



STEM Summit V: *Implementing the Plan*

Preparing Massachusetts students for careers in science, technology, engineering and mathematics

Schedule of Summit Activities

7:00 - 9:00 Continental Breakfast

7:30 - 8:15 First time attendee session

**Moderators: John Hodgman, Roberta G. Neuman,
Larisa Schelkin**

If this is the first STEM Summit you are attending, or you have not been to one recently, we invite you to participate in this briefing for "newcomers". We will amplify answers to the "Basic Questions and Answers about STEM in Massachusetts" found on the STEM Summit V website. We will also respond to other questions that participants might have. We want to provide a context for the Summit and to place the content of each of the breakout sessions into this context.

8:15 - 9:00 Registration

9:00 - 9:30 Welcome, University of Massachusetts

Paul Reville, Secretary of Education

Mitchell Chester, Commissioner, Department of Elementary & Secondary Education

Maura Banta, Chair, Board of Elementary & Secondary Education

Aundrea Kelley, Interim Commissioner, Higher Education

Frederick Clark, Chair of Board, Higher Education

9:30 - 10:20 **Keynote Speaker, Craig C. Mello, PhD, Howard Hughes Medical Institute Investigator, The Blais University Chair in Molecular Medicine, University of Massachusetts Medical School & winner of the Nobel Prize in 2006.**

Introduction: President Jack Wilson, University of Massachusetts

10:20 - 10:40 Overview of Day's Events

Isa Zimmerman, University of Massachusetts

10:45 - 12:15 Morning Breakout Sessions

STRAND 1: On The Way: Implementing the Commonwealth's STEM Plan

The preliminary report/planning document commissioned by the Goddard Council/Department of Higher Education that reviews other state STEM initiatives, national STEM reports, and interviews with key MA stakeholders will be presented. The report will organize findings, identify priorities, and make recommendations for STEM education strategies for improvement with particular attention to the STEM Pipeline goals.

Moderators:

Greg Sheldon, Sheldon Collaborative

Lance Hartford, MassBioEd Foundation

Participants:

Invited legislators, members of the Science and Technology Caucus, representatives from MA Business Roundtable and other business leaders will discuss their reactions to the report and establish some guidelines for the afternoon session in which attendees can contribute to the development of a state STEM plan and STEM Legislation.

Questions to be considered include:

Why is a state plan needed? • What roles can each stakeholder play in promoting/ensuring the plan's success? • What resources are needed? • How will they be provided? • What are the next steps?

There will also be time for discussion among session attendees.

EXEMPLARY PROGRAMS/PROMISING PRACTICES in STEM

The following sessions showcase the specific work of the presenting organizations as well as engage the participants in discussions about how the program was developed, implemented and successfully sustained as well as how the organizations have used data to support their accomplishments and demonstrate their impact on STEM student achievement.

STRAND 2: Wingspread: Globally Connected Learning

Over the past few years, online learning resources have evolved rapidly and dramatically. Recently, it has become possible to use web-based and open source environments as learning media. Such approaches as Moodle, Ning, podcasting, wikis, RSS feeds, iGoogle, blogs, webex, etc. are easily accessible and usable—the students are using them! They offer great new ways to teach and learn in and out of school. This Wingspread invites our expert “fish” to discuss and exchange ideas and practices.

Facilitator:

Annamaria Schrimpf, Winchester Public Schools

Participants in the 'fishbowl':

Patrick J. Crothers, Tech Director, SmartTechnologies

Casey Giordani, Math/Science Teacher, Hingham PS, MassCUE

Charles Fadel, CISCO

Romeo Marquis, The Learning Curve

Dennis Richards, Former Superintendent, Falmouth Public Schools

STRAND 3: *Advancing Diversity and Access*

This session provides an overview of diversity and access in Science, Technology, Engineering and Math (STEM) by examining current trends and issues, recent research developments, and best practices. There will be ample time for structured discussion. The perspective will include the Commonwealth, the nation and the world. Attendees will leave with resources for their own institutions for improving diversity.

