MASSACHUSETTS STEM SUMMIT 2018

PIPELINES TO PROSPERITY

NOVEMBER 14, 2018 • DCU CENTER | WORCESTER, MA • MASS-STEM-SUMMIT.ORG

HOSTED AND SPONSORED BY

STEM Advisory Council

MBR
MASSACHUSETTS BUSINESS ROUNDTABLE

UMASS DONAHUE INSTITUTE

MEDIA PARTNER
WGBH

HOSTED & SPONSORED BY

STEM Advisory Council

MBR
MASSACHUSETTS BUSINESS ROUNDTABLE

UMASS DONAHUE INSTITUTE

MEDIA PARTNER
WGBH

PREMIER SPONSOR

verizon

LEAD SPONSORS

BNY MELLON

MASSACHUSETTS LIFE SCIENCES CENTER
Investing in the State of Innovation

nationalgrid
HERE WITH YOU. HERE FOR YOU.

VERTEX
THE SCIENCE of POSSIBILITY

MAJOR SPONSORS

Biogen Foundation

GENERAL DYNAMICS
Mission Systems

Google

iRobot

MASSACHUSETTS NATIONAL GUARD

Raytheon

sunovion
Innovation today, healthier tomorrows

ThermoFisher SCIENTIFIC

UMASS AMHERST

UMass | Dartmouth

vmware | carahsoft

WPI

SPONSORS

BAY PATH UNIVERSITY

BOSE

BOSTON BUSINESS JOURNAL

eec Department of Early Education and Care

discover CENTRAL MASSACHUSETTS

EDC 60 1958 2018 edc.org

IBM

intellADAPT
Intelligent Adaptive Learning

KRONOS

LRIG NEW ENGLAND

Mount Wachusett Community College

rb ryan bennett videos

SUBZERO ICE CREAM & YOGURT

TERC

UMASS BOSTON

UMASS University of Massachusetts Lowell
Learning with Purpose

Event Schedule

7:30am – 2:00pm Registration

7:30am – 9:30am Breakfast Buffet

8:00am – 3:00pm Exhibit Hall

8:30am – 9:30am Welcome and Opening

Emcee: Doug Banks, Executive Editor, Boston Business Journal

Bridging STEM's Digital Divide: Verizon presents "Without a Net" — film screening and panel discussion

- **Rose Stuckey Kirk**, Chief Corporate Responsibility Officer, Verizon; President, Verizon Foundation
- **Rory Kennedy**, Moxie Firecracker Films Co-Founder; Producer/Director of "Without a Net: Bridging the Digital Divide"

9:30am – 9:45am Break

9:45am – 10:35am AM Breakout I

- A Deeper Dive Into the Digital Divide
- Closing the Access Gap to STEM for Underserved Student Populations
- Design Squad Global: New, sustainable invention activities to spark interest in solving community problems with STEM
- Developmentally Appropriate Precoding Experiences for Preschoolers
- Discover Massachusetts Maritime Academy's Follow The Voyage — Share The Experience Program
- Full STEAM Ahead: A Kinetic Sculpture Project
- Pathways to STEM Student Success and Workforce Development
- Project Based Learning Pathways: Reflections on a 6th Grade Public Middle School PBL Classroom Pilot
- STEM4Girls: Hands-on Experience to Engage 3rd-8th Grade Girls in STEM
- Tech Apprentice: 10 Years of Learning to Inform Employer Engagement
- Who's Nurturing the Next Generation of Innovators? Effective STEM Programs to Build Workforce Talent

10:35am – 10:55am Break

10:55am – 11:45am AM Breakout II

- A Data-Driven Approach to Aligning Higher Education Programs With Workforce Needs
- A Vision for Implementation: Current Initiatives for Supporting Pre-K-12 STEM Education in Massachusetts
- Closing the Digital Equity Gap: Ensuring Every Student's Access to Technology Jobs
- Energy House Design Challenge
- Invention Education and STEM: Preparing Students from Diverse Backgrounds for the Innovation Economy
- Job Simulations: An Exercise Connecting Students and Employers in a Meaningful, Time-efficient Way
- STEAMathon: Engaging Families in STEAM Activities
- Supporting a Home-to-School Approach in Preschool Curriculum with Low-income Immigrant Families
- The Flipped Internship: A New Partnership Strategy between Technology Companies and High Schools
- The Pipeline Doesn't End: Developing a Sustainable Culture of Digital Literacy in the Workplace

EVENT SCHEDULE

11:45am – 1:00pm Luncheon Buffet

12:30pm – 1:30pm Luncheon Plenary

Emcee: Doug Banks, Executive Editor, Boston Business Journal

Presentation of The Hall at Patriot Place 2018 Massachusetts STEM Teacher of the Year

- **Bryan Morry**, Executive Director, The Hall at Patriot Place presented by Raytheon
- **Erin Cronin**, Revere High School

Dell and MATHCOUNTS present: "Are You Smarter Than a Mathlete?"

