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Event Schedule

7:30am – 2:00pm Registration

7:30am – 9:30am Breakfast Buffet

8:00am – 3:30pm Exhibit Hall

8:30am – 9:30am Welcome and Opening

- **Doug Banks**, Executive Editor, Boston Business Journal
- **Presentation of The Hall at Patriot Place 2017 Massachusetts STEM Teacher of the Year**
  - **Bryan Morry**, Executive Director, The Hall at Patriot Place presented by Raytheon
  - **Kathleen Malone,** Derby Academy, Hingham
- **Raising the Bar: Building the Pipeline through STEM Education**
  - **Yvonne Spicer,** Vice President of Advocacy & Educational Partnerships, National Center for Technological Literacy, Museum of Science, Boston

9:30am – 9:45am Break

9:45am – 10:35am AM Breakout I

- 2016 Digital Literacy and Computer Science Standards: Implementation and Licensure
- Adapting Digital Media for STEM Instruction
- Engaging University Students in Co-design Projects with Partner Schools and Communities
- Exploring the "M" in Early Childhood STEM: Moving Beyond Rote Activities to Extend Concept Development
- Growing Community Partnerships through Art to Engineering: STEM, STEAM, & Beyond
- How Can Local Businesses Engage and Drive STEM Education in Their Communities?
- If You Build It, Will They Come? Reflections on the Vertex/Boston Public Schools Partnership
- MassBay's STEM Mentor Program: Partnering with Industry to Promote Students' Professional Success
- Partnering on Biomedical Expeditions to Engage Underserved Students in STEM
- Selecting and Designing Innovative K-12 Engineering Resources to Transcend Stereotypes
- STEM@Work: The State's Campaign for STEM Internships for High School Students

10:35am – 10:55am Break

10:55am – 11:45am AM Breakout II

- A Playbook on Gender Equity in Tech: Best Practices in Recruiting, Retaining, and Advancing Women
- Creative Robotics Across the Curriculum: An Innovative Partnership Project
- Establishing Effective Partnerships Across the Community College Sector
- Helping Preschool Teachers Engage Families in Supporting Young Children's Mathematics Learning
- Bringing Science to Life: Using Realistic Medical Emergencies with a Patient Simulator "STAN" to Engage and Inspire High School Students
- Invention Education and STEM: Preparing Students from Diverse Backgrounds for the Innovation Economy
- Mission To Mars — An Interdisciplinary Unit Using the Engineering Design Process and PBL
- Modest Funding with Big STEM Impacts: 5-Year District Partnership Increases Enriched STEM Learning
- Teach Students to Ask Their Own STEM Questions: Introduction to the Question Formulation Technique
- Work in Progress: How Business Leaders are Helping Close the Skills Gap

EVENT SCHEDULE

11:45am – 1:00pm Luncheon Buffet

12:30pm – 1:30pm Luncheon Plenary

Plenary

- **Doug Banks**, Executive Editor, Boston Business Journal
- **J. Lynn Griesemer**, Executive Director, UMass Donahue Institute; Associate Vice-President, Economic Development, University of Massachusetts President's Office
- **Jim Peyser**, Secretary of Education, Commonwealth of Massachusetts
- **John C. Warner**, President and Chief Technology Officer, The Warner Babcock Institute for Green Technology

1:30pm – 1:45pm Break

1:45pm – 2:35pm PM Breakout I

- Beyond Counting and Naming Shapes: Math All Day for Under 5s
- Cross-grade Partnerships in STEM: Fostering Community Connection and Deeper Conceptual Understanding
- Developing and Maintaining Business & Education Partnerships — Regionally and Locally
- GPSTEM: Increasing STEM Credentials at Community Colleges
- MA PKAL Regional Network: Promoting Professional Development, Networking, and Workforce Readiness
- Paving the STEM Pathway for At-Risk Students
- Sanofi Genzyme and Oracle Partnerships with the University of Massachusetts Boston
- School-wide STEM Day: A Recipe for Success
- STEM and the Workforce: Preparation During the Early Years
- Tiny House: Three Public High School Multidisciplinary STEM Classes — Architecture, Engineering, & Build

2:35pm – 2:55pm Break

2:55pm – 3:45pm PM Breakout II

- Building a Coherent University-School District-Industry Partnership to Scaffold STEM Learning
- College to Career Pathways: A New Online Tool for Adult Learners Returning to Education
- Engineering in the Out-of-School-Time Setting
- Evaluation of a Global Initiative to Teach Engineering and Global Competency to Middle Schoolers
- Exploring General Education Foundations for STEM Transfer Students
- Integrating the Question Formulation Technique into Your Work with STEM Students
- Novel Engineering: An Integrated Approach to Engineering and Literacy
- Seeds of STEM: Early Childhood Engineering Curriculum from Diversity and Collaboration Perspective
- So Much More Than Counting: Talking with Young Children About Mathematical Concepts
- The daVinci Program: Building a STEAM Learning Community

Plenary Speaker Bios

Doug Banks

Doug Banks is executive editor of the Boston Business Journal (BBJ), where he oversees all editorial content of the company's daily web site, multiple electronic newsletters, weekly print edition, and panel and award events. He is a frequent speaker and panel moderator on a variety of issues, from regional business and economic trends to communications, journalism and digital media. Prior to his role as executive editor, Doug was publisher and editor of BBJ sister company Mass High Tech. While leading Mass High Tech, he launched multiple digital products, including a new website and a family of e-newsletters, and helped dramatically grow its events business. Between stints at the Business Journal and Mass High Tech Doug served for three years as associate vice president for economic development at the University of Massachusetts President's Office, where his duties included developing strategic partnerships with state and federal government, business and industry, and other institutions of higher education, and where he managed a seed-fund investment program to drive new faculty research projects. Doug has a wife and two teen-aged children. A native of Worcester, Banks received a bachelor's degree in journalism and English literature from the University of Massachusetts Amherst and a master's of fine arts degree in nonfiction writing from the University of Pittsburgh. He has served on the boards of several area nonprofits and is currently the board treasurer at Calvary Christian Church in Lynnfield. The Boston Business Journal is Boston's leading business media company, which received the Breaking News award from the Society of American Business Editors and Writers in 2016 and the General Excellence Award as one of the nation's top three weekly print publications in 2013. It is one of 40 regional publications owned by American City Business Journals.

JD Chesloff

As Executive Director of the Massachusetts Business Roundtable (MBR), JD is responsible for developing and implementing the strategic framework and direction for MBR in partnership with the Chair, Executive Committee and Board of Directors. He works with MBR Task Forces and MBR leadership to develop its agenda on public policy matters and convey those ideas to opinion leaders and policy makers to help inform their deliberations. JD has worked in and around Beacon Hill for more than 25 years. In the Legislature, he was the Chief of Staff to the House Committee on Commerce and Labor, and was the education issues analyst and Deputy Budget Director for the House Committee on Ways and Means. After working as both a budget analyst and Assistant to the President at the University of Massachusetts, JD worked as the Legislative Director for State Treasurer Shannon O'Brien and then as Issues Director for the O'Brien-Gabrieli gubernatorial campaign in 2002. He joined MBR in 2004 after serving as Legislative/Issues Director for the Early Education for All (EEA) Campaign, where he was responsible for developing and driving legislative support for EEA's legislation and agenda which included the creation of the Massachusetts Department of Early Education and Care. He currently serves on the Department's Board of Directors. In addition, he serves on the state's STEM (Science, Technology, Engineering, and Math) Advisory Council's Executive Committee, and is a Trustee at the Massachusetts College of Liberal Arts. He also serves on the Board of The Discovery Museums; the Board of the Massachusetts Business Alliance for Education; and the Advisory Board of ReadyNation. JD holds a Masters in Public Affairs from the McCormack Institute of Public Affairs at the University of Massachusetts Boston, and has a Bachelor's Degree in Law and Public Policy and Telecommunications Writing from Syracuse University. He lives in Arlington, MA with his wife Lori and his two daughters, Sadie and Tessa.

J. Lynn Griesemer

J. Lynn Griesemer, Ed.D., M.P.A. is the Associate Vice President for Economic Development at the University of Massachusetts and Executive Director of the UMass Donahue Institute. She is also an adjunct professor in the Public Policy and Administration program at UMass Amherst. Prior to joining the University, Dr. Griesemer was the Executive Director of the Northeast Regional Exchange, a seven-state, non-profit collaborative in education for New England and New York. At the University of Rhode Island, she also held a faculty position and was the director of an education research and evaluation center. Dr. Griesemer holds a bachelor's degree in mathematics from Cedar Crest College, a master's in mathematics education from the University of Tennessee, and a master's in public administration from the Kennedy School at Harvard University, where she was a Littauer Fellow. She received her doctorate in educational administration and curriculum from the University of Tennessee. Since the formation of the University's five-campus system in 1991, Dr. Griesemer has worked closely with the UMass President's Office, managing several system-wide projects in economic development and related areas.

PLENARY SPEAKER BIOS

Kathleen Malone

2017 STEM Teacher of the Year

Prior to her work in education, Kathleen led a progressive 15-year career in the finance industry and earned her Bachelor of Science degree in finance from Providence College. Malone launched her teaching career in Massachusetts five years ago with a penchant for bringing real world relevancy and application to the classroom. She has a Master's Degree in math education from Lesley University with a focus on curriculum, instruction, and assessment in middle school mathematics. Kathleen joined the faculty at Derby Academy in Hingham, MA three years ago, where she teaches Upper School math and engineering design. In addition, she is the STEM Curriculum Specialist for Pre-K through Grade 8. She has led development of innovative, hands-on STEM curricula in the Middle and Upper Schools to promote critical thinking skills and oversees the scope and sequence of the School's STEM program. Kathleen was recently awarded the 2016 Pre-College Educator Award by the Boston Society of Civil Engineers Section of the American Society of Civil Engineers for the work she has done guiding her students through the engineering design process and connecting their classwork to the industry. She is a champion of authentic project-based STEM applications with a lens on social progress and teaches her students to delve into problem solving utilizing design thinking. Kathleen is a certified MIT Master Trainer in Educational Mobile Computing and served on the Computer Science and Engineering Subcommittee of the Governor's Advisory Council on STEM Education. She has demonstrated a commitment to advancing computer science education both at her school and in the state. She delivers tailored coding, mobile computing and robotics challenges to her students. She also volunteers at several outreach events aimed toward bridging the gender divide and encouraging girls to pursue STEM fields. In addition, she leads workshops for her local community and oversees the planning and execution of summer camp programs in 3D design, cryptography, Scratch, robotics, and MIT App Inventor. She has been integral to the advancement of STEM programming at Derby, especially as it relates to computational, critical and design thinking. She has had an impact at all levels of education, from her students and their families, to her peers and other professionals. An avid hiker and marathon runner, Kathleen lives in Norwell with her family where she enjoys coaching youth sports.

Bryan Morry

Bryan Morry rejoined The Kraft Group as The Hall's executive director during the venue's construction in December of 2007 after spending the previous two-plus years as the afternoon drive sports talk show host on the Score AM/FM in Providence, R.I. Before his radio stint, he was the editor of the Patriots official team newspaper, Patriots Football Weekly, from 1997–2005, where he covered the Patriots for the newspaper, patriots.com and as part of the Patriots Football Weekly television show. Bryan covered the first three Patriots Super Bowl victories for PFW and authored the coffee table book, Patriots United — the New England Patriots World Championship Season, following the surprising Super Bowl XXXVI win over the St. Louis Rams. He oversees all museum operations. He is an officer on the board of directors of the International Sports Heritage Association (ISHA) as the first vice president and chairs the group's communications committee while also serving on the MIAA's Endowment Committee and on the Trement Global Education Advisory Board.

Secretary Jim Peyser

As Secretary of Education, Jim Peyser directs the Executive Office of Education which is responsible for early education, K-12, and higher education in Massachusetts. Secretary Peyser sits on each of the boards governing the Commonwealth's education agencies — Department of Early Education and Care, Department of Elementary and Secondary Education, and Department of Higher Education as well as the University of Massachusetts system. He is Governor Baker's top advisor on education and helps shape the Commonwealth's education reform agenda.

Prior to his appointment as Secretary, he served as the Managing Director at NewSchools Venture Fund, a non-profit grant-making firm that seeks to transform public education in high-need urban communities by supporting innovative education entrepreneurs. From 1999 through 2006, Jim served as Chairman of the Massachusetts Board of Education. Prior to joining NewSchools, Secretary Peyser was Education Advisor to Governors Bill Weld, Jane Swift and Mitt Romney, where he helped shape state policy regarding standards and assessments, school accountability, and charter schools. In 1995, he served as Under Secretary of Education and Special Assistant to the Governor Weld for Charter Schools.

He previously spent seven years as Executive Director of the Pioneer Institute for Public Policy Research, where he helped to launch the Massachusetts Charter School Resource Center, which supported the development of the state's first charter schools. Before joining Pioneer Secretary Peyser held various positions at Teradyne, Inc. in Boston, an electronic test equipment manufacturer.

Secretary Peyser holds a Master of Arts in Law and Diplomacy from The Fletcher School (Tufts University) and a Bachelor of Arts from Colgate University.

PLENARY SPEAKER BIOS

Yvonne M. Spicer, Ed.D, DTE

Dr. Yvonne Spicer is a national and international speaker and advocate for pre-college science, technology, engineering, and math (STEM) education. In 2012, the International Technology & Engineering Educators Association (ITEEA) honored Spicer as a Distinguished Technology Educator (DTE). In 2013, she received the Massachusetts Association of Science Teachers' Russell P. Stanhope Distinguished Friend of Science Award for outstanding contributions to science education. In May 2016, the trail-blazing educator received an honorary Doctor of Humanities from the Massachusetts College of Liberal Arts. Concerned by how many children in the U.S. "are shut out of technology and engineering," Spicer makes a compelling case for closing the underrepresented minority gap in engineering and school leadership.

With expertise in technology and engineering education standards development, assessment, and strategic school leadership, Spicer served on the steering committee for the frontrunner of the first national assessment for technology and engineering literacy in the 2014 National Assessment of Educational Progress (NAEP). She also served on the technology and engineering design team for the National Research Council (NRC) "Next Generation": Framework for Science Education which was approved July 19, 2011.

In January 2010, Spicer was appointed to the Massachusetts Governor's STEM Advisory Council as the co-chair of the council's teacher development committee. She was instrumental in establishing the 2001 Massachusetts technology/engineering curriculum framework with Ioannis (Yannis) Miaoulis, president and director, Museum of Science. She is also an advisor to the National Governors Association.

In addition, Spicer helps disseminate the Museum's K-12 curricula, Engineering is Elementary®, Building Math, Engineering Now!℠ and Engineering the Future®, and she leads the Gateway Project, which originated in Massachusetts and is being replicated across the U.S. as a model to build leadership capacity for technological literacy. Endorsed by the Mass. STEM Advisory Council, and designed to guide systemic change, the Gateway Project helps school districts develop a strategic plan of action to implement K-12 technology and engineering programs. The Gateway community represents 100 school districts serving over 640,000 students and 600 Mass. educational leaders.

Earning her Ed.D. at the University of Massachusetts-Boston in 2004, she focused her dissertation on how nine African American female public school principals transformed their schools and thrived as educational leaders. Spicer is the former director of career & technical education in Newton, Mass., and served as the statewide technology/engineering coordinator at the Mass. Department of Elementary and Secondary Education. She earned B.S. and M.S. degrees in industrial arts & technology from the State University of New York-Oswego. A Brooklyn, New York, native, she is committed to improving opportunities for females and students of color in science, technology, engineering, and mathematics (STEM) fields.