Moderator:

Larisa K. Schelkin, Co-Founding Director & President, DOME Foundation, Inc.

Participants:

Rick Adrion, Principal Investigator, NSF funded Commonwealth Alliance for Information Technology Education (CAITE) and Professor, Department of Computer Science, UMass Amherst

Renee Fall, Project manager & member of CAITE Executive Committee

Erin Michael Salius, Program Manager, Middle School Outreach, MIT's Office of Engineering Outreach Programs (OEOP)

STRAND 4: *Stimulating Student STEM Interest*

This strand will showcase leading state projects geared to enhancing student interest in STEM fields of study. During the morning session, presentations on major initiatives of the *STEMTech Alliance* and *Berkshire Network* will highlight effective statewide and regional efforts to refine student messaging to support and encourage interest and competence in STEM subjects. The *STEMTech alliance* is a collaboration of Massachusetts technology-based trade associations representing over 3700 technology companies with approximately 300,000 employees. The *Berkshire Network* represents members from higher education, K-12, and industry. This session will include ample time for structured discussion.

Moderator:

David McCauley, Vice Chancellor for Workforce Development, MA Department of Higher Education.

Presenters/Panelists:

Monica Neset Joslin, Dean of Academic Affairs, Massachusetts College of Liberal Arts

Susan K. Moulton, Project Director, STEMTech Alliance

Joyce Plotkin, President, Mass Technology Leadership Council, Inc

Strand 5: Strengthening STEM Fundamentals

Focus on Professional Learning: Learn about two programs that can help schools or districts achieve a number of the STEM pipeline goals.

Massachusetts Intel Mathematics Initiative (MIMI) is a professional development program for K-8 math teachers focusing on the relationship of arithmetic, geometry, and algebra.

Intensive Immersion Institute in Mathematics and Science takes a three-pronged, content-based approach: (1) intensive immersion through working on world-class challenging problems, (2) modeling effective pedagogy through collegial interaction and just-in-time compact lesson delivery, and (3) building sustainability through establishing local expertise in conducting high-quality workshops.

Moderator:

Jeff Weidenaar, Pearson Education

Participants:

- Team from Massachusetts Intel Mathematics Initiative led by **Life LeGeros**, MA Department of Elementary and Secondary Education
- Team from Intensive Immersion Institute in Mathematics and Science led by **Andrew Chen**, EduTron Corporation

Strand 6: Empowering STEM Educators

This session will provide STEM teachers and guidance counselors with information and strategies about how they can create or improve STEM learning experiences for young people in their school and district. These programs are collaborative partnerships with local colleges, universities, industries, museums, and other school districts. They focus on effective teaching and instruction aligned with standards and sustainable partnerships.

CityLab has a mission to provide access to state-of-the-art biotechnology laboratory facilities and curriculum. Teachers from Massachusetts and neighboring states bring their students to CityLab where the students solve problems using inquiry strategies and hands-on, laboratory-based techniques in molecular biology.

Changing Student Misconceptions About Science is a program designed to identify and understand misconceptions children have about the earth, physical, and life sciences and to develop strategies to change them.

Moderator:

Ellen Ferraro, Raytheon

Participants:

Don DeRosa, Director of CityLab

Bob Barkman, Springfield College leads the team on Changing Student Misconceptions about Science including **Marisa Creel**, **Richard Konicek**, **Kathryn Merrill**, **Deanna Suomala**

Strand 7: Integrating Technology and Engineering in STEM Education

Technological literacy has become *essential* to informed participation in the democratic process and to our economic well being as individuals and as a global community. Yet few citizens are technologically literate, largely because technology and engineering are not taught in most of K-12 schools. To fully develop a 21st century curriculum that focuses on technological literacy and the integration of STEM education, technology and engineering need to be a core content area in K-12 schools

Expanding Technologies in Middle/High School Learn about new low-cost hardware and web technologies that are bringing computer-intensive, hands-on STEM projects into Massachusetts classrooms. Educators from Machine Science Inc. and the UMass Lowell will show their unique microcontroller development platforms, as well as a first-of-its-kind web system that enables students to develop code for embedded controllers on-line, without any locally installed software. The presenters will also discuss their NSF-funded collaboration—the Internet Community of Design Engineers (iCODE)—which aims to create a nationwide on-line community of learners using these engaging technologies.