- **Howard Elias**, President, Dell Services and Digital
- **Kristen Chandler,** Executive Director, MATHCOUNTS Foundation

1:30pm – 1:45pm Break

1:45pm – 2:35pm PM Breakout I

- Amp It UP! Industry Driven Lessons
- Beauty and Joy of Computing: A CS Principles Course
- Creating a STEM Pathway through Mentoring, Purpose, and Food Justice
- Designing for Scale to Impact System-wide Student Success
- EcoMOD: Blending Computational Modeling and Virtual Worlds for 3rd Grade Ecosystems Science
- Exciting Students in STEM: STEM Week Reflections and Lessons Learned
- Fairytales & STEAM - Cross Curricular Integration Through Project Based Learning
- Motivate Students with Free Innovative STEAM Resources from Public Libraries
- Priming Preschoolers to Enter the Engineering Pipeline through Problem-Solving
- The Shrinking STEM Workforce: Capitalizing on the Expanding K-12 EL Population as a Solution

2:35pm – 2:55pm Break

2:55pm – 3:45pm PM Breakout II

- Best Practices in STEM Space Design and Use
- Co-constructed STE Curriculum in Head Start: Partnership-Based Research for Program Improvement
- Collaborative Design for Engaging STEM Volunteers in Middle Grades Class Projects
- Creating Fun and Engaging STEM Learning with Toddler and Preschool Children
- Cybersecurity Education Standards: Partnership Between Industry and Education
- Integration of Computational Thinking into Math and Science Curriculum Materials
- Nudging to STEM Success: Supporting Persistence and Completion in STEM Pathways
- Robots and Screen-Free Coding for Your Youngest Learners — Come Play With KIBO!
- Vertically Aligned Life Sciences Lab & Career Experiences — An Opportunity for MS & HS
- What Can Your Library Do for STEM?

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.

Kristen Chandler

Kristen Chandler is the Executive Director of the MATHCOUNTS Foundation, an organization providing engaging math programs to more than 150,00 middle school students nationwide. Her prior experience within the organization ranged from directing content development, creating student programs, conducting teacher trainings and cultivating strategic partnerships.

Erin Cronin

2018 STEM Teacher of the Year

Erin has been teaching since 2009. She earned her bachelor's degree in mathematics at Harvard University. Erin then spent two years teaching and coaching at St. Mark's School in Southborough. In 2012, Erin completed a MAT in mathematics education at Boston University. At BU, Erin was part of the Robert J Noyce Scholars program. The Noyce program "seeks to increase the number of K-12 teachers with strong STEM content knowledge who teach in high-need school districts." For the past six years, Erin has taught at Revere High School. During this time she has taught a variety of courses including Geometry, Advanced Algebra, Functions Statistics and Trigonometry, and Pre-calculus. In recent years, Erin has had great success with her AP AB Calculus students. In both 2017 and 2018, 100% of her students have earned qualifying scores on the AP exam. During this current school year, Erin will begin working with a cohort of driven yet underserved students to promote college preparedness and retention through the One Goal program. (Fun fact: When school is out you can find Erin selling Fenway Franks in right field at Fenway Park.)

The Hall launched the STEM Teacher of the Year program in October of 2012 when Robert Kraft announced the initiative at the Massachusetts STEM Summit held that year at Gillette Stadium. Cronin is the sixth recipient of the award. The STEM Teacher of the Year award is part of The Hall's education program, which offers students in grades 4-12 standards-based educational modules in a fun, entertaining setting. The Hall hosts more than 20,000 school field trip visitors annually.

PLENARY SPEAKER BIOS

Howard Elias

Howard Elias is president of Dell Services and Digital, supporting customers across the Client Solutions and Infrastructure Solutions Groups. He oversees technology and deployment services, consulting services, global support services, education services, global Centers of Excellence, the Dell Digital organization and Virtustream.

Previously, Elias was president and chief operating officer of EMC Global Enterprise Services where he was responsible for setting and driving strategy and creating best practices for services that enabled customers' digital transformation and data center modernization.

He led EMC's consulting and technology professional services, operational services and global customer support organizations, as well as Centers of Excellence, global business services, IT, manufacturing and supply chain operations.

Elias also served as EMC's lead for the Dell and EMC integration, overseeing the value creation and combination of Dell and EMC and the cross-functional teams that drove all facets of integration planning. Previously, Elias was EMC's executive vice president of Global Marketing and Corporate Development where he led all marketing, sales enablement, technology alliances, corporate development and new ventures. Elias was a co-founder and served on the board of managers for the Virtual Computing Environment (VCE) Company.

Elias joined EMC in 2003 from Hewlett-Packard where he was senior vice president of Business Management and Operations for the Enterprise Systems Group. He previously held executive positions at Compaq, Digital, AST Research and Tandy Corporation.

Elias is also chairman of TEGNA Inc., formerly Gannett Co., Inc., a media and digital business company. He attended Wayne State University and Lawrence Technological University.

Rory Kennedy

Rory Kennedy is one of America's most prolific documentary filmmakers. An Academy Award-nominated, Primetime Emmy Award-winning director/producer, Kennedy's work deals with some of the world's most pressing issues — poverty, political corruption, domestic abuse, drug addiction, human rights and mental illness. Kennedy has made more than 30 highly acclaimed documentaries.

Most recently, Kennedy completed *Above and Beyond: NASA'S Journey to Tomorrow*, a feature documentary examining the extraordinary ways NASA has changed not only our vision of the universe, but also our planet, and ourselves. Covering 60 years and beyond, the film celebrates past accomplishments, investigates current initiatives, and surveys future plans, from the first lunar landing to the latest Mars rover to the vast network of satellites keeping watch over Earth. The film will broadcast on the Discovery Channel in October of this year.