John Warner

John Warner is the recipient of the 2014 Perkin Medal, widely acknowledged as the highest honor in American Industrial Chemistry. He received his BS in Chemistry from UMASS Boston, and his PhD in Chemistry from Princeton University. After working at the Polaroid Corporation for nearly a decade, he then served as tenured full professor at UMASS Boston and Lowell (Chemistry and Plastics Engineering). In 2007 he founded the Warner Babcock Institute for Green Chemistry, LLC (A research organization developing green chemistry technologies) where he serves as President and Chief Technology Officer, and Beyond Benign (a non-profit dedicated to sustainability and green chemistry education). He is one of the founders of the field of Green Chemistry, co-authoring the defining text Green Chemistry: Theory and Practice with Paul Anastas. He has published over 250 patents, papers and books. His recent work in the fields of pharmaceuticals, personal care products, solar energy and construction and paving materials are examples of how green chemistry principles can be immediately incorporated into commercially relevant applications. Warner received The 2004 Presidential Award for Excellence in Science Mentoring (considered one of the highest awards for US science education), the American Institute of Chemistry's Northeast Division's Distinguished Chemist of the Year for 2002 and the Council of Science Society President's 2008 Leadership award. Warner was named by ICIS as one of the most influential people impacting the global chemical industries. In 2011 he was elected a Fellow of the American Chemical Society and named one of "25 Visionaries Changing the World" by Utne Reader.

Breakout Sessions – AM Breakout I

2016 Digital Literacy and Computer Science Standards: Implementation and Licensure

Time – 9:45–10:35am
Venue – Meeting Room C
Strand – K-12 Education

Continuing the discussion from last year's conference, which introduced "Digital Literacy and Computer Science (DLCS) Framework: Where are we now?"

K-12 educators, learning coaches, and administrators are invited to learn more about the key features of the 2016 DLCS standards, implications for curriculum and instruction, resources available, examples of efforts already undertaken by some districts and implementation initiatives and implications for licensure.

SPEAKER

Anne DeMallie, Computer Science and STEM Integration Specialist, MA Department of Elementary and Secondary Education

Adapting Digital Media for STEM Instruction

Time – 9:45–10:35am
Venue – Plenary Hall
Strand – K-12 Education

Explore how digital media can be adapted for STEM instruction in this session from WGBH Education and PBS LearningMedia. This session will focus on what makes good digital media for STEM instruction and illustrate how the STEM education team at WGBH takes media from a range of sources, including WGBH programs such as NOVA and PEEP and the Big Wide World, as well as content partners such as NASA and NOAA, to engage students in learning STEM concepts and practices. Participants will engage with different forms of media, all freely available on PBS LearningMedia, and learn how each is contexualized to support classroom use with diverse learners. Facilitators will highlight the strengths of different media types to support student learning of STEM standards, such as providing an authentic context, representing complex data sets, or showing phenomena that otherwise are difficult to view in the classroom. The goal of WGBH Education is to advance the effective use of media by helping educators use media from a variety of sources to engage students in STEM learning.

SPEAKERS

Caitlin Stier, STEM Project Director, WGBH

Jake Foster, Director of STEM Curriculum and Instruction, WGBH

Laura Degelmann, Teacher, Malden Public Schools, and WGBH Teacher Advisor

Engaging University Students in Co-design Projects with Partner Schools and Communities

Time – 9:45–10:35am
Venue – Meeting Room E
Strand – Higher Education

There seems to be growing student interest in learning relevant STEM, design and entrepreneurship skills through real work with real people. D-Lab has been running project-based classes at the Massachusetts Institute of Technology, where university students from different disciplines come together to create innovations that address poverty with partner communities around the world. These opportunities have attracted diverse students to D-Lab, including a high number of female students (over 50%), international students, underrepresented minorities in STEM fields, and students from humanities and social sciences who are new to exploring STEM fields. Many alumni have continued on into STEM-related careers for positive social and environmental impact.

Running real projects in real communities comes with real responsibilities. This session will share what the D-Lab: Education course has learned over the years in providing university students with opportunities to work with youth and educators, co-developing educational technologies and hands-on STEM curricula with partner K-12 schools and communities in 5+ countries. The D-Lab: Education course aims to extend D-Lab's hands-on approach to younger students by helping to create more accessible, relevant, and inspirational pre-tertiary STEM learning opportunities. There are diverse stakeholders in the D-Lab: Education model, including at the university level, in partner K-12 schools (educators, students, families), and within partner communities where the K-12 schools are located (residents, leadership, community-based organizations).

AM BREAKOUT I

In this discussion plus hands-on idea generation session, we will engage universities, schools, and organizations in thinking through how to overcome some challenges of school-community partnerships and work towards developing impactful projects.

SPEAKERS

Jessica Huang, Instructor, D-Lab, MIT

Lisa Nam, Instructor, D-Lab, MIT

Exploring the "M" in Early Childhood STEM: Moving Beyond Rote Activities to Extend Concept Development

Time – 9:45–10:35am
Venue – Grand Ballroom North
Strand – Early Education

This hands-on workshop will help early childhood educators, directors, providers, and coaches to explore a variety of developmentally appropriate mathematical experiences to extend children's knowledge in everyday routines or mathematics centers.

The word "mathematics" can cause adults to either quiver or smile in fascination. Regardless of your comfort level, early childhood mathematics doesn't have to feel overwhelming, boring or tedious. As educators, we should instill an excitement about numbers, patterns, relationships, shapes and just talking about the math found all around us. Join us as we have some fun with mathematics through games and meaningful experiences that help students develop skills needed for future school success.

Presenters will share the approach used by The Hundred Acre School at Heritage Museums & Gardens, which moves away from the practice of using an isolated STEM-related lesson or activity and moves to transforming the learning environment and daily routine into an authentic STEM experience immersed in questions, vocabulary, and concepts. Presenters share how they have been able to do this in the area of mathematics by setting up demonstration areas during the workshop with materials but will explain the purpose, concepts, and questions that would enhance the students understanding of math concepts. Educators will also have the opportunity to explore how these concepts can be extended during a variety of daily routines like circle time, snack, transitions, and outdoors. Attendees are encouraged to share their experiences and how they would be able to incorporate these concepts into their classroom or learning environment.

SPEAKERS

Melissa Russell, Preschool Director,
The Hundred Acre School at Heritage Museums & Gardens

Kori Bardige, Education Consultant and Owner,
Learning Circle Consulting

Growing Community Partnerships through Art to Engineering: STEM, STEAM, & Beyond

Time – 9:45–10:35am
Venue – Junior Ballroom
Strand – K-12 Education

How do we inspire more girls and youth from groups underrepresented in the sciences to pursue STEM career pathways? This session will highlight two case-study partnerships between the Timothy Smith Network (TSN) of community technology centers in Roxbury, MA, and two local powerhouses of science and engineering — the Harvard-Smithsonian Center for Astrophysics (CfA) and Northeastern University. Each partnership was focused around the adoption and implementation by TSN of an innovative technology-based curriculum for youth in out-of-school-time programs. The first is an astrophotography program, *Youth Capture the Colorful Cosmos*, which empowers participants to control real telescopes over the Internet to take images of space. Using the tools and techniques of professional astronomers, youth learn to enhance, analyze, and interpret their images by producing astrophotography exhibits for their peers, family, and the public. In the second partnership, TSN worked with the Northeastern College of Engineering to plan and launch a LEGO Robotics program. Under the mentorship of Northeastern students, youth gained important experience in the engineering design process.

The panelists will share the details of these successful STEM engagement programs, along with specific partnership strategies that have led to successful outcomes for participating middle-school aged youth. The discussion will highlight examples of how these programs were adapted, improved, and expanded via the sustained partnership with TSN and how the partnerships accomplished more than any of the individual organizations could do on their own.

MODERATOR

Adreenne Law, Program Coordinator,
Timothy Smith Network

SPEAKERS

Mary Dussault, Science Education Program Manager,
Harvard-Smithsonian Center for Astrophysics

Susan Freeman, Director and Teaching Professor,
First Year Engineering Program,
Northeastern University College of Engineering

How Can Local Businesses Engage and Drive STEM Education in Their Communities?

Time – 9:45–10:35am
Venue – Meeting Room B
Strand – Workforce and Business

STEM education is highly important to schools and educators, but it is also imperative to local businesses in the STEM fields to maintain and drive a pipeline of talent for their workforce. General Dynamics Mission Systems has been engaged with STEM education in the local Berkshire County community for many years. The company and its employees have cultivated an annual set of educational events and STEM activities to enhance the STEM education happening in the classroom. This presentation will cover ideas on how businesses can further engage with their local community relative to STEM activities. Events and ideas to be discussed are site or facility field trips and tours, employee/student shadowing, home grown engineering competitions, in-class workshops, and introduction to engineering and STEM presentations. In addition to these events we will discuss the benefits of participation in local community events such as science fairs, STEM Pipeline Networks, and interaction with other educational venues like museums, zoos, and farms. STEM education and enrichment is a partnership between educators, the community, and local businesses. Come learn how you can enhance STEM in your community.

SPEAKERS

Beth Mitchell, Director of Engineering Maritime and Strategic Systems, General Dynamics Mission Systems

Elizabeth Bocchino, Engineering Leadership Program Supervisor, General Dynamics Mission Systems

If You Build It, Will They Come? Reflections on the Vertex/Boston Public Schools Partnership

Time – 9:45–10:35am
Venue – Meeting Room A
Strand – Workforce and Business

Representatives involved in the Vertex/Boston Public Schools (BPS) partnership will discuss the issues involved in establishing and maintaining a successful school/business relationship. This will be of interest to those companies who wish to connect with schools more closely. School leaders and teachers may also be interested in this session to learn how corporate relationships can benefit their students both during the academic year and summer.

Vertex is deeply committed to enhancing and promoting STEM education in the Boston community. The Vertex/BPS partnership was established in 2012 and Vertex has created academic and summer programs to engage BPS students. This session will be a case study of our experience working together.

Panelists from Vertex, BPS and the Boston Private Industry Council will share their knowledge of what works and what does not work followed by questions from the audience in the hope that more schools and businesses will develop these relationships. The panel will also include BPS teacher and student voices that will speak to how the partnership impacts the classroom and their educational experiences.

MODERATOR

Melodie Knowlton, Head, Vertex Learning Lab, Vertex Pharmaceuticals, Inc.

SPEAKERS

Stacia Reidy MacNaught, Vice President, External Affairs, Vertex Pharmaceuticals, Inc.

Makeeba McCreary, Managing Director and Senior Advisor of External Affairs, Boston Public Schools

Alysia Ordway, Employer Engagement Director, Boston Private Industry Council

MassBay's STEM Mentor Program: Partnering with Industry to Promote Students' Professional Success

Time – 9:45–10:35am
Venue – Conference Room 210
Strand – Higher Education

Participants will learn about MassBay Community College's STEM Mentor Program which brings together STEM students and regional STEM employers in one-on-one mentoring relationships and provides substantive, skills-based programs, and networking opportunities throughout the year.

SPEAKERS

Valerie Kapilow, Director, MassBay STEM Mentor Program, MassBay Community College

Wanda Gleason, Coordinator, MassBay STEM Mentor Program, MassBay Community College

Mark Anderson, Jr., Chief, Military Project Management Branch, US Army Corps of Engineers

Partnering on Biomedical Expeditions to Engage Underserved Students in STEM

Time – 9:45–10:35am
Venue – Grand Ballroom Center
Strand – K-12 Education

Representatives from Novartis and two Cambridge charter schools will share information about their collaboration to develop biomedical learning expeditions for high school students. The presentation will provide an overview of the Novartis Community Exploration & Learning Lab (CELL) and the expedition format. The presenters will share examples of biomedical expeditions created as a result of this collaboration. Representatives will offer their perspectives on the collaboration, including what worked well and future directions. Most importantly, presenters will share how the collaboration has impacted student engagement in STEM. Participants will have the opportunity to brainstorm areas of improvement, provide feedback, and ask questions during this interactive session.

MODERATORS

Russette Lyons, Head, Novartis Community Exploration & Learning Lab (CELL), Novartis

Meghan Spencer, Program Specialist, Novartis Community Exploration & Learning Lab (CELL), Novartis

SPEAKERS

Jeff Molk, Science Teacher & Science Department Chair, Community Charter School of Cambridge (CCSC)

Helen Shao, Science Teacher & 7-12 Science Coordinator, Prospect Hill Academy Charter School (PHA)

Selecting and Designing Innovative K-12 Engineering Resources to Transcend Stereotypes

Time – 9:45–10:35am
Venue – Grand Ballroom South
Strand – K-12 Education

As our need for engineers increases, so does our need to foster STEM identity and engage a broad range of young people in engineering. Unfortunately, many engineering curricula subtly or explicitly pander to stereotypes about engineering (construction, hard hats) or about gender (trucks and bridges or pink and princesses). With expertise in the design of imaginative, story-based K-12 engineering curriculum that appeals to girls and boys, facilitators will instead present the research-based importance of using nuanced, interdisciplinary resources. Then, presenters and participants will work together to create a draft rubric for distinguishing innovative resources — those that transcend stereotypes and portray engineering as a collaborative field that helps society — from more traditional ones. Participants will use the rubric in teams to evaluate a variety of published resources used in K-12 classrooms and report out on their results. Participants and presenters will discuss the most important characteristics of meaningful curricula and recommend changes to the rubric criteria. Finally, presenters will share curricula and resources they've found most valuable. Participants will leave empowered to inspire future engineers using excellent resources or prepared to design their own! After the conference, facilitators will create and format a final rubric and send it out to participants.

SPEAKERS

Beth McGinnis-Cavanaugh, Professor, Springfield Technical Community College; Principal Investigator, Through My Window

Isabel Huff, Outreach Coordinator, Through My Window

STEM@Work: The State's Campaign for STEM Internships for High School Students

Time – 9:45–10:35am
Venue – Meeting Room D
Strand – K-12 Education

The number one challenge facing Massachusetts' innovation economy is the demand for a qualified and skilled workforce. There are more open jobs in STEM than employees to fill them. This challenge will only grow with an aging workforce that will be retiring without enough qualified replacements. The solution starts in our K-12 schools. We need to get students excited about STEM well before college by offering them a wide range of STEM activities and experiences throughout their K-12 education.

One very powerful contribution to that effort is to offer high school students paid internships in STEM fields. This strategy has been selected by the state's STEM Advisory Council as one of three core strategies it has adopted to engage students in STEM subjects.

Shailah Stewart, director of the state's Connecting Activities Initiative, will give an overview of the STEM@Work Campaign. Representatives from businesses who have long hosted high school interns and those who hosted their first high school interns in the summer of 2017 will share their experiences.

MODERATOR

Shailah Stewart, Coordinator,
School to Career Connecting Activities,
MA Department of Elementary and Secondary Education

SPEAKERS

Matt Roszell, Senior Director, Employee Communications and Community, Vertex Pharmaceuticals

Michael Glass, Vice President, Talent Management and Development, Thermo Fisher Scientific

Mark McAuliffe, Director, Global Talent Acquisition, Waters Corporation

Breakout Sessions – AM Breakout II

A Playbook on Gender Equity in Tech: Best Practices in Recruiting, Retaining, and Advancing Women

Time – 10:55–11:45am
Venue – Grand Ballroom South
Strand – Workforce and Business

In summer 2017, AAUW and Dell released our "Playbook on Gender Equity in Tech: Best Practices in Recruiting, Retaining, and Advancing Women." This publication provides practical solutions for improving the status of diversity and inclusion in the tech space by weaving together crucial takeaways from existing literature, outlining research-based strategies for the workplace, and sharing examples of promising practices being used by industry thought-leaders.

The goal of this session is to equip attendees with a top line understanding of key strategies that can be effective in recruiting, retaining, and advancing women in the STEM fields. The intended audience includes corporate diversity and inclusion and human resources professionals as well as women who are working in the computing, engineering, and technology industries.

MODERATOR

Kathleen Buse, Research Consultant, AAUW

SPEAKERS

Jessica Anderson, North America Giving Manager, Dell EMC

Kim Churches, CEO, AAUW

Creative Robotics Across the Curriculum: An Innovative Partnership Project

Time – 10:55–11:45am
Venue – Grand Ballroom Center
Strand – K-12 Education

Integrating robotics into core curricula exposes more students to innovative computer science experiences and can promote deeper engagement with content (Gura, 2011; Gura & King, 2007). By seeing creative modes of scientific exploration, students may develop a better understanding of STEM generally (NSF, 2015).