Moderator:

Yvonne Spicer, National Center for Technological Literacy® (NCTL®), Museum of Science, Boston

Presenters:

Sam Christy, Co-Founder and Executive Director of Machine Science Inc.

Fred Martin, Professor of Computer Science at the UMass Lowell

12:15 to 1:00 Lunch Buffet

1:00 to 1:25 Celebrate the Fifth Summit—

How far have we come and where are we going?

1:30 to 3:00 Afternoon Breakout Sessions

Strand 1: On The Way: Implementing the STEM state plan, Part Two

Based on the presentation of the state STEM plan report earlier in the day and the ensuing discussion, attendees and representatives of all the stakeholder groups will discuss and identify what specific next steps school districts, institutions of higher education, the S & T Legislative Caucus and others can take to implement their part of the state plan, such as legislative, policy and financial actions that are needed.

The table discussions will be based on: the STEM outline which is posted on the STEM website (http://media.umassp.edu/massedu/stem/MA_STEMPlanOutline_4-26-08.pdf); the executive summaries of the latest reports also available on the website and proposed legislative language.

If you are interested in this session, looking at the materials on the web ahead of time is recommended.

Moderators:

Greg Sheldon, Sheldon Collaborative

Lance Hartford, MassBioEd Foundation

Participants:

Invited legislative aides, members of the Science and Technology Caucus, representatives from MA Business Roundtable and other business leaders and Summit attendees.

MORE EXEMPLARY PROGRAMS/PROMISING PRACTICES in STEM

Strand 2 - Wingspread - Globally Connected Learning

This session is an opportunity for morning attendees to take the Web 2.0 tools discussed in the "fishbowl" and create an action plan for their classroom/school/district that will enable integration of these tools into their teaching and learning repertoires and environments.

An in depth Q and A, with experienced educators brought into the meeting through one of these tools, and extensive networking opportunities will contribute to the development of action steps to guide the integration process. Web 2.0 tools continue to evolve and by participating in this session, Wingspread attendees will begin the journey into the interactive web.

Moderator:

Annamaria Schrimpf, Winchester Public Schools

Participants:

Attendees and "fish" from the morning session

Strand 3: Advancing Diversity and Access

This session will provide an overview of diversity and access in Science, Technology, Engineering and Math (STEM) by examining current trends and issues, recent research developments, and best practices. There will be ample time for structured discussion. The perspective will include the Commonwealth, the nation and the world. Attendees will leave with resources for their own institutions for improving diversity.

Moderator:

Larisa K.Schelkin, Co-Founding Director & President, DOME Foundation, Inc.

Participants:

Julian S. Green, Program Coordinator, Saturday Engineering Enrichment and Discovery (SEED) Academy, MIT

Connie Chow, Executive Director, Science Club for Girls

Teresa A. Martin, The Commonwealth Covenant Fund Board member; Founder, Junior-Tech (Grade 4-12) STEM Education

Erin Mawn, Project Coordinator/Workforce Development, DHE

Strand 4: Stimulating Student STEM Interest

This session will include *Central Massachusetts STEM Network* and *Massachusetts State Science & Engineering Fair, Inc.* presentations focused on capturing interest among diverse student groups through exposure to STEM careers and professionals through fairs and conferences, including regional science fairs and the "Women in Science Conference." There will be ample time for structured discussion.