In 2017, Kennedy completed *Take Every Wave: The Life of Laird Hamilton*, a feature documentary about the life of legendary big wave surfer Laird Hamilton. The film had its world premiere at the Sundance Film Festival and was distributed theatrically through IFC. In 2014, Kennedy made the PBS/American Experience feature documentary Last Days in Vietnam. Nominated for an Academy Award, the film premiered at the Sundance Film Festival and went into wide theatrical release in the fall of that year. In 2012, Kennedy made the HBO feature documentary *Ethel* chronicling the extraordinary life of her mother, Ethel Kennedy. The film premiered at the Sundance Film Festival and was nominated for five Primetime Emmy Awards.

A graduate of Brown, Kennedy majored in women's studies. Along with acclaimed documentary filmmaker Liz Garbus, she is co-founder of Moxie Firecracker Films in New York and Los Angeles. Kennedy is also a governor of the Academy of Motion Pictures Arts and Sciences.

PLENARY SPEAKER BIOS

Rose Stuckey Kirk

Ms. Kirk oversees the strategic direction for all marketing activity related to Verizon's social impact assets, directs the programmatic build and investment strategy for the company's CSR portfolio, and oversees the company's marketing talent development.

Rose is an award-winning journalist and marketer and is the executive producer of the documentary *Without A Net: The Digital Divide in America*. She is a member of the Women's Leadership Board of the Harvard Kennedy School, the Aspen Institute's Business and Society Leader's Forum; serves on The Ad Council's Advisory Committee; the Advisory Board of Arkansas State University, and the Executive Leadership Council. She also serves on the Finance Committee and Board of Trustees for Gill Saint Bernard's School, a college preparatory institution, and is the recent past governance committee member and board chair of the board of directors of Dress for Success Worldwide.

Rose's background as a senior leader in various P&L functions has primed her to advance the social innovation work of Verizon. She has held numerous leadership positions in wholesale, operations, sales and customer service, product development and marketing. Additionally, she has served as lecturer, panelist and guest speaker on a host of topics including mobility in education, women in the workplace, and the role of corporations in creating a sustainable future.

Rose holds a BS in Journalism from Arkansas State University and is completing a Masters in International Affairs at Washington University in St. Louis, MO. She and her husband, Robert, are the parents of two sons.

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.

Breakout Sessions – AM Breakout I

A Deeper Dive Into the Digital Divide

Time – 9:45–10:35am
Venue – Meeting Room A
Strand – All Strands

As a direct follow-up to this morning's engaging film screening and discussion of "Without A Net: The Digital Divide in America", this session will be a conversation about how the digital divide can be bridged and, ultimately closed, in Massachusetts. As the film illustrated, the digital divide not only affects the learning of children at all school levels but continues to affect these individuals as they move out of high school and into college and/or the workplace. Thus, the persistence of the divide throughout all points on the STEM pipeline beg to be addressed. Session speakers will represent the fields of STEM education and business.

MODERATOR

Donna Cupelo, Region President, Verizon

SPEAKERS

Erin Cronin, Mathematics Teacher, Revere High School

Laryssa Doherty, Principal,
Clarence R. Edwards Middle School, Boston Public Schools

Paul Foster, Chief Information Officer, Springfield Public Schools

Timothy P. Murray, President and CEO,
Worcester Regional Chamber of Commerce

Closing the Access Gap to STEM for Underserved Student Populations

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

Consider joining this collaborative partnership program bringing, at no cost to partner high schools, AP® science to underserved school populations.

Economically disadvantaged students in many urban, rural, and small suburban communities don't have access to rigorous physics courses. Lacking opportunity to access such courses, these demographic groups are hard pressed to compete in physical science related Science, Technology, Engineering and Mathematics fields and academic programs with their peers from more affluent communities. Project Accelerate, a National Science Foundation funded project, is a partnership program between Boston University, West Virginia University and high schools bringing a College Board accredited AP® Physics 1 course to schools not offering this opportunity

Preliminary results indicate that students participating in Project Accelerate do as well as their peers enrolled in traditional classroom-based AP® Physics 1 classes. Project Accelerate creates a collaborative learning environment utilizing the supportive infrastructures from the students' traditional school with a highly interactive private edX online instructional tool. This pairing provides opportunities for under-represented groups who otherwise would not have access to this often prerequisite course to success in physical science, information technology and medical-related academic and career pathways

Project Accelerate contains the potential to support hundreds of schools and thousands of students throughout the country bringing opportunity for success in STEM to under-served and economically disadvantaged young men and women.

MODERATOR

Mark D. Greenman, Research Fellow, Boston University

SPEAKERS

Ali Ferhani, Student, Community Charter School of Cambridge

Andrew Flye, Science Teacher,
Boston International Newcomer Academy

Jeff Molk, Department Chair,
Community Charter School of Cambridge

AM BREAKOUT I

Design Squad Global: New, Sustainable Invention Activities to Spark Interest in Solving Community Problems with Stem

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

Design Squad Global is the latest iteration of Design Squad, a respected source of design/build projects that focus on the engineering design process. In this panel, formal and informal educators will discuss how they have implemented projects from our new Inventing Green guide, with sustainable projects that encourage youth to solve everyday issues in an environmentally-friendly way. We will also highlight the Design Squad Global Club opportunity, a location-based program that empowers youth aged 10-13 to explore engineering and cross-cultural connections through fun, hands-on activities. DSG Clubs are guided by Club Leaders and partner with a DSG Club from a different nation or state exchange engineering ideas and designs. These projects and clubs engage youth with STEM, sparking interest in STEM-related fields and in using the design/build process to solve community problems.