To increase opportunities for middle school students to engage in technology innovation, this NSF-funded Math Science Partnership project, involving higher education, evaluation, and school district partners, designed the Creative Robotics project. They studied its implementation with grade 6–8 public school teachers who integrated robotics units into their science, health, art, English, and social studies courses.

Successful curricular integration required intentionally designed connections between robotics activities and disciplinary learning goals, allowing teachers to deepen their thinking about topics and reconsider their typical pedagogical approach. Robotics units supported learners by creating universally designed class environments that offered multiple modes of engagement and expression. They helped some students translate abstract concepts into concrete exemplars and to explore new subject matter, while supporting the development of technological fluency.

This session will offer examples (including student artifacts and classroom video) of robotics units in several content areas, enabling administrators, teachers, and/or technology specialists to identify ways for integrating creative technologies at the classroom, school, and district levels. Session participants will learn how partnerships can support technology innovations like Creative Robotics, and they will consider how partnerships among schools, higher education, and industry could create career pathways that appeal to a wider range of students.

SPEAKERS

Karen Mutch-Jones, Co-Director,
STEM Education Evaluation Center, TERC

Debra Bernstein, Senior Researcher, TERC

Michael Cassidy, Research Associate, TERC

AM BREAKOUT II

Establishing Effective Partnerships Across the Community College Sector

Time – 10:55–11:45am
Venue – Meeting Room A
Strand – Higher Education

Scale is one of those buzz words in thinking about initiatives that can cause change. However, anyone implementing projects knows that in order to scale impact, you need strong partnerships. Can such partnerships support a system-level model for promoting student engagement and success across an entire Commonwealth? This session highlights the efforts of the STEM Starter Academy Initiative, administrated through the Massachusetts Department of Higher Education, to support the STEM pipeline at all 15 of the public community colleges in Massachusetts. Through this work the campuses have built upon existing STEM programming to provide a cohesive set of student supports through the coordination of different offices on campuses and by learning from each other on what is working to impact student retention rates and program completion. This work has spawned several vibrant partnerships, and connected an active and diverse learning community that is deeply committed to inter- and intra-campus collaboration.

During this session we will review key steps in the development of collaborations within and across campuses, highlighting specific instances of success, challenge, and emergent best practices. Audience members will learn about effective inter- and intra-campus collaborations across the system through the lens of STEM Starter Academy programming. Key steps in the process for developing these collaborations will be highlighted during this session, as well as the practices and lessons learned to make this collaboration turn into a true learning community that can be applied to other regional and state-wide partnerships.

MODERATOR

Allison Little, Executive Director, STEM,
Massachusetts Department of Higher Education

SPEAKERS

Laura Rubin, Dean of STEM & Education,
North Shore Community College

Darcy Carlson, STEM Starter Academy Project Coordinator,
Quinsigamond Community College

Jeremiah Johnson, Senior Research Manager,
UMass Donahue Institute

Helping Preschool Teachers Engage Families in Supporting Young Children's Mathematics Learning

Time – 10:55–11:45am
Venue – Meeting Room B
Strand – Early Education

Young children's mathematics learning is most meaningful when it is integrated across the various settings where they live and learn—at home, at school, and in the broader community. However, despite the recognized value of family engagement in young children's learning, educators and parents alike are often unsure about the concrete action steps they can take to increase family involvement in mathematics learning. In this early education session, we will present the work from the *Games for Young Mathematicians Family Engagement project*, which focuses on helping preschool teachers effectively engage families in supporting their children's mathematics learning through fun, playful home mathematics activities. This project provided mathematics and family engagement professional development (PD) to 70 Head Start teachers across three programs during the 2016–2017 school year. The family engagement PD focused on engaging families in home-based mathematics activities that complemented math games teachers were using with children in the classroom. Researchers gave teachers materials to send home with the children that included math mini-books and home versions of the classroom math games. These materials included tips for families about important preschool mathematics concepts such as shapes and their attributes, patterns, and number sense. The panel will include two Head Start teachers from the study who will share insights about how they used the family engagement materials and teachings to deepen their work with families.

SPEAKERS

Heidi Rosenberg, Research Scientist, EDC

Kelley O'Carroll, Research Associate II, EDC

Michie Collins, Head Start Teacher,
Greater Lawrence Community Action Council, Inc.

Michelle Lambert, Head Start Teacher,
Greater Lawrence Community Action Council, Inc.

Bringing Science to Life: Using Realistic Medical Emergencies with a Patient Simulator "STAN" to Engage and Inspire High School Students

Time – 10:55–11:45am
Venue – Conference Room 210
Strand – K-12 Education

Many programs expose students to the richness of medical science careers. But many students are left wondering "Can I do it?". When faced with the reality of: costs, length and rigor of postsecondary education, students' self-confidence wanes. Our unique pedagogy embedded in a high school biology course instills the essential 21st century skills (problem solving, critical thinking and teamwork) in conjunction with self-confidence and self-efficacy that students need to take risks and succeed.

The HMS MEDscience program was started in 2008 with one Boston Public School (BPS) and has grown significantly to the current nine BPS and additional suburban schools. Our students are 54% female, 52% Black, 26% Hispanic or Latino and 18% were classified as English as a second language (ESL) learners (2015/16 data). We are tasked with inspiring the next generation of successful STEM students by engaging them in emergency medical simulations, teaching them real medical skills (intubation, IVs, and suturing), and exposing them to careers in STEM fields. Our goal is to close the achievement and inspiration gap in the BPS and encourage underrepresented students to take risks and be confident. Our student reflections and surveys indicate that we are successful in our mission, specifically in the areas of teamwork and self- confidence.

MODERATORS

Nancy Oriol, Faculty Associate Dean for Community Engagement in Medical Education, Associate Professor of Anaesthesia, Harvard Medical School

Dr. Uzo Ndukwe, Strategic Development , MEDscience Program, Harvard Medical School

SPEAKERS

Julie Joyal, Executive Director, Harvard Medical School, MEDscience Program

Colby Moore Reilly, Education Program Lead, Harvard Medical School, MEDscience Program

Invention Education and STEM: Preparing Students from Diverse Backgrounds for the Innovation Economy

Time – 10:55–11:45am
Venue – Junior Ballroom
Strand – K-12 Education

This joint presentation by the Academy of Applied Science, the Lemelson-MIT Program, and a leading invention educator addresses the urgent need for greater diversity among the ranks of leading innovators in the U.S. It will also address partnerships needed between K-12 educators, the higher education community and others to ensure that new learning opportunities are afforded to students in K-12 all along the education continuum. Participants will examine invention education as a strategy for attracting more students from underrepresented backgrounds into STEM college/career pathways. Panelists will share data from three existing programs (InvenTeams, JV InvenTeams, and the Young Inventors' Program) that support this new approach to integrating STEM, discuss free teaching resources and support available from a range of program providers across all of grades K-12, and will highlight grant opportunities available within different grade spans. Ways educators have structured invention education programs in both formal and informal settings and information about the alignment with state standards will also be shared. Presenters will discuss strategies used to create partnerships within local communities and beyond to support students' and teachers' work. An example of one teacher's journey into invention education and what it has meant for students will be explored as a telling case.

MODERATOR

Leigh Estabrooks, Invention Education Officer, Massachusetts Institute of Technology, School of Engineering, Lemelson-MIT Program

SPEAKERS

Nicole MacMillan, Director, Young Inventors' Program/Invention New England, Academy of Applied Science

Tony Perry, Invention Education Coordinator, Lemelson-MIT Program, MIT School of Engineering

Doug Scott, Technology/Engineering Subject Matter Leader for grades 6–12, Hopkinton Public Schools

AM BREAKOUT II

Mission To Mars — An Interdisciplinary Unit Using the Engineering Design Process and PBL

Time – 10:55–11:45am
Venue – Meeting Room E
Strand – K-12 Education

The specific examples and materials that will be presented were created for 10th grade students in a high school STEM program, but could easily be adapted for other age groups. The STEM EC/HS program at Marlborough High School includes two cohorts of students, one in 9th grade and one in 10th grade. These students complete semester long projects using the Engineering Design Process and Project-based learning. We will be presenting the 10th grade, second semester project, Mission to Mars. Students are placed in groups of four and take on the roles of CEO, Chief Engineer, Director of Business Development and Director of Community Development. They form space exploration companies, including names and logos to complete the project. Their challenge is to design four prototypes. Companies create marketing materials and a trade show booth for our STEM Expo. Industry professionals from the Marlborough area come to the June Expo and act as NASA representatives to choose the top company to support NASA's mission to Mars.

Participants in this workshop will be able to facilitate this project-based unit, using the EDP in a high school classroom. They will receive materials for planning, organizing, pacing and grading a project-based unit. They will be able to explain the steps of the Engineering Design Process with an example of an actual prototype and describe the contributions from history, ELA, math, science and engineering to this process. They will also get to design one component of the project to model the student experience.

MODERATORS

Megan Fenneuff, Math Teacher, Marlborough High School

Paul Duplessis, Engineering Teacher, Marlborough High School

SPEAKERS

Stephanie Gill, Biology Teacher, Marlborough High School

Lindsay Shomphe, English Teacher, Marlborough High School

Modest Funding with Big STEM Impacts: 5-Year District Partnership Increases Enriched STEM Learning

Time – 10:55–11:45am
Venue – Meeting Room C
Strand – K-12 Education

A strong multiyear partnership is inspiring student STEM learning and teacher effectiveness in two high-needs urban districts in Massachusetts: Lowell and Worcester. In Lowell for six years, this partnership is rooted in the district's vision and strategic plan for STEM, and partners participate in district-wide STEM planning meetings.

Hear from district leaders and STEM coordinators about how the partnership works, data on why it has been successful in impacting student learning and school culture, and what new challenges it addresses.

Three key areas of the partnership are funded by MSSEF's Curious Minds Initiative (http://scifair.com/curious-minds) and leverage each other's impact: (1) STEM teacher professional development; (2) mini-grants for schools to expand student research opportunities and build a science fair program; and (3) mentoring for students working on STEM innovation projects. In Lowell, mentoring became the focus of the district's weekly afterschool STEM Club, and student participation grew rapidly by word-of-mouth — from a few students to over 250 who opt to stay after school over four months. A STEM Facilitator recruits and coordinates mentors (STEM professionals and college majors) and is a resource to participating STEM teachers. All eight middle schools opted in, and the district now funds their teachers' stipends. Total costs for the ramped-up program are remarkably low, ~$130/student/year, including student materials, teacher PD and stipends, and showcase events.

This partnership model was designed from the start to be adapted by other districts. Please join us for discussion of successes and challenges, and learn how your school(s) can benefit.

MODERATOR

Barnas G. Monteith, President, Tumblehome Learning

SPEAKERS

Kathy Berube, K-12 Science & Engineering Liaison, Worcester Public Schools

Martha Cohn, STEM Coordinator, Lowell Public Schools

William F. Rigney, STEM Educational Consultant

Maureen Binienda, Superintendent, Worcester Public Schools

Teach Students to Ask Their Own STEM Questions: Introduction to the Question Formulation Technique

Time – 10:55–11:45am
Venue – Grand Ballroom North
Strand – K-12 Education

A good question can spark curiosity and fuel creativity, understanding, and innovation. We know from research and from educators across the country that question-formulation is an increasingly vital skill for critical thinking, media literacy, and civic engagement in the 21st century. And as a part of many new standards, including the Next Generation Science Standards (NGSS), students are expected to formulate, explore, and use their own questions. Yet, it is rare that the skill of question formulation is deliberately taught to students. How can we transform teaching and learning and build the capacity for *all* students to take greater ownership of their learning and develop higher order thinking skills through question-asking?

Learn the Question Formulation Technique (QFT), a simple yet powerful step-by-step strategy to teach students how to ask, improve, and use their own questions. On their own initiative and without any mandate, more than 250,000 educators in diverse pre-k through higher education settings worldwide are now using the QFT simply because it helps their students become more curious and fully engaged learners.

Participants will experience the QFT themselves, see examples of how the QFT is used in science classrooms, explore how the QFT address the NGSS, and learn more about how the QFT benefits student learning. Participants will identify ways they can implement the QFT immediately to teach their students how to ask their own questions that will ignite their own STEM curiosity and investigation.

SPEAKERS

Sarah Westbrook, Director of Professional Learning, The Right Question Institute

Dan Rothstein, Co-Director, The Right Question Institute

Nicole Bolduc, 7th Grade Science Teacher, Ellington Public Schools, Ellington, CT

Work in Progress: How Business Leaders are Helping Close the Skills Gap

Time – 10:55–11:45am
Venue – Meeting Room D
Strand – Workforce and Business

According to a survey of Massachusetts employers, 75% report difficulty filling open positions. A recent report by the national Business Roundtable (BRT) confirms this is a problem nationally as well, finding that the nation's economic growth "is hindered because the skills of today's workers have not kept up with the requirements of current and future jobs." Both the BRT report and one by the Massachusetts Business Roundtable highlight unique partnerships between business and education to address this issue, and call on business to seek strong partnerships with education at all levels to develop scalable solutions. Keynoted by the Chair of the Massachusetts Business Roundtable, this session will explore various types of skills gaps, their genesis, and what business leaders are doing to address them.

MODERATOR

JD Chesloff
Executive Director, Massachusetts Business Roundtable

SPEAKERS

Anthony Consigli, CEO, Consigli Construction

Beth Phalen, President and General Manager, Data Protection Division, Dell EMC

Marcy Reed, Chief of Business Operations, National Grid

Kelli Wells, Executive Director of Education and Skills, GE Foundation

Jay Benson, Lexington Manufacturing Site Lead, Shire Pharmaceuticals

Breakout Sessions – PM Breakout I

Beyond Counting and Naming Shapes: Math All Day for Under 5s

Time – 1:45–2:35pm
Venue – Grand Ballroom Center
Strand – Early Education

In this active, hands-on session, participants will learn playful and impactful ways to support young children's understanding of spatial relationships, patterns, measurement, quantities, and everyday math vocabulary. These mathematical areas are often given less emphasis in early childhood programs, yet, according to a burgeoning body of research, preschool skills in these areas are highly predictive of later school success.

During the session, participants will:

- Become familiar with several interdisciplinary math activities for young children in these critical math areas;
- Deepen understanding of children's mathematical development in these areas;
- Learn and practice ways to talk with children about math so as to engage them in exploring, noticing, showing, and explaining, and to ensure that they develop comfort and confidence in math;
- Learn and practice ways to read aloud storybooks while emphasizing math concepts;
- Understand how these activities set children on the trajectory of the MA Curriculum Framework for Mathematics for PK.

The session draws on methods and materials from a research-based English/Spanish math program developed collaboratively by YMCA Early Learning Readiness (in MA, CA, and NJ) and TERC, a STEM education non-profit in Cambridge, MA. External evaluation demonstrates that this program succeeds in deepening mathematical impact of community-based preschool programs, including engaging children in mathematical thinking and reasoning and supporting educators and caregivers who are initially uncomfortable with math.

This session is intended for early childhood educators and for pre- and in-service early childhood educators. Participants who are parents or grandparents of young children are also welcome.

SPEAKERS

Marlene Kliman, Senior Scientist, TERC

Audrey Martinez-Gudapakkam, Research Associate, TERC

Cross-grade Partnerships in STEM: Fostering Community Connection and Deeper Conceptual Understanding

Time – 1:45–2:35pm
Venue – Grand Ballroom South
Strand – K-12 Education

Come join Belchertown Public School teachers, in our 7th year of cross-grade partnerships, as we present multiple examples of successful activities partnering high school with elementary school students. Since winning the Toyota Tapestry grant in 2011, the BEST (Belchertown Environment, Science and Technology) effort has grown to include a monthly after school program, Ecomentors, as well as cross-grade garden-based activities, and the wildly successful 2nd Grade Lake Wallace field trip, in which the BHS Ecology students run interdisciplinary, multimodality stations for the entire 2nd grade, all within walking distance of the schools. Engage in a discussion of the potential for participating in Schoolyard Ecology projects through Harvard Forest's LTER K-12 Education program. Get introduced to the dual garden lessons, Let Them Eat Kale and It Takes a Village to Raise a Meal. Consider the potential of cross-grade partnerships for engaging your reluctant learners, showing them how fulfilling it can be to step out of your comfort zone to do something great for your community. We'll also share some of the positive press these activities have garnered, and how we have used this as leverage to help our administrators more fully support constructivist, whole-child STEM learning. Share your vision with us and we'll work through a brainstorming session to help you implement cross-grade partnerships within your own school/system.