Moderator:

David McCauley, Vice Chancellor for Workforce Development, Massachusetts Department of Higher Education.

Presenters/Panelists:

Cora Beth Abel, Executive Director, Massachusetts State Science & Engineering Fair, Inc.

Sandra Mayrand, Founder and Director, Regional Science Resource Center, University of Massachusetts Medical School

Strand 5 – Strengthening STEM Fundamentals

Focus on High School Achievement:

Mathematics – The Stand and Deliver Mentoring Program has a proven track record of helping students improve their math skills through one-on-one tutoring. Learn how Raytheon Company partnered with the program and Lawrence Public Schools to create and pilot the corporate campus academic mentoring model which enriches the lives of both students and mentors.

Biology – BioTeach is an ambitious teacher professional development program designed to support biotechnology instruction and career awareness activities. It

features hands-on lab experiences that inspire scientific curiosity, understanding, and, for some, a career in the life sciences.

Computing – The Boston Area Advanced Technological Education Connections (BATEC) and the Commonwealth Alliance for IT Education (CAITE) teamed up to provide new opportunities for students to study computer science. Learn about the After-School College program and a newly developed online program for introductory Java.

Moderator:

Jeff Weidenaar, Pearson Education

Participants:

- Team from Stand and Deliver Mentoring Program led by **Terri Munson**, Raytheon Corporation
- Team from BioTeach led by **Robert Ross**, Massachusetts Biotechnology Education Foundation
- Team from BATEC and CAITE led by **Deborah Boisvert**, UMass Boston

Strand 6: Empowering STEM Educators

The two programs covered in this session are:

Leadership Initiatives for Teaching and Technology (LIFT²) is a professional development program that offers middle school and high school math, science, and technology teachers a professional learning experience that integrates three graduate courses with authentic and relevant paid externships in industry.

Growing STEM Teacher Leaders discusses the development and implementation of the Northeast Network STEM Fellows Project for teams of STEM teachers from partner district middle and high schools.

Moderator:

Ellen Ferraro, Raytheon

Participants:

Jim Stanton, Director of LIFT² leads the team with **Andrea Roda**, **Douglas Chabinsky**, and **Kathy Shea**

Judith A. Boccia, UMass Lowell leads the Northeast Network STEM Fellows Project team with **Maryellen D. Rancourt**, **Marjorie Dennis**, **Barbara Lurvey**, and **Linda D. Perry**

Strand 7 Integrating Technology and Engineering in STEM Education

Engineering is Elementary Children are born engineers who are fascinated with building and with taking things apart to see how they work. By encouraging these explorations in elementary school, we can keep these interests alive. Describing their activities as "engineering" when they are engaged in the natural design process can help children develop positive associations with engineering, and increase their desire

to pursue such activities in the future. We will also explore how one resource, Engineering is Elementary can help:

- engage students in the design of new technologies,
- tie into existing science content areas,
- align with Massachusetts and National Science Standards, and
- make connections to other fields, including language arts, math, and social studies.

Moderator:

Yvonne Spicer, National Center for Technological Literacy® (NCTL®), Museum of Science, Boston

Presenter:

Kate Hester, National Center for Technological Literacy® (NCTL®), Museum of Science, Boston

Engineering the Future: Science, Technology, and the Design Process™ is a full-year course designed to introduce students to the world of technology and engineering, as a first step in becoming technologically literate citizens. Through this course's practical real-world connections, students have an opportunity to see how science, mathematics, and engineering are part of their every day world, and why it is important for every citizen to be technologically and scientifically literate. *Engineering the Future* aligns directly to the Technology/Engineering strand of the Massachusetts Science and Technology/Engineering Framework.

Johanna Bunn, Teacher Educator for the Engineering the Future project under the National Center for Technological Literacy at the Museum of Science, Boston

3:00 to 3:30

Cookies/coffee/networking

3:30 to 4:00

Plenary session/Reflections on the day and the future of STEM in MA