SPEAKERS

Robert Parks, Senior Editor, WGBH Education

Lisa Sama, Engineering Instructor, Luther Burbank Middle School, Lancaster, MA

Saranya Sathananthan, Outreach Project Manager, WGBH Education

Kathleen Wright, STEM Specialist, Richard J. Murphy K-8 School, Dorchester, MA

Developmentally Appropriate Precoding Experiences for Preschoolers

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

Computational thinking skills and coding literacy will be critical to our children's success in the future workforce. Join us to explore how to support the development of precoding skills as preschool children engage in play-based learning experiences. Participants will gain understanding of the need for early exposure to precoding experiences, components and benefits of computational thinking, and ways to embed developmentally appropriate precoding activities into preschool curriculum using everyday materials and without increasing screen time. Attendees will participate in examples of activities and useful handouts will be provided.

SPEAKERS

Joanna Doyle, Director of Training and Education, Clarendon Early Education Services, Inc.

Rosemary Hernandez, Western Regional Director, Clarendon Early Education Services, Inc.

Discover Massachusetts Maritime Academy's Follow The Voyage – Share The Experience Program

Time – 9:45–10:35am
Venue – Conference Room 210
Strand – K-12 Education

Take your students on an unforgettable, two-month, world-wide STEM adventure with Massachusetts Maritime Academy's Follow The Voyage – Share The Experience program. Your students will virtually cruise aboard the TS Kennedy with cadets majoring in Marine Engineering, Marine Transportation, and Facilities Engineering who are taking part in their annual Sea Term. Students will also follow the Winter Experiences of cadets majoring in Marine Safety Science & Environmental Protection, Energy Systems Engineering, International Maritime Business and Emergency Management & Homeland Security as they study around the globe.

Administrators, teachers, librarians, and parents will love the comprehensive Follow The Voyage – Share The Experience curriculum linked to the Common Core Mathematics Standards and the Next Generation Science Standards. The curriculum also incorporates language arts, social studies, and fine arts. Many of the engaging lessons and hands-on activities were created exclusively for Massachusetts Maritime Academy.

During this session, you will be introduced to the Follow The Voyage – Share The Experience program, discover its history, and view evidence of the program's success. You'll also get a preview of the expanded 2019 Follow The Voyage – Share The Experience program which promises to be bigger and better than ever. We'll provide the information needed to register a class, a grade level, or an entire school.

Don't miss Massachusetts Maritime Academy's one-of-a-kind 2019 STEM adventure on land and sea!

SPEAKER

Nancy A. Franks, Follow The Voyage – Share The Experience Coordinator, Massachusetts Maritime Academy

AM BREAKOUT I

Full STEAM Ahead: A Kinetic Sculpture Project

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

In this session, educators from the Public Schools of Brookline will share a successful interdisciplinary learning experience for 8th graders. Based on Arthur Ganson's mechanical artwork at the MIT Museum, students integrated learning from science, engineering, visual arts, and technology to create their own kinetic sculptures in a public display of project-based learning. This innovative project brought about high levels of student engagement and achievement.

In this session, we will share details of all stages of this project (including photos and video), from preparation to classroom lessons to the final showcase. The stages include movement drawings, visiting MIT, observational drawings, brainstorming, sketching, building (and persisting), and reflecting. We will share successes, challenges, and lessons learned in thinking about future iterations and implications for our own practice as educators. Time will be built in for questions from attendees. We believe this session would benefit all teachers in grades K-12, with a particular emphasis for middle school. We are hoping that participants would leave with an inspiring opportunity to integrate content in an engaging relevant manner. We also hope the audience would take away the relationship among student-directed learning, persistence, and engagement, and that these skills will remain with students forever.

SPEAKERS

Matt Durant, Educational Technology Specialist, Public Schools of Brookline

Mark Goldner, Science Teacher, Schools of Brookline

Tanya Gregoire, Enrichment & Challenge Support Specialist, Public Schools of Brookline

Ceara Yahn, Visual Arts Teacher, Public Schools of Brookline

Pathways to STEM Student Success and Workforce Development

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

There is a growing demand for science, technology, engineering and mathematics (STEM) professionals, but the number of STEM graduates is not keeping pace. UMass Boston College of Science and Mathematics (CSM) had been no exception to the problem of low graduation rates, an issue made particularly urgent considering the opportunity we have, as a minority-majority college, to contribute to the diversity of the STEM pipeline and workforce. This urgent issue led to careful analysis of student data to identify the "leaks" in the pipeline and the utilization of a multidimensional approach incorporating data-driven strategies and interventions that strengthened our pipeline and improved success rates for students. The strategies and interventions work synergistically to enable our students to succeed and persist in STEM fields. CSM has successfully leveraged the community concept, which begins with the Freshman Success Community (FSC) Program. The FSC serves as a platform to address the needs of first-year STEM students, provide an enriched academic experience, and increase motivation to pursue STEM. CSM has developed collaborative relationships with external corporate and institutional partners to support student research and internships. As students make progress through their STEM education (the pipeline), they participate in these high- impact practices and vertical learning communities to generate awareness of STEM careers, increase their confidence in their STEM capabilities, build their network through mentorship with faculty, peers, and industry professionals, and acquire the knowledge and technical and soft skills to be successful in college and pursue rewarding and productive careers in STEM.