SPEAKERS

Louise H. Levy, Science Teacher, Belchertown High School

Darryl Clark, Grade 2 Teacher, Swift River Elementary School

David Monroe, Science ILT Leader/Teacher, Belchertown High School

Developing and Maintaining Business & Education Partnerships — Regionally and Locally

Time – 1:45–2:35pm
Venue – Meeting Room C
Strand – Workforce and Business

Panelists represent business and educators, early childhood through adulthood. Panelists will demonstrate how they partner with businesses, educators, and community organizations to advance STEM education and support workforce development efforts.

Panelists will provide information on strategies that focus on ensuring all students are STEM-literate and educational opportunities are available to those students who are interested in pursuing rigorous STEM studies and careers in STEM fields.

Attendees will take away materials to be used to develop and enhance partnerships on a regional and/or local level:

- Regional and local strategies on developing and maintaining relationships that can be replicated.
- Evaluation summaries that illustrate the benefits of partnerships to business, educators, and students.
- Information on the type of involvement of over 300 organizations since 2011 with the SE MA STEM Network including and business and educator alignment meetings, STEM Resource Fairs, educational programs, and events for STEM stakeholders.
- Information on local initiatives including community team development, community events for students and parents, and work-based learning for educators and students.
- Examples of the benefits of partnerships to business, educators, and students.

Attendees will identify the strategies presented that would be most helpful to them and share what they plan to do during the report out and if they plan to share what they have accomplished at a meeting in 2018 "Business & Education Partnerships — preparing students for success in the workplace" that will be held at AccuRounds in March 2018.

MODERATOR

Michael Tamasi, President & CEO, AccuRounds and SE MA STEM Network Advisory Board Member

SPEAKERS

Teresa Murphy, Superintendent, Mansfield Public Schools and SE MA STEM Network Advisory Board Member

Debra Garvin, Education Coordinator, Early Childhood and School Age Programs, Robbins Children's Program and SE MA STEM Network Advisory Board Member

Rodney Clark, Dean, Attleboro Campus, Bristol Community College

GPSTEM: Increasing STEM Credentials at Community Colleges

Time – 1:45–2:35pm
Venue – Conference Room 210
Strand – Higher Education

This session will provide an overview of the TAACCCT IV GPSTEM grant and its implementation at the 15 community colleges. The Complete College America Guided Pathways approach will be outlined, and representatives from Mass Bay and Middlesex Community College will deliver presentations on the successes experienced at their institutions as a result of the grant.

SPEAKERS

Emily Chambers, Assistant Director, GPSTEM, Massasoit Community College/GPSTEM Grant

Philip Sisson, Provost and VIP of Academic and Student Affairs, Middlesex Community College

Phara Boyer, Navigator, Mass Bay Community College

MA PKAL Regional Network: Promoting Professional Development, Networking, and Workforce Readiness

Time – 1:45–2:35pm
Venue – Meeting Room E
Strand – Higher Education

The goal of this session is to introduce and invite participation in the Project Kaleidoscope (PKAL) Massachusetts Regional Network by STEM faculty, staff and administrators at higher education institutions, and STEM industry representatives. During this session, members of the MA PKAL Regional Network will give the audience an introduction to the National PKAL Network and discuss the mission, vision, and goals of the Massachusetts Network to (1) increase STEM student success, persistence, and retention, (2) provide professional development and leadership development opportunities, (3) promote workforce readiness, and (4) disseminate resources. The panel will discuss progress toward the goals including background on past biannual Massachusetts network meetings in which STEM faculty from multiple institutions from across the state have shared best practices in higher education. After introducing the network, round table discussions will catalyze discussions between participants on how they and their institutions could benefit from participation in the network and how the network can best serve the needs their institutions. The panel is particularly interested in ideas and partnerships that address goals towards which the network has not made progress; ideas for topics and speakers for future regional meetings are of particular interest to the network steering committee. Finally, this will provide an excellent opportunity for institutions not currently involved in the network to attend these meetings and participate in the network.

PM BREAKOUT I

MODERATOR

Robin White, Assistant Professor of Biology, Westfield State University

SPEAKERS

Lorrie Comeford, Professor of Chemistry, Salem State University

Ann Billetz, Associate Professor of Biology, Massachusetts College of Liberal Arts

Catherine Dignam, Associate Professor of Chemistry and Food Science, Framingham State University

Paving the STEM Pathway for At-Risk Students

Time – 1:45–2:35pm
Venue – Grand Ballroom North
Strand – K-12 Education

With the increase of students with exceptionalities receiving services in the inclusive setting, the establishment of effective partnerships between general education teachers and special education teachers are not only necessary but are required. This in turn provides the perfect atmosphere for all students to learn and succeed. In addition to effective collaborative partnerships, the consistent use of evidence-based teaching practices is critical to the success of students with disabilities. A critical component of the Individuals with Disabilities Education Improvement Act (2004) as well as No Child Left Behind, is the emphasis on the use of research-based or evidence-based instructional practices. Evidence-based practices are instructional strategies that have been proven effective through extensive and methodologically sound research studies. Implementing evidence-based practices have been shown to decrease the achievement gap for students with disabilities, as well as at-risk students. Special needs and at-risk students often struggle more in the content areas commonly associated with STEM. This presentation will focus on evidence-based instructional practices that have been found to improve educational outcomes in the STEM content areas, with the goal of opening up the future occupations to student populations that have historically been under-represented and educationally unprepared.

According to Maheady, Rafferty, Patti, and Budin (2016), the concept of evidence-based practices is one of the most critical pieces of current educational reform. Federal mandates require that both content area teachers and special education teachers are highly qualified, asserting that they understand evidence-based educational practices, and that they continually identify and implement these practices in their classrooms. Research strongly supports that implementation of evidence-based educational practices work to close the achievement gap by optimizing student outcomes in all areas but most especially in STEM courses (Cook, Tankersley, Cook, and Landrum, 2008; Scheeler, Budin, and Markelz, 2016).

SPEAKERS

Nicholas D. Young, Superintendent of Schools, South Hadley Public Schools

Kristen Bonanno-Sotiropoulos, Assistant Professor of Special Education, Springfield College

Sanofi Genzyme and Oracle Partnerships with the University of Massachusetts Boston

Time – 1:45–2:35pm
Venue – Meeting Room A
Strand – Workforce and Business

This session synthesizes the successful partnership between UMass Boston's College of Science and Mathematics and the Sanofi Genzyme and Oracle Corporations. Contributions of $1.5M over 5 years have been made for student support and research programs. Funding inspired an integrated set of education and social development activities that enhanced academic confidence and student social capital for persistence and graduation with STEM degrees. This relationship supported a deep engagement that contributed to increasing the overall CSM 6-year graduation rates which are now tracking at 60%, exceeding both overall national STEM and the university's 6-year graduation rates, and approximately doubled the 6-year graduation rate compared to when CSM started a new Student Success Program.

Speakers will detail the engagement processes that led university and corporate representatives to develop mutual value propositions for students, stockholders, and the Commonwealth of Massachusetts. The partnership depended on effective communication (both interpersonal and media-based), the development of metrics to measure impact, and commitment by both the industry and education leaders within the college. The panelists will discuss their perspectives on those dynamics as well as the importance of gathering and reporting data relevant to program objectives and the resultant analysis of risks and benefits. Panelists will highlight the development of the partnership and the critical contributions from the Dean and senior level corporate champions. Finally, the panelists will share additional insights on relationship building versus transactional strategies for attaining extramural funding for innovative student success programs and STEM workforce development activities.

MODERATOR

Marshall Milner, Executive Director Science Training Programs, UMass Boston — College of Science and Mathematics

SPEAKERS

Felecia Edwards, Director of the CSM Student Success Center, UMass Boston — College of Science and Mathematics

TBD, Sanofi Genzyme Corporation

TBD, Oracle Corporation

School-wide STEM Day: A Recipe for Success

Time – 1:45–2:35pm
Venue – Junior Ballroom
Strand – K-12 Education

What can be done to excite students and teachers about STEM education? How to bridge the gap between school and out-of-school experience? A school-wide STEM day that engages students, teachers, and community members to solve authentic problems could be the solution.

This interactive session will walk participants along the schedule of a successful, best-practice and standards-based middle school STEM day from the first planning meeting to the closing assembly. The presenters include the principal of the school who led the planning committee, the 8th grade science teacher who led the implementation of the day, a member of the STEM Education Center who helped with the framework of the day as well as reaching out to community members, and a student who was engaged in her project long after the STEM day concluded.

A video will highlight parts of the day, and participants will be provided with a template to plan and draft their own STEM day.

SPEAKERS

Sharon Hobbs, Middle School Principal, Lincoln Public Schools

Julie Reynolds, 8th grade Science Teacher, Lincoln Public Schools

Mia Dubosarsky, Director of Professional Development, The STEM Education Center at WPI

Phoebe Ryan, 6th Grade Student, Lincoln Public Schools

STEM and the Workforce: Preparation During the Early Years

Time – 1:45–2:35pm
Venue – Meeting Room D
Strand – K-12 Education

A group of Massachusetts STEM industry veterans including JD Chesloff (Executive Director of the Massachusetts Business Roundtable) and Brian Cali (Senior Vice President, Ironwood Pharmaceuticals) will host a panel on how to fill the STEM workforce with talented, competent individuals by employing best practices in the classroom to increase student interest and literacy in STEM in the 4th–8th grade range. They will explain the importance of STEM training and preparation during these critical years, using the unique approach of STEM enrichment non-profit Science from Scientists (SfS) and home robotics company iRobot as models. SfS sends the same two real, charismatic scientists into 4th–8th grade classrooms, during school, every other week for the entire academic year to teach hands-on, engaging STEM lessons aligned with the Next Generation Science Standards (NGSS) and Massachusetts Comprehensive Assessment System (MCAS) frameworks. iRobot's national STEM outreach program focuses on encouraging students K-16 to enter and remain in STEM fields by providing real life examples of robotics for students, teachers and educational groups.

SPEAKERS

JD Chesloff, Executive Director, Massachusetts Business Roundtable

Lisa Freed, STEM Program Manager, iRobot

Brian Cali, Senior Vice President, Ironwood Pharmaceuticals

Isa Kaftal Zimmerman, Principal, IKZ Advisors

Tiny House: Three Public High School Multidisciplinary STEM Classes – Architecture, Engineering, & Build

Time – 1:45–2:35pm
Venue – Meeting Room B
Strand – K-12 Education

Learn about Marblehead High School's only cross-curricular suite of three STEAM classes based on the Tiny House movement and how teachers partnered with community groups & members of the community to offer & refine such a complex project in a public school.

SPEAKERS

Mike Agosti, Teacher – Wood Shop, Robotics & Engineering, Marblehead High School

Cathy Landergan, Teacher – CAD & Architecture, Marblehead High School

Ryan Forcier, Teacher – Physics & Engineering, Marblehead High School

Breakout Sessions – PM Breakout II

Building a Coherent University-School District-Industry Partnership to Scaffold STEM Learning

Time – 2:55–3:45pm
Venue – Meeting Room D
Strand – K-12 Education

In this session we will describe the Waltham STEM Collaboratory (WSC). The WSC is focused on building and sustaining a longitudinal and district wide STEM program for middle school students. The WSC consists of (1) Waltham Public Schools, (2) Faculty from the Lynch School of Education (Drs. Barnett, Kim,, and Zhang), (3) the Lemelson-MIT invent program (http://lemelson.mit.edu/jv-inventeams), and the (4) Massachusetts Technology Leadership Council (MassTLC: http://www.masstlc.org/). We will discuss how the collaborative work directly addresses the strategic priorities for Waltham Public Schools (WPS) in STEM education. Specifically, how the work is enabling WPS to create transformative STEM experiences for all middle-school aged youth. A special focus is on youth from under-represented populations in STEM to not only participate in rich STEM experiences to but also to engage in experiences that build on their interests, prepare them for high school, and enable youth pursue STEM fields in the future.

MODERATOR

Mike Barnett, Professor of Science Education, Boston College

SPEAKERS

Stephanie Couch, Executive Director, Lemelson-MIT Program, MIT School of Engineering

David Jackson, After-School STEM Coordinator, Waltham Public Schools; Graduate Student, Boston College

Heather Metallides, Science Director, Waltham Public Schools

Helen Zhang, Research Professor, Boston College

College to Career Pathways: A New Online Tool for Adult Learners Returning to Education

Time – 2:55–3:45pm
Venue – Meeting Room B
Strand – Workforce and Business

In 2014, the 15 Massachusetts community colleges received $5 million from the U.S. Department of Labor to create an online tool for people to research high-demand, high-paying occupations, and to connect to community college programs that prepare them for their career goals. The GPSTEM Student Pathways Application will soon be launching in beta, for use by the public, and at career centers and colleges. Come see this powerful new tool in action and learn how it will enable job seekers to get on the path to higher education and rewarding STEM careers. Behind the scenes, the data project will enable researchers to explore skills gaps by regions and track employment outcomes for program completers. These tools will help community colleges align programs with workforce demands, and will support the regional planning efforts under WIOA.

MODERATOR

Kathleen M. Kirby, GPSTEM Statewide Project Director, Massasoit Community College

SPEAKERS

Gregory Bunn, Assistant Secretary for Policy and Planning, Executive Office of Labor and Workforce Development

David Leavitt, Executive Director of Institutional Research, Bunker Hill Community College

Engineering in the Out-of-School-Time Setting

Time – 2:55–3:45pm
Venue – Grand Ballroom Center
Strand – K-12 Education

This session is designed for educators working with K-8 students in afterschool or camp settings and will explore the benefits of introducing STEM experiences into the out-of-school-time (OST) setting. Collaborating to expand access to STEM opportunities, the Museum of Science, Boston and the Massachusetts Afterschool Partnership (MAP) will discuss the many benefits of including engineering challenges in afterschool programs.

In this session, participants will experience a condensed version of the free-to-download OST curriculum developed by the Museum of Science, Boston. Participating in this engineering activity as a learner and reflecting as an educator will help participants contextualize the problem-solving, collaborating, and communication skills students develop in quality STEM activities. Participants will gain comfort and confidence about knowing what to expect and how to facilitate engineering activities in their own programs, and learn how to access free-to-download curricula resources for K-8 OST settings.

SPEAKERS

Shannon McManus, Professional Development Manager, Engineering is Elementary, Museum of Science

Ardith Wieworka, CEO, Massachusetts Afterschool Partnership

Evaluation of a Global Initiative to Teach Engineering and Global Competency to Middle Schoolers

Time – 2:55–3:45pm
Venue – Meeting Room A
Strand – K-12 Education

This presentation will discuss the evaluation of a global program that integrates engineering with global competencies and works with thousands of middle school students and educators across the globe. The evaluation included data from several hundred students in five countries including the U.S., Jordan, South Africa, Vietnam, and Malawi. To date, evaluation findings indicate that the program was successful at achieving many of its intended impacts on children and educators. This presentation will provide researchers, evaluators, and practitioners with an introduction to the global engineering program; a description of the evaluation design and instruments; a description of the evaluation participants; findings related to intended impacts; a summary of the challenges faced in the study and lessons learned; factors to consider when planning similar evaluations; and factors to consider when implementing similar programs.

