck Goodwin, NYS Technology & Engineering Educators Assoc., Frank Roma of NYSSPE

All areas of Science, Technology, Engineering and Mathematics are incorporated through the construction, testing, and analyzing of a mousetrap vehicle problem. Attendees will experience how easy it is to bring STEM areas into this popular activity. A CD containing the mousetrap PowerPoint will be distributed.

D - Syracuse University Center of Excellence Tour

E - Nspired Learning Solution

Dana Morse, Texas Instruments

Engage students with interactive math and science education technology. Challenge them to explore and investigate new concepts.

F - Maximize! Minimize! Be a Packaging engineer!

Elizabeth Waite, AMTNYS Vice-President

Participate in a variety of activities that explore surface area and volume and their connection to work done by packaging engineers. Walk away with lessons to use with your class.

G - STEM for the Technologically Challenged (Like Me!)

Mary W. Thomas

Monroe 2-Orleans BOCES

Elementary and middle level teachers will experience a variety of low-tech, problem-based activities that can be implemented quickly as a means to get started with STEM education. Participants can expect to design low-tech solutions to problems, explore opportunities to integrate ELA with STEM problems and walk away with new ideas.

X - Historic and Economic Influence of Engineering Projects

Don Nims

Bergmann Associates

Engineers have been and will always have an influence on our communities. Whether engineering a bridge, building, dam, lock, or road the Engineer not only contributes to the health, safety, and welfare of people and the environment; they also contribute to history and economic development. This presentation will describe examples of that contribution: Marcy-SUNYIT Parkway (Economic Development) and Flight of Five (Historic Restoration).

H - Empire State STEM Learning Network Information Session

Margaret Ashida,

Empire State STEM Learning Network,

State University of New York Office of the Education Pipeline

Interested in learning more about Empire STEM and how to get involved? Join this discussion about how to connect, collaborate and compete!

Plenary bringing it back together 11:30 a.m.

Buffet luncheon with boxed lunches to go also available.

Noon Wednesday - Crowne Plaza Conference Center

Organization Committee for this 2012 STEM Education Institute

**Beryl Szwed - Bob Hazen - Bob Rogers - Chuck Goodwin - Ellen Falk - Frank Roma - Fred Pidgeon
Gwendolyn Maturo-Grasso - Iva Jean Tennant - Jan Stark - Joe Zawicki - Judith Belt - Mike Fry
Margaret Ashida - Terry McSweeney**



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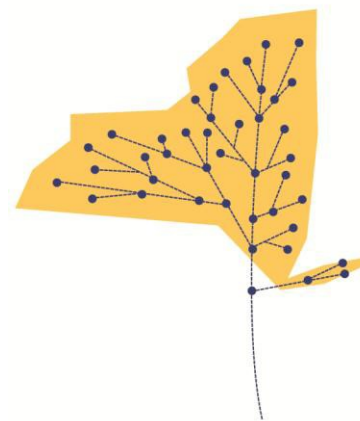
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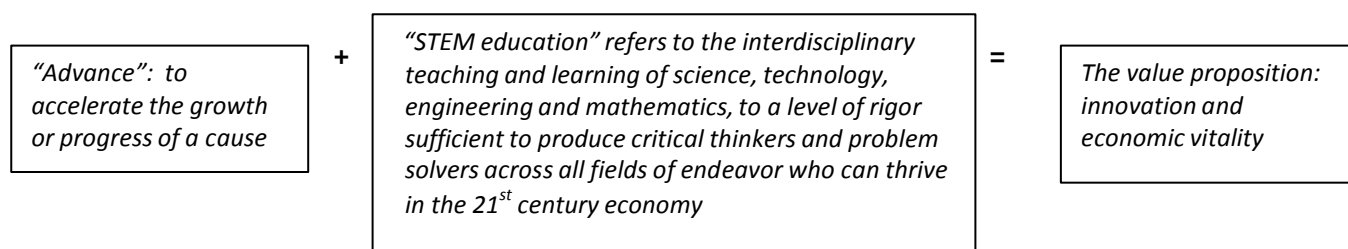


NEW YORK STATE STEM PROFILE

Empire State STEM Learning Network

Empire STEM is a statewide, community-led collaborative.

The Network's **mission** is to advance STEM education to prepare *all* students for success in school, work and life to fuel innovation and economic vitality in the Empire State:



The Network's **vision** provides a roadmap for communities to accelerate the way they learn and compete by leveraging assets, expertise and partnerships:

- Advocate for **POLICIES** that advance interdisciplinary, inquiry-based, contextual teaching and learning
- Contribute to **PORTFOLIOS** of effective and/or promising STEM practices and programs
- Establish **PLATFORMS** for innovative STEM teaching through proven or promising models
- Develop public / private **PARTNERSHIPS** that engage diverse stakeholders over the long term

The Network's **design principles** represent common beliefs held by stakeholders across the state:

1. **STEM FOR ALL:** All students must attain STEM literacy for the Empire State to thrive in the 21st century
2. **SYSTEMIC MODEL:** A systemic, interdisciplinary approach to STEM teaching and learning is required to prepare the "whole" student for success in work and life
3. **EVIDENCE-BASED APPROACH:** Effective STEM education must leverage existing assets and embrace new models that reflect real world context, interests and needs of students, teachers, and their communities
4. **OPEN COLLABORATIVE INNOVATION:** Innovative STEM education policies, processes and programs must be both scalable and sustainable
5. **COMMITTED STAKEHOLDERS:** Business, PK-20 education, students, parents, community organizations, foundations and government must engage steadfastly, openly, and with ingenuity across a broad spectrum of interests, expertise and capacities to achieve STEM excellence

NETWORK FORMATION STATUS: Empire STEM was launched June 2010 and is mobilizing communities to form interconnected regional STEM hubs across the state with goals relevant to local needs, capacities and priorities that are aligned to the Network's mission, vision and design principles. Hubs have been launched in the Capital Region, Central New York, Finger Lakes, Greater Southern Tier, and Long Island with formation underway in the other economic regions of New York State. Empire STEM's statewide office is based in the State University of New York (SUNY) Office of Community Colleges and the Education Pipeline in partnership with Battelle, through which it is connected to state STEM networks across the nation.

INDUSTRY PARTNERS: Employers and business associations involved in the network at a statewide or regional level include AT&T, Battelle, Bill & Melinda Gates Foundation, BioDrill Technical Solutions LLC, Bristol-Myers Squibb, Brookhaven National Laboratory, Center for Economic Growth, Cisco, Cold Spring Harbor Dolan DNA Learning Center, Corning Incorporated, Eastman Kodak Co., Ford, GE, Global Foundries, Hauppauge Industrial Association, IBM, Klein Steel Service, Lockheed Martin Corp., Long Island Association, Long Island Forum for Technology, MACNY, M&T Bank, North Shore-LIJ Health Systems, Partners for Education & Business, Rochester Business Alliance, Siemens, Technology Association of Central New York, Time Warner Cable, VWR Education, Winthrop Hospital, and Xerox.

NETWORK DIRECTOR: Margaret Ashida

CONTACT INFORMATION: margaret.ashida@suny.edu / (518) 320-1275

WEB SITE: www.empirestem.org