MODERATOR

Andrew Grosovsky, Dean, College of Science and Mathematics, University of Massachusetts, Boston

SPEAKER

Marshall Milner, Executive Director Science Training Programs, University of Massachusetts, Boston

AM BREAKOUT I

Project Based Learning Pathways: Reflections on a 6th Grade Public Middle School PBL Classroom Pilot

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

Project based learning (PBL) is a student-centered learning model that has a long history of implementation in schools, but is still considered to be an innovative teaching method to better prepare students for college, career and life.

Research has shown that PBL can be particularly effective in helping students develop 21st century skills such as creativity, collaboration, communication and creativity, as well as improving retention of cognitive skills and knowledge.

In the 2017-18 school year, the Westford, MA public school system decided to launch a pilot 6th grade classroom that would offer a fully integrated (i.e., STEM and Humanities) PBL classroom as an alternative to traditional subject- specific classroom settings. Parents opted into the choice of this classroom for their children, and for some it was a way of trying to re-engage their sons and daughters who were losing interest in school. The session will summarize the results of the pilot in the words of the two teachers who led the class, two of their students from the pilot classroom, as well as an evaluator who conducted a mixed methods assessment during the school year. Topics covered in the session will include an explanation of how the integrated PBL model was implemented, what was needed to make the year a success, and what were the key learnings by looking at the outcomes from the year. Perspectives from students, parents, teachers and the administration will be included in the session.

SPEAKERS

Malvika Bhardwaj, Student, Stony Brook Middle School

Tristan Caldwell, Student, Stony Brook Middle School

Sandra Femino, 6th Grade Humanities Teacher, Stony Brook Middle School – Westford Public Schools

Jane Heaney, Program Evaluator, Westford Public Schools

Sanhita Lothe, Student, Stony Brook Middle School

Jennifer Masterson, 6th Grade STEM Teacher, Stony Brook Middle School – Westford Public Schools

STEM4Girls: Hands-on Experience to Engage 3rd-8th Grade Girls in STEM

Time – 9:45–10:35am
Venue – Grand Ballroom South
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.

SPEAKERS

Shakhnoza Kayumova, Assistant Professor, Kaput Center for Research & Innovation in STEM Education at UMass Dartmouth

Chandra Orrill, Director, Kaput Center for Research & Innovation in STEM Education at UMass Dartmouth

Stephen Witzig, Associate Professor, Kaput Center for Research & Innovation in STEM Education at UMass Dartmouth

AM BREAKOUT I

Tech Apprentice: 10 Years of Learning to Inform Employer Engagement

Time – 9:45–10:35am
Venue – Meeting Room D
Strand – Workforce & Business

Through Tech Apprentice, the Boston Private Industry Council has focused on IT/tech internships as a subset of its overall Youth Summer Employment Program in partnership with the Mayor and the Boston Public Schools for over 10 years. In 2017 the PIC sought to understand how these very early pipeline efforts were impacting the future labor force and how programming and systemic work might evolve to meet the demand for greater scale, preparation and diversity in the tech workforce. This panel presentation and discussion will focus on:

- Approaches for employer engagement and relationship cultivation;
- More about the Tech Apprentice Signal Success curriculum and its potential for talent outreach, identification, and preparation;
- What employers can do to be receptive environments for aspiring technologists;
- Increasing student diversity through alignment with career and technical education pathways.

MODERATOR

Alysia Ordway, Employer Engagement Director, Boston Private Industry Council

SPEAKERS

Jennifer Applebaum, Director of Youth Employment, Curriculum & Training, Youth Pathways, Commonwealth Corporation

Bea Mitchell, Director, Technology, DTCC

Olivia Paquette, Senior Career Specialist, Charlestown High School, Boston Private Industry Council

Bruce Stephen, Employer Engagement Director, Boston Private Industry Council

Michelle Sylvaria, Executive Director of Career and Technical Education High Schools, Boston Public Schools

Who's Nurturing the Next Generation of Innovators? Effective STEM Programs to Build Workforce Talent

Time – 9:45–10:35am
Venue – Grand Ballroom Center
Strand – Workforce & Business

The future of STEM business growth depends on current and future STEM talent, that pipeline of scientists, technicians and engineers with the skills, creativity and perseverance to innovate, and a citizenry that understands fundamental STEM concepts. Business leaders from companies that place high value on STEM competencies in their workforce will discuss the STEM educational programs that they support to inspire and nurture the next generation of researchers and innovators.

Hear from panelists about Santander Bank's investment of over $1.3 billion in higher-education STEM programs and Intel's investment of millions in K-12 STEM education. Learn about the successful STEM program developed by the international law firm of Fish & Richardson, in which intellectual property experts guide young innovators through the patent application process, providing full legal services annually to the two most inventive projects by Massachusetts students statewide. Over the last 18 years, the results have been impressive—high school students whose research is helping to cure breast cancer, address the worldwide opioid crisis and aid people suffering from seizures. Together, these companies and programs have helped hundreds of thousands of students to pursue STEM learning and careers.