SPEAKER

Christine Paulsen, President, Concord Evaluation Group

Exploring General Education Foundations for STEM Transfer Students

Time – 2:55–3:45pm
Venue – Conference Room 210
Strand – Higher Education

One of the Department of Higher Education's (DHE) priorities is to develop a seamless transfer system for students. In September 2016, the DHE launched the new MassTransfer website that features its MassTransfer A2B Pathways, Commonwealth Commitment and Course Equivalency Database. The DHE, in collaboration with the community colleges, state universities, and University of Massachusetts campuses, began exploring the potential of building an alternative to the current Gen Ed Foundation that would allow STEM students to take the foundational courses related to their major prior to transfer. The STEM Gen Ed Foundation removes barriers to on-time completion for STEM students who intend to earn baccalaureate degrees and better supports them to take full advantage of the high-quality, affordable education provided at one of our 15 community colleges.

MODERATOR

Allison Little, Executive Director, STEM, Massachusetts Department of Higher Education

SPEAKERS

Elena Quiroz-Livanis, Director of Academic Policy and Student Success, Massachusetts Department of Higher Education

Charles Kaminski, Dean of Business, Science, Mathematics & Technology, Berkshire Community College

Margaret Caroll, Dean of Science, Technology, Engineering, and STEM, Framingham State University

Integrating the Question Formulation Technique into Your Work with STEM Students

Time – 2:55–3:45pm
Venue – Grand Ballroom North
Strand – K-12 Education

A question is a propulsive agent that can spark curiosity and fuel creativity, understanding, and imagination. We know from educators across the country that question-formulation is an increasingly vital skill for critical thinking, research and innovation, and civic engagement in the 21st century. And as a part of the Next Generation Science Standards (NGSS), students are expected to formulate and explore their own questions. Yet, it is rare that the skill of question formulation is deliberately taught to students. How can we transform teaching and learning and build the capacity for all students to acquire sophisticated higher order thinking skills through question-asking?

This session builds on the introductory session offered earlier in the day. Attendees will dive deeper into the planning, lesson design, and facilitation of the Question Formulation Technique (QFT), a simple, yet powerful step-by-step process which teaches students how to ask, improve, and use their own questions. On their own initiative and without any mandate, more than 250,000 educators in diverse pre-K through higher education settings worldwide are now using the QFT simply because it helps their students become more curious and fully engaged learners.

In this hands-on, active learning experience, participants will leave with a deep understanding of the strategy, tools for best practices in planning, design, and facilitation, and the ability to immediately apply the QFT with students and share it with colleagues in K-12 STEM classrooms of any level. Work with a range of planning tools and classroom resources and have opportunities to receive feedback.

SPEAKERS

Sarah Westbrook, Director of Professional Learning, The Right Question Institute

Dan Rothstein, Co-Director, The Right Question Institute

Nicole Bolduc, 7th Grade Science Teacher, Ellington Public Schools, Ellington, CT

Novel Engineering: An Integrated Approach to Engineering and Literacy

Time – 2:55–3:45pm
Venue – Meeting Room C
Strand – K-12 Education

Novel Engineering, an NSF-funded project at the Tufts Center for Engineering Education and Outreach, is engaging 1st–8th grade students and educators in engineering by using books as a context for client-centered, open-ended design challenges. In this hands-on workshop, participants will be introduced to the Novel Engineering approach. They will watch video of students doing Novel Engineering, engage in a conceptual planning activity, and look at examples of Novel Engineering in the classroom and think about places Novel Engineering could support their own work with students.

This session will begin with an overview of Novel Engineering that will include examples of books and projects that have been done in K-8 classrooms. We will engage in a planning activity around *A Long Walk to Water*, which contains a realistic fiction account of Nya, and chronicles her life in Southern Sudan and her daily trek to get water for her family. After this experience, participants will brainstorm ways that Novel Engineering could be included in their own classrooms. The final portion of the session will include watching videos of students engaging in Novel Engineering activities in classrooms and discussing engineering moments in the videos as well as ways in which Novel Engineering inspires deeper learning in classrooms. The overall goal is to help educators recognize the beginning of engineering in students in an interdisciplinary activity and gain an understanding of the basics of the Novel Engineering approach.

SPEAKER

Elissa Milto, Director of Outreach, Tufts University Center for Engineering Education and Outreach

Seeds of STEM: Early Childhood Engineering Curriculum from Diversity and Collaboration Perspective

Time – 2:55–3:45pm
Venue – Junior Ballroom
Strand – Early Education

Seeds of STEM is a high-quality engineering curriculum that was developed to enhance preschool children's skills of problem solving. To achieve this, we developed the curriculum through the collaboration of WPI, The College of Holy Cross, and Worcester Head Start. In addition, the partnership conducted professional development workshops for all Worcester Head Start teachers that focused on the engineering design process and diversity in STEM. This presentation is intended to inform Pre-K educators, administrators, para-professionals, policy makers, and researchers who study the early learning of STEM. In our session, we will present the Seeds of STEM research based framework for high quality early childhood STEM and diversity in the classroom. We will provide examples of high quality tasks from Seeds of STEM curriculum and share results from Engineering in the classroom and Diversity training teacher workshops, teacher feedback forms, and video observations of applied learning.

SPEAKERS

Melissa-Sue John, Co-PI, Seeds of STEM, Worcester Polytechnic Institute

Susmitha Wunnava, Graduate Student, Worcester Polytechnic Institute

So Much More Than Counting: Talking with Young Children About Mathematical Concepts

Time – 2:55–3:45pm
Venue – Meeting Room E
Strand – Early Education

In this interactive workshop, we will share videos created by preschool teachers in Chelsea Achieve in Mathematics (CAM). The short videos show preschool children engaged in higher order thinking about mathematical concepts, including dual language learners and children with disabilities. Following each video, the participants will discuss with peers how the teachers created the opportunity for the higher order thinking, how the children reacted, and how these activities link with the *Mass Curriculum Frameworks for Mathematics,* and the *Guidelines for Preschool Learning Experiences*. Following each video discussion, the facilitators will summarize with the developmental level of the children in relationship to learning trajectories. At the conclusion of the session, individuals will reflect on how to use the reflection process in their own practice with preschool children or preschool teachers.

MODERATOR

Mary Lu Love, Senior Early Childhood Specialist, University of Massachusetts Boston

SPEAKERS

Kristen Kent, Early Childhood Curriculum Coach, Chelsea Public Schools

Jennifer Kearns-Fox, Early Childhood Specialist, University of Massachusetts Boston

The daVinci Program: Building a STEAM Learning Community

Time – 2:55–3:45pm
Venue – Grand Ballroom South
Strand – K-12 Education

Welcome to Newton South High School's STEAM program, daVinci. Our students apply cross discipline ideas to solve real world problems and collaborate with each other, learning how to work together to build a strong supportive community. We would like to share our journey, struggles, and success in building a STEAM program and classroom environment. Please join us in learning about secondary STEAM education in action while getting a chance to apply these ideas of multi-content integration, exploratory learning, collaboration and problem based discovery to your own classroom, lessons, and school.

SPEAKERS

Amy Richard, Biochemistry Teacher, Newton South High School

Molly Baring-Gould, Art Teacher, Newton South High School

Divya Shannon, Mathematics Teacher, Newton South High School

Exhibits

Full exhibit descriptions are available online at: www.mass-stem-summit.org

A MA STEM Regional Networks

B **Sponsor:** Massachusetts Business Roundtable

C **Sponsor:** Biogen

D **Sponsor:** BNY Mellon

E **Sponsor:** Mass Life Sciences Center

F **Sponsor:** National Grid

G **Sponsor:** Vertex

H **Sponsor:** Discover Central Mass

I **Information**

J **Sponsor:** UMass Donahue Institute

K **Sponsor:** UMass Amherst

L **Sponsor:** UMass Boston

M **Sponsor:** UMass Dartmouth

N **Sponsor:** UMass Lowell

O **Handouts**

P **Title:** NASA Epic Challenge High School Project — Solar Oven Tracking System (SOTS-1)

Organization: Northbridge High School

Strand: K-12 Education

Overview: Several Northbridge High School Seniors will present their Solar Oven Tracking System they call SOTS-1 which was developed as part of the NASA Epic Challenge program to support a sustainable human colony on Mars. This is the culmination of a three-year project.

Q **Sponsor:** Massachusetts Commission for the Blind

R **Title:** The Discovery Museums' Traveling Science Workshops

Organization: The Discovery Museums

Strand: K-12 Education

Overview: A variety of hands-on STEM activities from Magnetism to Sound to Physical Changes of Matter that not only represent the depth and breadth of what The Discovery Museums' Traveling Science Workshops offer students and teachers PreK-8th grade, but also provides ideas for simple and affordable ways to bring physical science concepts to life in the classroom.

S **Title:** Introduction to New England FIRST and ingenuityNE, Inc.

Organization: FIRST New England

Strand: K-12 Education

Overview: Representatives of our programs will answer questions concerning how your organization can be involved in the FIRST Mission. Students will display the results of their teams' work over past seasons.

1–4 **Sponsor:** WGBH

Booth in Exhibit Hall

Exhibits in the Lobby

EXHIBITS

5

Title: NOVA Education

Organization: WGBH (NOVA)

Strand: K-12 Education

Overview: NOVA Education extends NOVA's award-winning science journalism into classrooms, with an extensive list of digital resources (videos, games, lesson plans, and more) designed for engaging STEM education in the 21st century.

6

Title: Beyond Benign: Green Chemistry Education for a Sustainable Future

Organization: Beyond Benign

Strand: K-12 Education

Overview: Sustainability and pollution prevention can be taught from elementary school through undergraduate courses. By teaching green chemistry principles and practices at all grade levels, educators can inspire the next generation of problem solvers while teaching core science concepts. Beyond Benign provides educators with the tools, training and support to make green chemistry an integral part of science education.

7A **Sponsor:** Siemens

7B **Sponsor:** TERC

8A **Sponsor:** Massachusetts Technology Collaborative

8B **Sponsor:** Massachusetts Department of Early Education & Care

9

Title: MazeFire Games for Life and Physical Sciences: Reflective Learning Meets Neural Network Theory

Organization: MazeFire LLC / Northeastern University

Strand: Higher Education

Overview: MazeFire games delight students and empower professors. How these reflective learning experiences engage neocortical information nodes will be presented along with the goal of encouraging such activities throughout STEM education. The exhibit will feature fun aspects of the Maze Environment and its application to biology, chemistry, physiology, neurobiology and microbiology.

10

Title: Next Generation Science and Technology/ Engineering MCAS

Organization: MA Department of Elementary and Secondary Education

Strand: K-12 Education

Overview: The Massachusetts Department of Elementary and Secondary Education will have information available about the Next-Generation Science and Technology/Engineering (STE) MCAS tests. Come by to learn about new technology-enhanced questions and new reporting categories for the STE MCAS tests.

11

Title: Science Club for Girls: Advancing K-12 Girls' Literacy and Confidence in STEM through Mentorship

Organization: Science Club for Girls

Strand: K-12 Education

Overview: Science Club for Girls is a K-12 out-of-school time program serving girls in the Greater Boston area and Lawrence. Stop by our booth and hear how our mentoring model builds girls' STEM future.

12 **Sponsor:** Troxel Communications

13A **Sponsor:** IBM

13B **Sponsor:** Boston Business Journal

14

Title: Regional Invention Convention: Young Inventors' Program, Academy of Applied Science

Organization: Young Inventors' Program, Academy of Applied Science

Strand: K-12 Education

Overview: Young Inventors' K-12 program is a hands-on learning opportunity culminating in an innovation competition which challenges learners to think outside the box and exercise 21st Century skills. Over 70 schools in NH & MA send school Invention Convention winners to the Regional Invention Convention & National Invention Convention and Entrepreneurship Expo.

15 **Sponsor:** Museum of Science

16 **Sponsor:** Massachusetts National Guard

Booth in Exhibit Hall Exhibits in the Lobby

EXHIBITS

17 **Title:** Tufts University Animal Based Pedagogy in Engineering Education

Organization: Cummings School of Veterinary Medicine at Tufts University

Strand: K-12 Education

Overview: Animal-based curriculum provides an opportunity to engage students with science and engineering problems that are engaging and motivating. Faculty at the Cummings School of Veterinary Medicine at Tufts University have designed or adapted curricular units that can be used as tools for integrating science and engineering education within an active learning, problem-based model.

18 **Title:** STEM Enrichment by the National Inventors HoF: Pre-K-12 Programs to Inspire Curiosity and Innovation

Organization: National Inventors Hall of Fame

Strand: K-12 Education

Overview: Honor. Inspire. Challenge. The National Inventors Hall of Fame® is a non-profit that pays it forward and invests in the future of innovation and STEM through our national, pre-K-12 educational programs, Invention Playground®, Camp Invention®, Club Invention®, and Invention Project®. All of our education programs focus on creativity, innovation and real-world problem solving. For more information, call 800.968.4332 or visit **www.campinvention.org**.

19 **Title:** The Life of an Invention

Organization: Communities United Inc.

Strand: Early Education

Overview: Join us as we explore the life of the inventive process through a child's eyes. From inspiration to creation to modification to perfection!

20–21 **Title:** Independent Research Projects by Students, Exciting Showcase/Competitions & Grants for Your School

Organization: MA State Science & Engineering Fair

Strand: K-12 Education

Overview: Come meet middle and high school students eager to discuss their scientific research findings and engineering design innovations. Learn about resources and grants to help your school/district offer students the opportunity to investigate a meaningful question in depth, guided by STEM mentor — and to bring science/engineering practices into your classroom.

22 **Sponsor:** Google

23 **Title:** Creating a Green Collar Workforce through Alternative Energy Powered Urban Farming

Organization: Boston College

Strand: K-12 Education

Overview: We will be providing examples of curriculum, hydroponic systems, solar power activities, robotics and coding learning experiences. Visitors will learn how we create interdisciplinary curriculum and how to access the curriculum and other learning materials.

24A **Sponsor:** Kronos

24B **Sponsor:** Laboratory Robotics Interest Group

25 **Title:** Live Science Ideas from the Connecticut Science Center

Organization: Connecticut Science Center

Strand: K-12 Education

Overview: The Connecticut Science Center offers hands-on experiences that are not only educational but also fun. Through professional development, field trips, and Traveling Science in Motion we engage groups from K to college.

26 **Sponsor:** Quinsigamond Community College

27 **Title:** SEUSSICAL STEM — Dr. Seuss + STEM = SEUSSICAL STEM

Organization: STEM Beginnings

Strand: Early Education

Overview: Oh, the things you can think when you connect STEM learning to the literature of Dr. Seuss! Oh the places you'll go when you join us at our exhibit, as you experience more Dr. Seuss stories through a STEM lens!

28 **Title:** Six Years of Experience of Global STEM Classroom™ Programs at Dennis-Yarmouth Regional High School

Organization: Dennis-Yarmouth Regional High School

Strand: K-12 Education

Overview: This exhibit summarizes 6 years of experience of innovative, rigorous and exciting global STEM programs that focus on international collaborative STEM projects conducted in a virtual environment. In the program, DYRHS students collaborate with students in many countries as well as with national, state and local non-profit organizations, higher education institutions and government agencies.

Booth in Exhibit Hall Exhibits in the Lobby

EXHIBITS

29A **Sponsor:** IntelADAPT

29B **Sponsor:** Fitchburg State University

30 **Title:** Building STEM Partnerships: How a Common Evaluation Strategy by Communities Transforms STEM Practice

Organization: The PEAR Institute: Partnerships in Education and Resilience

Strand: K-12 Education

Overview: Use data to improve STEM programming! Discover how communities across the U.S. work together to gather evidence of STEM learning using common measurements. The PEAR Institute will introduce you to its valid data-creating tools and show how communities use data to learn from one another and continuously improve practices.

31 **Sponsor:** Raytheon

32 **Title:** Quarrybrook Experiential Education Center: Teaching and Learning Practices to Develop STEM Concepts

Organization: Northern Essex Community College, Quarrybrook

Strand: K-12 Education

Overview: This exhibit will provide information for K-12 educators interested in learning about Experiential Education to foster student learning of STEM concepts. Visitors will leave with a better understanding of the potential impact of experiential teaching and learning and concrete examples of how to do this in their own classrooms.

33 **Sponsor:** General Electric

34 **Title:** Little Miss Science™: Inspiring a Love for Science in Young Girls

Organization: Little Miss Science™

Strand: K-12 Education

Overview: Little Miss Science™, an after-school program designed to foster a passion for science in young girls, was founded by three high school sophomores. Each week, the girls conduct fun science experiments and learn about underlying scientific principles including chemical reactions, surface tension, engineering design, and energy.

35 **Title:** Project Lead The Way STEM Programs: Creating Partnerships for Massachusetts K-12 Students & Teachers

Organization: Project Lead The Way

Strand: K-12 Education

Overview: Explore PLTW's standards-based STEM programs that engage K-12 students in problem-solving and critical thinking related to Engineering, Computer Science, and Biomedical Science. Learn about the partnerships that PLTW has with WPI, AP/College Board, and Industry. View and try student activities. Learn about activities, projects, and problems-based curriculum development.

36 **Sponsor:** Worcester Polytechnic Institute

37 **Title:** Creating Outdoor STEM Spaces: A Community Comes Together

Organization: Worcester Child Development Head Start

Strand: Early Education

Overview: This exhibit will highlight the theme of this year's Summit, "Progress Through Partnership," by sharing examples of creative STEM related improvements made to an outdoor early childhood courtyard and explain how community collaboration made those improvements possible.

38 **Title:** STE Standards in the Garden: Taking Life Science, Engineering and Sustainability Learning Outdoors

Organization: Wachusett Regional School District

Strand: K-12 Education

Overview: Explore an STE aligned gardening trajectory that pairs garden tasks with grade level standards to create a vertically aligned gardening curriculum. Grade level sustainability and engineering tasks are included to further student learning and engage them in the science and engineering practices in an authentic learning environment.

39 **Title:** Innovative Partnerships: Successful STEM Professional Development for K-12 and Informal Educators

Organization: Museum Institute for Teaching Science

Strand: K-12 Education

Overview: The Museum Institute for Teaching Science (MITS Inc.) provides STEM Professional Development programs for K-12 teachers to assist schools with implementing the MA Science and Technology/ Engineering standards by developing unique and innovative collaborations for delivering both science and pedagogical professional development. Learn how these work from partners, participants and MITS staff.

Booth in Exhibit Hall Exhibits in the Lobby

EXHIBITS

40 **Title:** Inspiring Generation STEM with Texas Instruments Technology and Professional Services

Organization: Texas Instruments, Inc.

Strand: Higher Education

Overview: Learn about TI's Ten Minutes of Code, Path to STEM Projects and Science Through Engineering Design. Enter our drawing for a FREE TI-Innovator™ Hub with TI LaunchPad™.

41 **Sponsor:** Charles River Laboratories

42 **Title:** Exemplary Student Inventors from the Lemelson-MIT Program

Organization: Lemelson-MIT Program

Strand: K-12 Education

Overview: The Lemelson-MIT Program celebrates outstanding inventors and inspires young people to pursue creative lives and careers through invention. Through two grants initiatives, JV InvenTeams and InvenTeams, the Lemelson-MIT Program supports young inventors developing inventive mindsets and skills through activity-based invention units and open ended invention projects. Past grantees of both initiatives will showcase their work and demonstrate different possibilities to engage all students in inventing.

43 **Title:** Engineering Excitement for Young Investigators!

Organization: Berkshire County Head Start

Strand: Early Education

Overview: Berkshire County Head Start's Engineering Excitement for Young Investigators showcases the work of Preschool Teachers to encourage children to explore design challenges to solve real world problems proposed by teachers and of their own invention.

44 **Title:** Maps to Mazes for Preschoolers

Organization: GLCAC, Inc. Head Start

Strand: Early Education

Overview: GLCAC, Inc. Head Start, located in Lawrence and Methuen, MA, exhibits their MAPS to MAZES study. Preschool children applied principles of engineering design and spatial thinking skills to investigate their natural environment, location, place and space, and to the creation of maps and mazes.

45 **Title:** 3D Technology in Education

Organization: 3D Educational Services, Inc

Strand: K-12 Education

Overview: 3D Educational Services, Inc will demonstrate how 3D technology and spatial intelligence can be adopted in K-12 classroom.

46 **Title:** iCREAT (introduction to Coding, Robotics, Electronics And Technology) a pathway to STEM careers.

Organization: MassBay Community College

Strand: K-12 Education

Overview: iCREAT program is a collaboration with Boston College and other partners to prepare high school and college students for STEM careers. We offer two multidisciplinary project-based courses to teach electronics, coding, and engineering design, networking, and cybersecurity topics that will help students toward a technical career pathway.

47 **Title:** OCcreates — Skills in Action

Organization: Old Colony RVTHS

Strand: K-12 Education

Overview: OCcreates — Vocational students from various disciplines collaborate to design and build a product in response to a small business need.

48 **Title:** Integrating 3D Printing with Augmented and Virtual Reality

Organization: Mashpee Middle-High School

Strand: K-12 Education

Overview: Mashpee Middle-High School students will lead attendees through hands-on interactive demonstrations of their 3D printed models and AR and VR scenes. This will include the use of IPad tablets, laptop computers and Oculus 3D goggles.

49 **Title:** Woodrow Wilson Academy of Teaching & Learning: Designing a Teacher Ed Program for the 21st Century

Organization: Woodrow Wilson Academy

Strand: Higher Education

Overview: Woodrow Wilson Academy staff and MIT colleagues are designing curriculum and assessments for an innovative STEM teacher education program. We are engaging students and teachers in our design process and in testing our prototypes. Visitors to the exhibit can learn more about the design process for the Academy, experience early versions of our games, and offer input to help shape this cutting-edge program to prepare STEM teachers.

Booth in Exhibit Hall Exhibits in the Lobby

EXHIBITS

50 **Sponsor:** EDC

51 **Title:** STEM: It's in Our Nature

Organization: Mass Audubon

Strand: K-12 Education

Overview: Mass Audubon's "STEM: It's in Our Nature" exhibit demonstrates that opportunities for engaging students in STEM surrounds us in our natural environment. We will share resources, curriculum, and take-aways that illustrate how teachers and community-based educators create opportunities for STEM teaching and learning in their schoolyards, neighborhoods, and community.

52 **Sponsor:** iRobot

53 **Title:** MySTEM - Mentoring Youth for STEM Success

Organization: Big Brothers Big Sisters Central MA / Metrowest

Strand: K-12 Education

Overview: MySTEM provides mentors and youth in Big Brothers Big Sisters with opportunities to engage in STEM, leading to better STEM-esteem. We will discuss mentoring best practices, partnering opportunities, and STEM activities.

54 **Title:** Mass Save Energy Education Programs

Organization: Mass Save Energy Education Working Group

Strand: K-12 Education

Overview: Mass Save State-wide Energy Education Programs — Visit our interactive exhibit to see what materials are available to help you teach energy science free of charge to your school.

55 **Sponsor:** Microsoft

56 **Title:** Coding in Elementary Schools, K-6

Organization: Pentucket Regional School District

Strand: K-12 Education

Overview: This Coding exhibit is a hands-on exhibit where visitors can learn about and try out five different robots, the Terrapin Logo programming language, and HyperDuino shield. Students and educators familiar with the hardware and software will share coding experiences and answer questions.

57 **Title:** Merrimack College Partnering for STEM Success: Teaming Up Across Departments, Levels, Districts, and Local Urban Communities to Support STEM Efforts

Organization: Merrimack College, Department of Civil Engineering

Overview: Merrimack College's student-centered approach to higher-ed retention is an integrated support network increasing college students' and younger urban students' self-efficacy, sense of belonging, and belief in their contributions to society. Come learn and share your methods of retention and improving outcomes, as well as linkages between K-12 and workforce.

58 **Title:** Partnering to Teach Robotics, Engineering & Computer Science

Organization: Bancroft School

Strand: K-12 Education

Overview: What do you get when you combine a Computer Science teacher and an Engineer? In the case of a course taught at Bancroft School and mentored by Technocopia you get a robotic bulldog. Learn how to use BowlerStudio, an integrated development environment for robotics, in middle and high school classrooms.

59 **Title:** The BSCES Public Awareness and Outreach Program

Organization: Boston Society of Civil Engineers

Strand: K-12 Education

Overview: Discuss and get hands-on with BSCES activities including the Model Bridge Contest and the Future City competition. Our volunteer organization of Civil Engineers brings meaning to STEM subjects, introduces students to a whole world of careers, and generally brings appreciation for our built and natural environments, all at no cost to schools.

60 **Title:** STEM Courses for Teachers: Research-Based Program Options for Teachers

Organization: Tufts University

Strand: K-12 Education

Overview: This exhibit will showcase the work of three certificate programs at Tufts University that provide in-service teachers with opportunities to earn graduate level course credit while deepening their own understanding of STEM topics and improving their students' learning.

61A **Sponsor:** SeaPerch

Booth in Exhibit Hall Exhibits in the Lobby

EXHIBITS

61B **Sponsor:** Carney Sandoe Associates

62 **Sponsor:** Baypath University

63 **Title:** Massachusetts Science Education Leadership Association (MSELA)

Organization: Massachusetts Science Education Leadership Association (MSELA)

Strand: K-12 Education

Overview: The Massachusetts Science Education Leadership Association (MSELA) connects science leaders across school districts, higher education, research institutions, and informal science organizations to develop a network of advocacy and support for K-12 science education. Visit our exhibit to learn about professional development and networking opportunities for current and aspiring science education leaders, and find out more about our current work.

64 **Title:** Citizen Science Educational Partnerships for Experiential STEM Learning and Professional Development

Organization: Earthwatch Institute

Strand: K-12 Education

Overview: Earthwatch Institute, a Boston-based environmental citizen science non-profit, shares its experiences and successes in developing partnerships to offer professional development opportunities for STEM educators and promote in-field experiential education opportunities for high school students.

65 **Sponsor:** Thermo Fisher Scientific

66 **Title:** Using STEM Workshops to Promote Diversity and Access to University Intellectual Capital

Organization: Diversity Programs Office, College of Engineering, University of Massachusetts Amherst

Strand: Higher Education

Overview: The UMass Amherst Programs Office has coordinated efforts from multiple departments to provide STEM workshops and programs that will encourage underserved or minority students to pursue a STEM education and career. Our exhibit offers the story of our successes, as well as our strategies for coping with major hurdles.

67–69 **Title:** Teaching Students the Tool of the Future — A Practical Project-Based UAS Curriculum

Organization: University of Massachusetts Amherst, UMass Air

Strand: K-12 Education

Overview: UASs are set to become a staple tool in many industries, and it is important that we develop effective methods for providing UAS instruction. We will be presenting our course structure and lessons, conducting demo quadcopter flight exercises, and discussing the successes in the course and our plans for improvements.

Booth in Exhibit Hall Exhibits in the Lobby

OFFICE OF THE GOVERNOR
COMMONWEALTH OF MASSACHUSETTS
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CHARLES D. BAKER
GOVERNOR

KARYN E. POLITO
LIEUTENANT GOVERNOR

November 14, 2017

Dear Friends:

On behalf of the Commonwealth of Massachusetts, we welcome you to the 14th Annual STEM Summit at the DCU Center in Worcester.

As always, thank you to the UMass Donahue Institute and the Massachusetts Business Roundtable for their ongoing efforts to build a STEM community and for making this event a success each year.

We also want to thank the Lt. Governor's co-chairs, Congressman Joseph Kennedy III and Dr. Jeffrey Leiden, and the rest of the council for working with our Administration and Education Secretary Jim Peyser with energy, enthusiasm and a commitment to broadening opportunities in STEM for more students across the state.

As many of the fastest growing industries in the state have connections to STEM fields, we must continue to prepare our students for the demands of higher education and the workforce. It is essential that we engage students throughout their K-12 school years with hands-on lessons in science, engineering, computer science, technology, and math. Our system of postsecondary education, whether traditional or online, must ensure that students learn the necessary skills so they are ready for the workplace.

We are heartened that so many people – educators, parents, and business and community leaders – come to this summit and engage in this conversation at the local, regional and statewide level. It is your excitement, interest, and knowledge that will help our economy and educational system continue to innovate and evolve.

We look forward to today's conversation and to the work we will undertake together to ensure that every student is ready to succeed in the careers of our 21st century economy.

Sincerely,

Governor Charlie Baker

Lt. Governor Karyn Polito

Massachusetts STEM Advisory Council

One Ashburton Place, Suite 1403, Boston, MA 02108 | www.mass.edu/stem

November 14, 2017

Dear Members of the STEM Community:

On behalf of the STEM Advisory Council, we would like to welcome you to this year's STEM Summit.

The Summit provides an opportunity for the entire community to share best practices and highlight successful programs and partnerships across the Commonwealth. We hope that you'll find this to be a valuable day to connect with each other, learn something new, and find inspiration.

Over the past year, with the leadership of the Baker-Polito Administration, the STEM Advisory Council has focused its efforts around four priorities, aspects of which are woven throughout today's conversation. Work is underway in each of those areas, which include:

- Expanding Work-Based Learning Programs
- Developing and Implementing Models of STEM Early College Career Pathways
- Broadening and Deepening Computer Science & Engineering Initiatives
- Strengthening and Aligning with the Regional STEM Networks

Through initiatives that support each of these goals, we believe that the Commonwealth will increase the number of students who are interested in science, technology, engineering, and math, and who choose to go into a STEM career. We know that hands-on learning – through internships, college credits, and innovative curricula – is the key to inspiring our next generation.

The STEM Advisory Council is grateful for all of your contributions to these critical efforts. We look forward to continuing to work and collaborate with all of you to help our students build a "lifetime of opportunity".

Sincerely,

Hon. Joseph Kennedy III
U.S. Representative, MA 4th District

Jeff Leiden
MD, PhD, Chairman, President and CEO, Vertex

MBR
MASSACHUSETTS BUSINESS ROUNDTABLE

November 14, 2017

Dear Members of the STEM Community:

On behalf of the members of the Massachusetts Business Roundtable – a statewide organization of CEOs and senior executives committed to the state's long term economic vitality – we want to express our gratitude for all that you do to promote STEM education in the Commonwealth and for your participation in today's Summit.

This year's theme – Progress Through Partnership – was the focus of a report issued by the Roundtable last year, "Shaping the Future Workforce", that highlighted more than two dozen innovative partnerships between leading businesses and schools at every level across the state. These partnerships, and others like them, are helping to shape a future workforce that will give the Commonwealth a key competitive edge in the global economy. The talent imperative is driving employers in every sector to build new and creative partnerships that will impact workforce development in both the short- and long-term.

To remain competitive, employers must be confident in their ability to find skilled and trained talent today and assured that the education and workforce pipeline is producing the workers of tomorrow. That is why they are reaching out in increasingly unique and targeted ways to schools from pre-K through graduate school to ensure the pipeline is producing the talent they need. And that is why the work you are doing, and the focus of today's Summit, are so critical to the long term prospects for the Massachusetts economy. So…thank you.

The state's STEM Council, led by the Baker – Polito Administration, as well as Congressman Joe Kennedy III and Jeff Leiden, the CEO of Vertex Pharmaceuticals, are energized and focused on this issue, implementing strategies to build a STEM pipeline to support the state's economy. Working in partnership with you, we will continue and expand Massachusetts' national leadership in STEM.

The Massachusetts Business Roundtable is pleased and honored to partner with you in this effort.

Sincerely,

Marcy Reed
Chief of Business Operations
National Grid
Chair, MBR
Member, MA STEM Council

Tracy Pitcher
Regional Senior Vice President
Comcast
Chair, MBR Education Task Force

JD Chesloff
Executive Director

University of Massachusetts
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Martin T. Meehan
President

November 14, 2017

Dear STEM Colleagues,

On behalf of the University of Massachusetts, I want to welcome you to the 14th annual Massachusetts STEM Summit. The theme of this year's summit is "Progress Through Partnership," and in that spirit, we are proud to once again collaborate with the Massachusetts Business Roundtable and the Governor's STEM Advisory Council in delivering this important event. Today, you will share and learn about some of the many efforts taking place across the state to embolden our STEM-related education and workforce development opportunities.