Learn how your organization or company can create its own business-school partnership that provides STEM- mentored research opportunities for young innovators. Discover funding that is focused on STEM for high-needs communities and disadvantaged students. Moderated by a co-founder of Boston-based Dock Square Equity, topics will include advancing and financing STEM talent in K-20 and beyond, to keep pace with the growing STEM sector.

MODERATOR

Rishi Shukla, Co-Founder & Managing Partner, Dock Square Equity

SPEAKERS

Jodi Dahlgard, Human Resources Director and Director of Inclusion and Diversity, Analog Devices

Timothy A. French, Principal, Fish & Richardson, P.C.

Anne McGrath Linehan, Corporate Social Responsibility Project Manager, Santander Bank

Breakout Sessions – AM Breakout II

A Data-Driven Approach to Aligning Higher Education Programs With Workforce Needs

Time – 10:55–11:45am
Venue – Junior Ballroom
Strand – Higher Education

Learn how accessible, on-line data on job trends in STEM industries can help guide curriculum, connect with industry and improve career awareness among students. As we work to build the STEM pipeline and create career pathways for students, educators need to have access to clear data and analysis that effectively conveys the skill needs of STEM industries. By examining an ongoing partnership between the biopharmaceutical industry and higher education, facilitated by the MassBioEd Foundation, attendees will learn how the daunting task of aligning education programs with the skill requirements of STEM employers can be greatly eased by the effective use of available data on hiring trends. This session includes panelists from higher education, industry and a data provider, who will share how access to such data and analysis has created a common ground for industry and higher education to come together to help direct alignment around skills development and provide new tools for educators at the secondary and post- secondary level to better create awareness among students about careers in the life sciences, for which 12,000 additional jobs will need to be filled by 2023.

MODERATOR

Peter Abair, Executive Director, MassBioEd Foundation

SPEAKERS

Aron Clarke, Training Lead, Sanofi

Kenneth Henderson, Dean of the College of Sciences, Northeastern University

Dan Restuccia, Chief Product and Analytics Officer, Burning Glass Technologies

A Vision for Implementation: Current Initiatives for Supporting Pre-K-12 STEM Education in Massachusetts

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

The 2016 MA Science and Technology/Engineering Curriculum Framework, 2017 MA Mathematics Curriculum Framework, and 2017 Digital Literacy and Computer Science Curriculum Framework, established a vision for all students. This vision was that all students, regardless of their future education plan and career path, must have an engaging, relevant, rigorous, and coherent pre-K–12 STEM education to be prepared for citizenship, continuing education, and careers. As the STEM Office within the Department of Elementary and Secondary Education (DESE), we are committed to providing support and guidance to districts and schools that support how they can best engage and support their students in STEM as they progress through the "Pipeline."

Pre-K–12 educators, coaches, and administrators are invited to learn more about the resources and strategies available, and examples of efforts already undertaken by some districts around providing high quality, rigorous, standards-aligned math, science, and STEM education for their students. During this session, we will highlight the following initiatives:

- Math and Science & Technology/Engineering (STE) Ambassadors Program
- Statewide Networks for Instructional Support
- High Quality Instructional Materials
- Content Specific Feedback
- Administrator Guidebooks

SPEAKERS

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

Erin Hashimoto-Martell, Director of STEM, MA Department of Elementary and Secondary Education

Nicole Scola, Science and Technology/Engineering Content Support Lead, MA Department of Elementary and Secondary Education

Leah Tuckman, Mathematics Content Support Lead, MA Department of Elementary and Secondary Education

Closing the Digital Equity Gap: Ensuring Every Student's Access to Technology Jobs

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

Participants in this interactive session will be guided through a Digital Equity Walk presenting data in an accessible way, using tools such as Tableau Public, for all to visualize and understand the gender, racial and socioeconomic disparities that exist. Audience members will explore the data individually before collectively discussing implications and identifying solutions to address inequities and improve outcomes. As participants walk and absorb the data, they will respond to the information they find most compelling.

This session will ask participants to reflect on current efforts to expand access to computer science study, where they are being introduced and how to address the fact that in 2016 only 13% of Massachusetts high school students participated in a computer science course and less than 1% took the AP Computer Science exam. Of the 1,151 test takers, 321 were female, 65 were Black, 80 were Hispanic, and 150 were low-income.

Attendees will leave with tangible solutions they can implement and advocate for in their communities to create a pipeline for ALL students to jobs that are now the #1 source of new wages in the country. Participation does not require prior experience with data and is geared toward all audiences.

MODERATOR

Jackney Prioly Joseph, Director, Career Readiness Initiatives, Massachusetts Business Alliance for Education

SPEAKERS

Milton Irving, Executive Director, Timothy Smith Network

Aimee Sprung, Civic Engagement Manager, Microsoft New England Research & Development Center

Energy House Design Challenge

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

Get comfortable with the engineering design process in your classroom while allowing students to take the rein with NEED's "Energy House Challenge" activity. Come try your hand at building an energy house, from the purchasing aspect to installation and efficiency. You'll be investigating the science behind keeping building occupants healthy and comfortable and our buildings energy efficient. Learn about efficiency, conservation and economic returns by using various materials to insulate a cardboard house and then test its efficiency. An excellent activity in applying engineering principals and problem-solving skills to energy efficiency, while incorporating math with a set budget and cost for materials. Students will be able to describe efficiency and conservation measures for the home and justify why these measures make sense economically. This challenge can be easily differentiated for grades 6-12.