As the Commonwealth's public land-grant university, we embrace our responsibility in supporting the Massachusetts economy and its highly skilled workforce. In collaboration with our public and private peers, our STEM focus continues to be an integral component of the Commonwealth's aggressive effort to compete in today's global economy. We are proud of the creative work taking place on our campuses to support STEM teacher professional development, and in school districts through innovative, STEM-focused partnerships and programs. Today, more than a third of all UMass students, or roughly 24,000, are studying STEM disciplines and ninety percent of our $632 million in annual research is conducted in science and engineering fields. That research supports established and emerging industries, generates numerous patents, launches startup companies, and enriches the learning environment for our students. At UMass, we remain firmly committed to doing our part in this worthwhile endeavor.

I sincerely thank the organizers – The STEM Advisory Council, the Massachusetts Business Roundtable, and the UMass Donahue Institute – for their tremendous work in making this important event a success. We also owe a debt of gratitude to the many sponsors who have supported this event with their various contributions.

Finally, thanks to all of you for your continued commitment in making STEM education and workforce development a priority for Massachusetts and for its citizens.

I hope you all have a fulfilling experience and thoroughly enjoy the summit.

Sincerely,

Martin T. Meehan
President

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Our Developing Skills™ Initiative empowers people to become globally productive citizens. The GE Foundation is working across the state of Massachusetts to cultivate a more diverse STEM workforce by supporting the development of skills needed for the innovative economy of tomorrow.

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MASSACHUSETTS
LIFE SCIENCES CENTER

Investing in the State of Innovation

November 14, 2017

Dear STEM Stakeholders:

The Massachusetts Life Sciences Center (MLSC) is pleased to continue to support the Massachusetts STEM Summit. We are also proud to participate on the Massachusetts STEM Advisory Council as it actively expands access to high-quality STEM education for students across the Commonwealth.

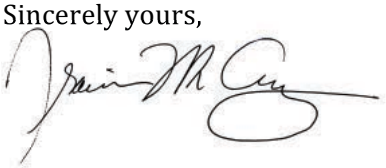
Our state is recognized as the place to be if you want something accomplished in biotechnology, pharmaceuticals, medical devices or diagnostics. To maintain this position, we must meet the needs of companies arriving or growing in the Commonwealth, by continually investing in a robust, world class education and workforce pipeline that is as dynamic and innovative as the sector itself. We believe that through our investments, and the commitment from educators, innovators, the private sector, and research institutions alike, we can make available an environment where every child in Massachusetts has the opportunity to become a leader and integral part of the life sciences ecosystem.

In order to provide as full a science education and training experience as possible, we strategically invest at the elementary, secondary and post-secondary levels. Whether through equipment & supplies grants to middle schools or internships for post-secondary and graduate students, we hope the MLSC's investments cultivate students' natural curiosity in STEM, and spark a passion for a career in the sciences. Last year, we also developed a dedicated funding opportunity for the professional development of educators. As our researchers and scientists unravel more and more of the mysteries of life, our educators' scientific understanding and ability to communicate those developments must also continue apace.

Through the MLSC, the Commonwealth of Massachusetts' commitment to life sciences education and workforce development is unparalleled. And yet, there is more work to be done. The life sciences industry is constantly, rapidly evolving and we must adapt with it. We must redouble our efforts on educational equity to ensure that no matter the identity, zip code or economic circumstances of our students, we are finding a place for them in this industry in Massachusetts that is, literally and figuratively, changing the world every day.

Thank you for your support which allows the MLSC to work on behalf our students, our budding scientists, technologists and entrepreneurs. We look forward to joining you at this year's STEM Summit to further the dialogue and discuss strategies that we hope will strengthen Massachusetts' status as a global leader in life sciences education.

Sincerely yours,



Travis McCready
President and CEO

1000 Winter Street
Suite 2900
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Waltham, MA 02451

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STEM ROBOTICS

For future scientists and engineers, the typical classroom often is not enough. Recognizing this, we are proud to be able offer our Urban Search & Rescue Robotics Challenge to them at no-cost. Please do not hesitate to contact us with any questions, comments, or suggestions.

This Tetrix Kit, used extensively by SkillsUSA, consists of heavy-duty, aircraft-grade aluminum elements, powerful drive motors, and wireless cameras. The event challenges competitors to engineer a robot which can navigate a unique obstacle course with the objective of finding and removing an object within a specified time. Recognizing that no two districts or curricula are identical, we designed this set to be usable by any sized group with any possible time considerations. We can allow for days of in-depth design and construction or simply allow students to navigate our courses with pre-built machines.

The Massachusetts National Guard is a locally-based organization which places the heaviest of emphasis on educating our members and the betterment of our communities. We offer training in a wide variety of STEM career fields and feature unique benefits which allow our members to attend college 100% free of tuition or academic fees!

FOR MORE INFORMATION CONTACT:

Geoffrey Allen
339-202-9008
geoffrey.d.allen.mil@mail.mil

Ken Dowd
339-202-9007
kenneth.e.dowd.mil@mail.mil

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Microsoft

Welcome to the 2017 Massachusetts STEM Summit!

Microsoft works with local communities to help leverage the power of technology to promote economic growth and increased opportunities for all. We are fortunate that Massachusetts continues to experience rapid growth and lead in civic innovation. But like many states across the US, Massachusetts suffers from a lack of qualified candidates to fill jobs that require STEM skills. Microsoft is committed to helping to fill the pipeline of qualified candidates for these jobs of the future.

Students of the Commonwealth of Massachusetts must be competitive, agile students prepared with 21st century skills. The Microsoft Stores team connects with local students through a series of free YouthSpark summer camps, field trips, and drop-in activities. Visit youthspark.org for more information. Every Saturday, teachers can drop in to learn new hands-on STEM curriculum from the Hacking STEM team in Boston, Burlington, and Natick. Visit aka.ms/hackingstem for details. We are also proud to support key organizations driving computer science education efforts for Massachusetts such as BATEC and MBAE.

Together we are making progress. More students are becoming interested in STEM. More teachers are learning cutting edge technologies. Schools are partnering with industry. But it's just the start. We look forward to partnering with you to strengthen the STEM pipeline in Massachusetts, to close the skills gap and meet projected domestic workforce needs.

Sincerely,

Aimee Sprung
Civic Engagement Manager
Technology & Corporate Responsibility

nationalgrid

November 14, 2017

Dear STEM Stakeholders,

I am honored to welcome you to the 2017 Massachusetts STEM Summit. We're all here because of our shared passion for enhancing the STEM-literate workforce that we so critically need.

Jobs in the science, technology, engineering, and math fields are a key component to the success of our economy. We must advance STEM skills from a young age, so our workforce is fully prepared to respond to and address our 21st century society's needs. Whether it's the energy industry, or any of the industries represented here today, STEM training is invaluable.

At National Grid, we recognize how crucial it is to inspire a new generation of engineers and other STEM professionals. We are facing energy challenges that must be solved by employees with these skills. Recognizing how directly linked STEM education is to our business, we are proud to invest in several Worcester-area organizations:

Girls Incorporated: Providing girls with high quality STEM training and support throughout the school year and summer months.
FIRST Robotics: Sponsorship of Central MA district event at Worcester Polytechnic Institute.
Bottom Line: Assisting students through college application process and mentoring through college graduation. (Bottom Line's second class graduated this year!)

Please take full advantage of the opportunities today to engage in presentations, breakout sessions, and exhibits, keeping a steady eye on how you may turn today's lessons into action. Thank you for your commitment to STEM education.

Sincerely,

Cordi O'Hara
President, National Grid, Massachusetts

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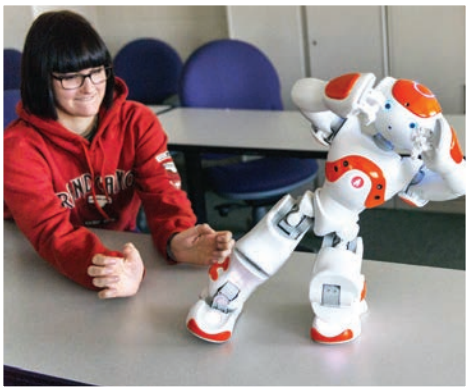

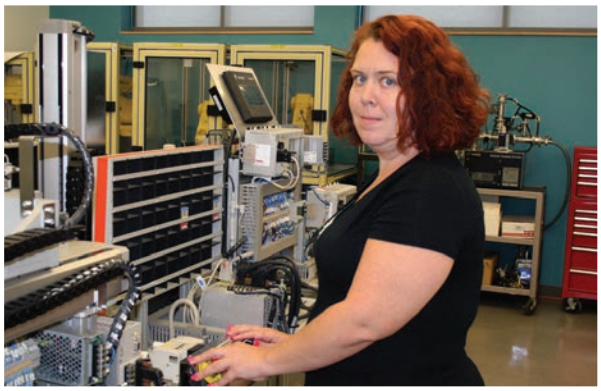

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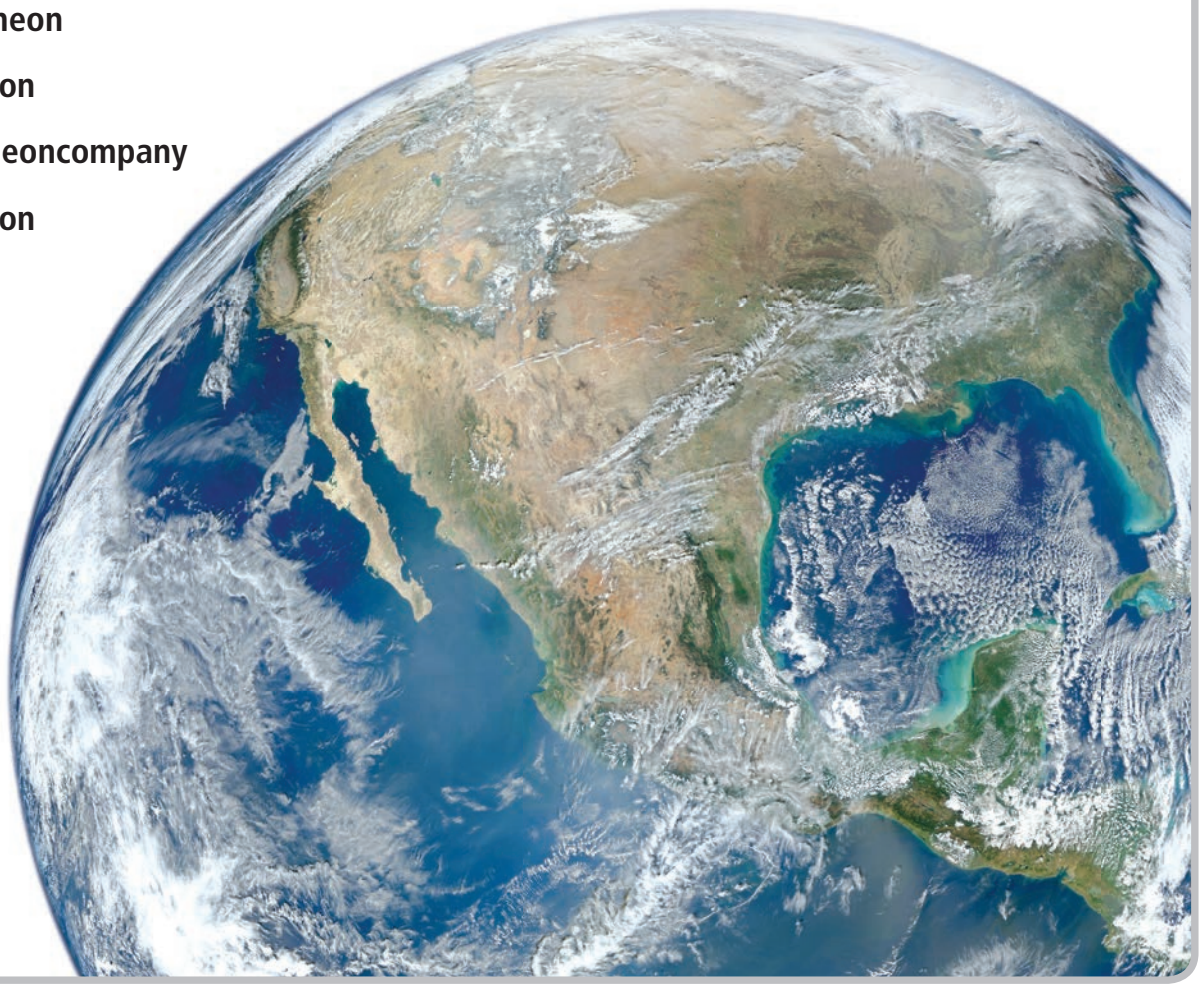

"Blue Marble" image of Earth captured by Raytheon's Visible Infrared Imaging Radiometer Suite.

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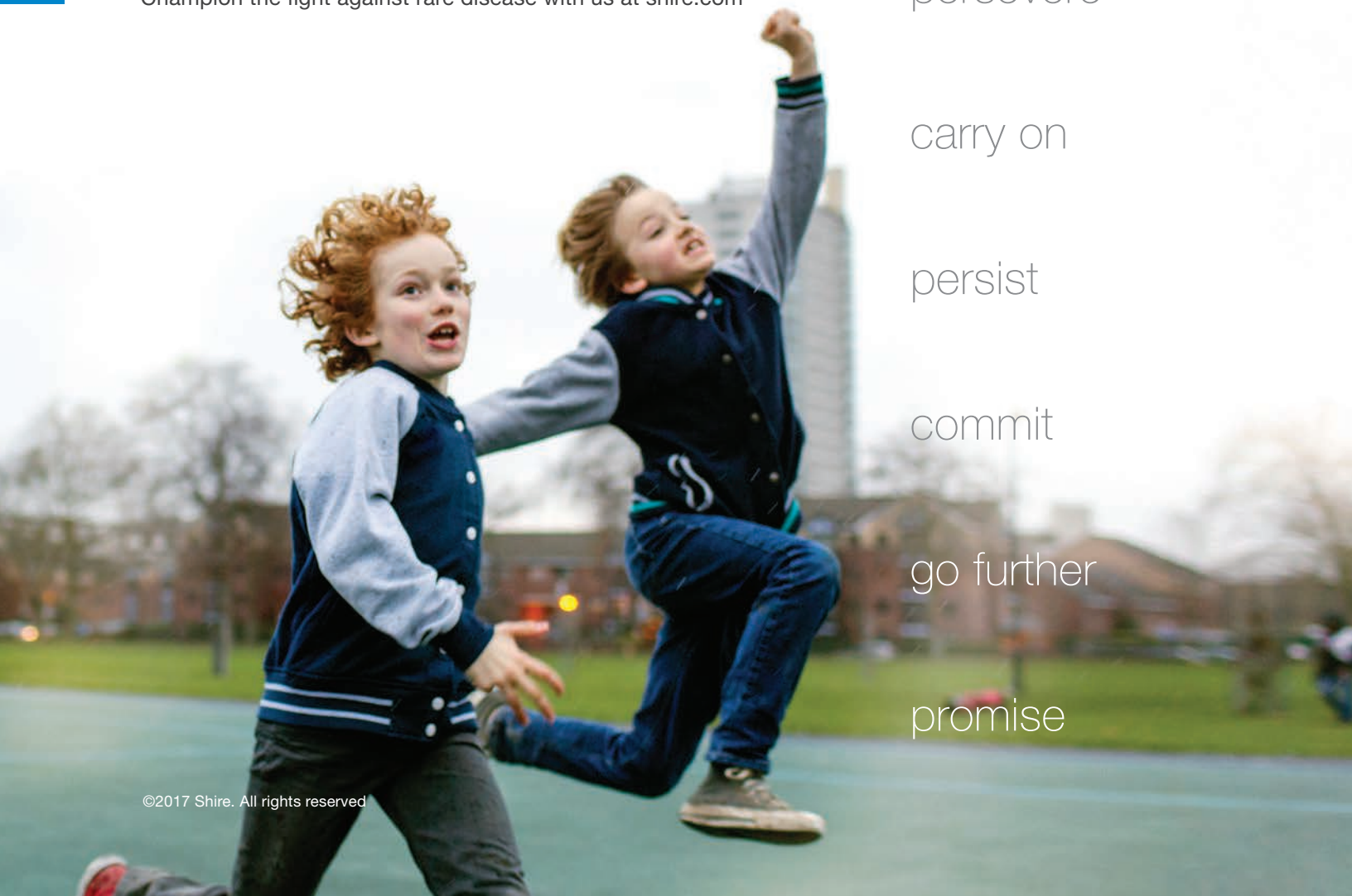

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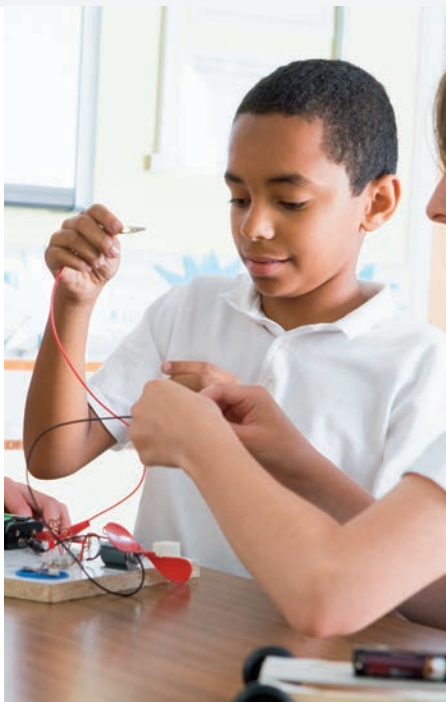

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Donna C. Cupelo
Region President – New England

November 14, 2017

Dear STEM Stakeholders,

Verizon is proud to support the Massachusetts STEM Summit, which provides educators, business leaders, nonprofit partners, and public officials a forum to collaborate and strengthen Science, Technology, Engineering, and Math (STEM) education for students in the Commonwealth.