SPEAKER

Nancy Gifford, Science Educator/Science Education Consultant, Monomoy Middle School, WGBH/PBS Learning Media, WGBH Bringing the Universe to America's Classrooms

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

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

This joint presentation by the Academy of Applied Science and leading invention educators addresses the urgent need for greater diversity among the ranks of leading innovators in the U.S. and 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. The 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. We will review a seven week asynchronous online project- based learning pedagogy course preparing educators to begin an invention program. Presenters will discuss strategies used to create partnerships within local communities and beyond to support students' and teachers' work. Examples of teachers' journeys into invention education and what it has meant for students will be explored.

SPEAKERS

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

Diane Dabby, Professor of Electrical Engineering & Music, Olin College

Veronica Lewis, Student, Georgetown Middle High School

Mary Lyon, High School Creativity/STEM Educator, Georgetown High School

Frank Xydias, Engineering Faculty, Milford High School

Job Simulations: An Exercise Connecting Students and Employers in a Meaningful, Time-efficient Way

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

In today's diverse STEM economy, students pursue a wide variety of careers critical to the scientific enterprise. However, it can be challenging for students to learn about career options due to time, financial and logistical constraints. Here, we present an educational model for experiential learning developed as part of our National Institutes of Health BEST (Broadening Experiences in Scientific Training) grant: #MicroSim job simulations.

#MicroSims connect students with employers in a meaningful interaction that takes just a few hours. Each simulation activity replicates a task common to the career role, giving the student an opportunity to consider their own career fit. The student shares their job simulation product with an employer in an informational interview or small group discussion setting, helping both student and professional deepen the conversation and build a more meaningful connection. We developed job simulations as a component of our Career Pathways Communities (CPC), which are career-themed learning communities connecting employers and Ph.D. students. We anticipate that the #MicroSims model could be applied to students across STEM disciplines and at various educational levels. In this session, we will share strategies for development and implementation of #MicroSim job simulations and facilitate an audience discussion of potential applications in other contexts. Joining us will be an employer who helped to develop and facilitate a job simulation, and a student who experienced the program, sharing their perspectives about the experience and the benefits for all parties.

SPEAKERS

Spencer L. Fenn, Assistant Director, Center for Biomedical Career Development, UMass Medical School

Cynthia Fuhrmann, Assistant Dean, Career & Professional Development, Center for Biomedical Career Development, UMass Medical School

Jennifer Griffin, VP, Industry Programs & Relations, Massachusetts Life Sciences Center

Heather Yonutas, Career Pathways Curriculum Intern, Center for Biomedical Career Development, UMass Medical School

STEAMathon: Engaging Families in STEAM Activities

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

Within the K-12 school, we are always looking for ways to engage our families and our community. STEAM activities and events are a great way to bring our families and community members into our schools. By working with the community through local grants and donations, Mary E. Stapleton Elementary has hosted a completely free event that provides hands on activities and experiences in the areas of STEAM. These activities spark interest in our students in the areas of STEAM outside of school. They make connections with the materials they see and use at the event with jobs and interests that they have outside of school. This session will allow us to share our planning processes for a successful event that can be hosted at your school with examples of activities we have done and materials we have purchased that are now available for our classroom teachers to use throughout the school year. We will begin by sharing our planning process and documents that have been used in planning and promoting the event with exit surveys and feedback from families. We will then move to an open exploration where attendees of the session will have the opportunity to try some of the activities for themselves and ask questions about the event. We will share our beginning planning for next year's event and some of the resources/vendors we have purchased items from or may be purchasing from in the future.

SPEAKERS

Heather Allen, Classroom Teacher / STEAMathon Coordinator, Mary E. Stapleton Elementary School

Ashley Newton, Classroom Teacher / STEAMathon Coordinator, Mary E. Stapleton Elementary School

Supporting a Home-to-School Approach in Preschool Curriculum with Low-income Immigrant Families

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

The Readiness through Integrative Science and Engineering (RISE) project seeks to develop ecologically valid, culturally-relevant integrative science, technology and engineering (STE) preschool curriculum components and home-school connections, forged through exploration of family knowledge, activities, and routines related to STE, to support young dual language learning (DLL) children's school success. A principal innovation of RISE is the process of co-construction, conceptualized as reciprocal and non-hierarchical engagement by researchers, parents and teachers. RISE was developed and initially implemented in seven Head Start classrooms in a large northeastern city, across two programs serving Latino and Chinese heritage families and their DLL children. We will present the RISE Model of Co-Construction,

highlighting the Home-School Collaboration (HSC) component. The HSC component, guided primarily by the work of Joseph Tobin and Luis Moll, is built on the idea that schools can leverage families' unique contributions to children's learning, rather than trying to overwrite these to get children "ready for school." Essential to our reconceptualization of family engagement is that the home-to-school flow of information is just as important as the school-to-home flow, with a particular focus in RISE on STE learning as the family-school bridge. By effectively connecting children's familiar knowledge and classroom curriculum, teachers can facilitate powerful learning for children from non-dominant groups (Thompson, 2010). We will present our innovative approach, as well as preliminary evidence of its success, and discuss links to early childhood policy and practice.