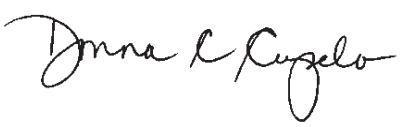
In order to compete for the jobs of the future, it's essential for every student to have access to technology and STEM education. That's why Verizon, through our Verizon Innovative Learning initiatives, invests in programs that provide technology access and hands-on immersive learning in STEM for students in need. We work with nonprofit partners and schools to reach as many students as possible while diligently measuring the impact of our work —and it's making a difference.

Our collective commitment to STEM education and bridging the digital divide is integral to the success of our economy. With some 9 million available STEM jobs nationally – and over 4 million available jobs in science and technology alone – our youth need access to education and resources that will prepare them for success in tomorrow's high-tech world.

We simply need more kids involved in science, technology, engineering and math. Not just for their benefit, but because the world needs them — their brains, their creativity and their experiences — to create amazing solutions that will make our world a better place.

We look forward to collaborating with Summit participants to ensure Massachusetts students are engaged and achieving in STEM.

Sincerely,



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WGBH
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02135

617 300 2000
wgbh.org

Dear Massachusetts STEM Summit Participants,

WGBH is proud to once again be the media partner for the annual Massachusetts STEM Summit. We commend the Massachusetts Business Roundtable, the Massachusetts STEM Advisory Council, and the University of Massachusetts Donahue Institute for their ongoing and extraordinary commitment to STEM education, and for convening this summit, now in its fourteenth year.

A pioneer in digital learning, public media producer WGBH has a long history of promoting STEM awareness and education both locally and across the country. This year at the Summit we are thrilled to showcase some of our latest work: *Bringing the Universe to America's Classrooms*, a collaboration with NASA to design and develop digital media-integrated instructional resources for K-12 classrooms. The first instructional modules from this collaboration were published in August, and are being distributed free of charge through PBS LearningMedia, a partnership between WGBH and PBS which now offers more than 120,000 free classroom-ready, curriculum-targeted digital resources.

Bringing the Universe to America's Classrooms integrates dynamic content from NASA as well as WGBH signature STEM programs: *NOVA*, *PEEP and the Big Wide World*, and *Plum Landing*. This project would not be the same, however, without **our most important partnership**: **teachers**. Our national panel of 50 Teacher Advisors have been critical to the development of the resources over the past two years, and we're very pleased to have some of the Massachusetts-based advisors join us here at the Summit.

WGBH salutes Massachusetts Governor Charlie Baker, the Commonwealth's Department of Education, the participants in today's summit, and educators statewide for continuing to make *progress through partnership* in STEM education. We are excited to join with you in supporting creative collaboration in STEM programs that make a difference in the lives of students and their families.

Jonathan C. Abbott
President and CEO

Stepping into the future requires a foundation—and a pathway

At WPI, our commitment to Science, Technology, Engineering, and Math (STEM) starts early and goes further. We never stop thinking of new ways to engage students of all ages in the wonder of innovation. We know it takes hands-on discovery for every generation to step into a future rooted in STEM. That's why we encourage our students, faculty, and partners to imagine across boundaries and in all directions.

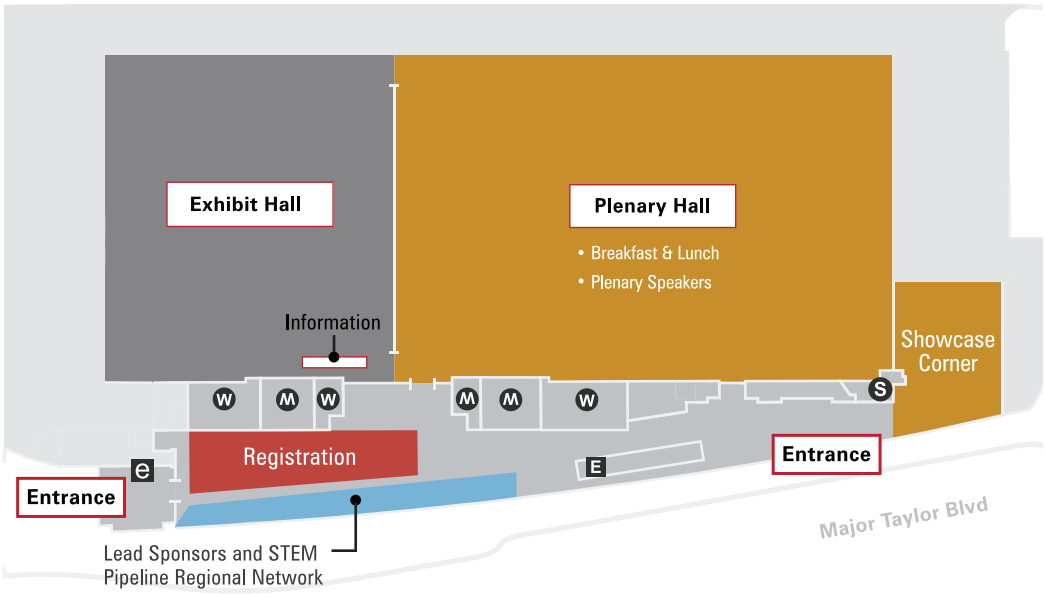
When exploring is always part of your life,
there are sure to be opportunities to make an impact.

WPI

BREAKOUT SESSION ROOM ASSIGNMENTS

1ST LEVEL				
Location	**AM Breakout I (9:45 – 10:35)**	**AM Breakout II (10:55 – 11:45)**	**PM Breakout I (1:45 – 2:35)**	**PM Breakout II (2:55 – 3:45)**
Plenary Hall	**K-12 Education:** Adapting Digital Media for STEM Instruction			
Showcase Corner	Sub Zero Ice Cream Presentation	Sub Zero Ice Cream Presentation	Sub Zero Ice Cream Presentation	Sub Zero Ice Cream Presentation
2ND LEVEL				
Location	**AM Breakout I (9:45 – 10:35)**	**AM Breakout II (10:55 – 11:45)**	**PM Breakout I (1:45 – 2:35)**	**PM Breakout II (2:55 – 3:45)**
Conference Room 210	**Higher Education:** MassBay's STEM Mentor Program: Partnering with Industry to Promote Students' Professional Success	**K-12 Education:** Bringing Science to Life: Using Realistic Medical Emergencies with a Patient Simulator "STAN" to Engage and Inspire High School Students	**Higher Education:** GPSTEM: Increasing STEM Credentials at Community Colleges	**Higher Education:** Exploring General Education Foundations for STEM Transfer Students
3RD LEVEL				
Location	**AM Breakout I (9:45 – 10:35)**	**AM Breakout II (10:55 – 11:45)**	**PM Breakout I (1:45 – 2:35)**	**PM Breakout II (2:55 – 3:45)**
Grand Ballroom South	**K-12 Education:** Selecting and Designing Innovative K-12 Engineering Resources to Transcend Stereotypes	**Workforce & Business:** A Playbook on Gender Equity in Tech: Best Practices in Recruiting, Retaining, and Advancing Women	**K-12 Education:** Cross-grade Partnerships in STEM: Fostering Community Connection and Deeper Conceptual Understanding	**K-12 Education:** The daVinci Program: Building a STEAM Learning Community
Grand Ballroom Center	**K-12 Education:** Partnering on Biomedical Expeditions to Engage Underserved Students in STEM	**K-12 Education:** Creative Robotics Across the Curriculum: An Innovative Partnership Project	**Early Education:** Beyond Counting and Naming Shapes: Math All Day for Under 5s	**K-12 Education:** Engineering in the Out-of-School-Time Setting
Grand Ballroom North	**Early Education:** Exploring the "M" in Early Childhood STEM: Moving Beyond Rote Activities to Extend Concept Development	**K-12 Education:** Teach Students to Ask Their Own STEM Questions: Introduction to the Question Formulation Technique	**K-12 Education:** Paving the STEM Pathway for At-Risk Students	**K-12 Education:** Integrating the Question Formulation Technique into Your Work with STEM Students
Meeting Room A	**Workforce & Business:** If You Build It, Will They Come? Reflections on the Vertex/Boston Public Schools Partnership	**Higher Education:** Establishing Effective Partnerships Across the Community College Sector	**Workforce & Business:** Sanofi Genzyme and Oracle Partnerships with the University of Massachusetts Boston	**K-12 Education:** Evaluation of a Global Initiative to Teach Engineering and Global Competency to Middle Schoolers
Meeting Room B	**Workforce & Business:** How Can Local Businesses Engage and Drive STEM Education in Their Communities?	**Early Education:** Helping Preschool Teachers Engage Families in Supporting Young Children's Mathematics Learning	**K-12 Education:** Tiny House: Three Public High School Multidisciplinary STEM Classes – Architecture, Engineering, & Build	**Workforce & Business:** College to Career Pathways: A New Online Tool for Adult Learners Returning to Education
Meeting Room C	**K-12 Education:** 2016 Digital Literacy and Computer Science Standards: Implementation and Licensure	**K-12 Education:** Modest Funding with Big STEM Impacts: 5-Year District Partnership Increases Enriched STEM Learning	**Workforce & Business:** Developing and Maintaining Business & Education Partnerships – Regionally and Locally	**K-12 Education:** Novel Engineering: An Integrated Approach to Engineering and Literacy
Meeting Room D	**K-12 Education:** STEM@Work: The State's Campaign for STEM Internships for High School Students	**Workforce & Business:** Work in Progress: How Business Leaders are Helping Close the Skills Gap	**K-12 Education:** STEM and the Workforce: Preparation During the Early Years	**K-12 Education:** Building a Coherent University-School District-Industry Partnership to Scaffold STEM Learning
Meeting Room E	**Higher Education:** Engaging University Students in Co-design Projects with Partner Schools and Communities	**K-12 Education:** Mission To Mars – An Interdisciplinary Unit Using the Engineering Design Process and PBL	**Higher Education:** MA PKAL Regional Network: Promoting Professional Development, Networking, and Workforce Readiness	**Early Education:** So Much More Than Counting: Talking with Young Children About Mathematical Concepts
Junior Ballroom	**K-12 Education:** Growing Community Partnerships through Art to Engineering: STEM, STEAM, & Beyond	**K-12 Education:** Invention Education and STEM: Preparing Students from Diverse Backgrounds for the Innovation Economy	**K-12 Education:** School-wide STEM Day: A Recipe for Success	**Early Education:** Seeds of STEM: Early Childhood Engineering Curriculum from Diversity and Collaboration Perspective

LEVEL 1



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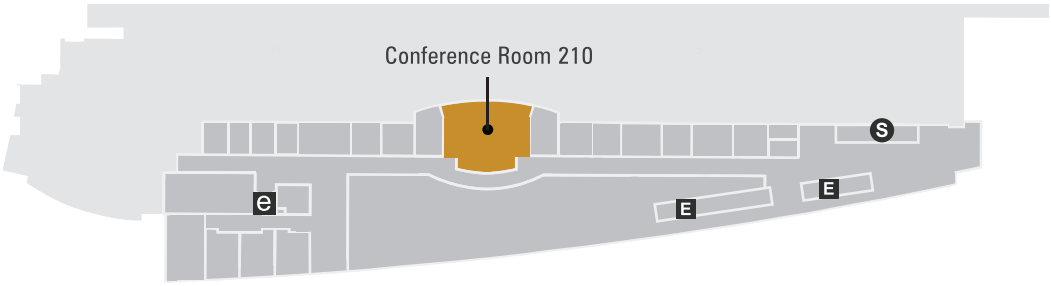

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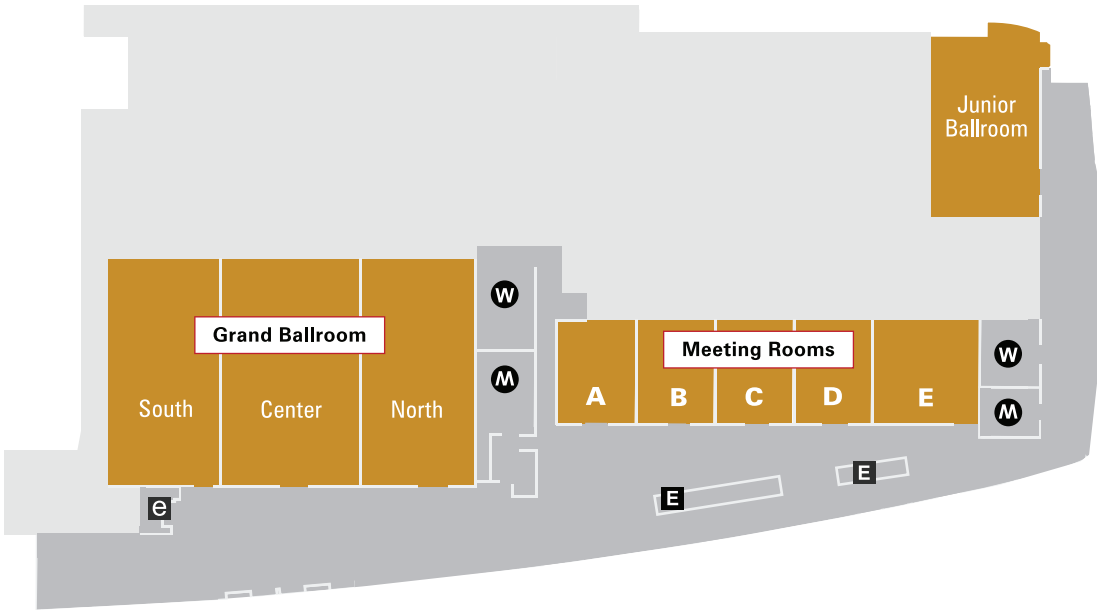

Breakout Session Location | Women's Room | Men's Room | Escalator | Elevator | Stairs

Special Thanks

Cora Beth Abel, MA State Science & Engineering Fair
Beth Ashman, Apprenticeship Rhode Island
Rusti Berent, Ward's Science
Blair Brown, MA Executive Office of Education
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