MODERATOR

Christine McWayne, Professor of Child Study and Human Development, Tufts University

SPEAKERS

Virginia Diez, Community Connector, RISE Project, Tufts University

Antonia Hutchinson, Family Advocate, ABCD Head Start, Malden, MA

Sunah Hyun, Doctoral Candidate and Research Assistant, Tufts University

The Flipped Internship: A New Partnership Strategy between Technology Companies and High Schools

Time – 10:55–11:45am
Venue – Meeting Room A
Strand – Workforce & Business

High School Internships in technology companies are difficult to find. As a result, students often miss out on opportunities to learn, first-hand, about careers in technology. To solve this problem, MITRE and Burlington High School (BHS) collaborated and created a new strategy to provide High School Seniors with technology and career-related experiences in the "Flipped Internship." Students were given an opportunity to propose and complete a career- related project while remaining in school. Industry mentors met with students once a week, and introduced them to software development methodologies such as Agile and Scrum, development tools like GitHub and Trello, emerging fields like Cybersecurity, and new software development platforms. Additionally, using technologies like Trello and Github enabled both teachers and off-site mentors to have insights into student progress and obstacles. Because the interns remained in the classroom, a large number of students were able to participate and work as colleagues, supporting and learning from each other. Weekly Mentor meetings were scheduled during lunch, and MITRE employees from different departments were able to meet and traveled together, creating a sustained engagement with the school that offered employees both structure and flexibility. Two lead engineers from MITRE's NextUp group and two computer science teachers from Burlington High School will describe their experiences, share lessons learned, and provide a framework for other schools and businesses who would like to use this model.

SPEAKERS

Emily Holt, Cyber Security Engineer, MITRE

Dylan Phelan, Visualization and Computer Graphics Software Engineer, MITRE

Shereen Tyrrell, Computer Science Teacher, Burlington High School

LeRoy Wong, Student Help Desk Instructor and Instructional Technology Specialist, Burlington Public Schools

The Pipeline Doesn't End: Developing a Sustainable Culture of Digital Literacy in the Workplace

Time – 10:55–11:45am
Venue – Conference Room 210
Strand – Workforce and Business

Given the theme of "Pipelines to Prosperity" and the importance of cultivating ongoing practices – as opposed to one-time check-off-the-box-and-it's-done initiatives – we explore some workplace-tested ideas regarding "what works" based on notions of learning as situated in communities of practice (Lave & Wenger, 1991). To turn these theoretical insights into specific actionable programs, we offer an example of blockchain technology which demonstrates the importance of cultivating agile, diverse, entrepreneurial organizations capable of navigating future landscapes in which learning is a lifelong endeavor. To explore how businesses can reimagine their role in broadening participation in digital literacy initiatives, we draw upon insights garnered from the anthropological lens of "figured worlds" (Holland, Lachicotte, Skinner, and Chain, 1998). This session prepares employers of all sizes to leverage the latest research findings to implement digital literacy practices not only for "knowledge workers," but for all workers. While Massachusetts is known internationally as a hub of technological innovation, many who hail from historically non-dominant communities, e.g. females, Latinx, Black and Brown individuals, and English Learners (ELs), are underrepresented in industries that require STEM knowledge and skills (Landivar, 2013). The reasons for this are myriad: access to resources is often not enough; successful efforts must also address issues related to identity, i.e. not seeing oneself as a "science person" (Carlone, 2004); the "problematic pipeline" (Chapa & De La Rosa, 2006); and sociopolitical practices that embrace deficiency viewpoints (Gutiérrez, 2013). We frame workplace digital literacy initiatives as one way to improve communication, collaboration, innovation, and actualize increased prosperity for all.

SPEAKERS

Nicole Butts, CEO, Consigli Construction

Suzanne Cardello, PhD Student, University of Massachusetts Dartmouth STEM Education

Semiha Gun-Yildez, PhD Student, University of Massachusetts Dartmouth STEM Education

Breakout Sessions – PM Breakout I

Amp It UP! Industry Driven Lessons

Time – 1:45–2:35pm
Venue – Grand Ballroom Center
Strand – Workforce & Business

The AMP IT UP program is an industry, school, and agency program that provides a day-long mini-externship to STEM teachers in local companies. Teachers observe how the math and science skills that they teach under the Massachusetts Curriculum Frameworks are applied in the day-to-day activities of these companies. The program includes professional development sequence that embeds the field experience into a resulting lesson extension. As a result, hundreds of students in math, science and engineering classes throughout the north shore are learning about local high tech companies, STEM careers and the importance of mathematics, science and engineering practices.

We will share the professional development model, lesson plan templates and resources developed. Additionally, lesson extension samples will be shared with the group.

SPEAKERS

Katie Crowder, Manager of Youth WD Programs,
North Shore Workforce Investment Board

Mary Sarris, Executive Director,
North Shore Workforce Investment Board

Christine Shaw, Professional Development Leader,
Merrimack College

Beauty and Joy of Computing: A CS Principles Course

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

Computer science (CS) has been a field dominated by White and Asian men, but the educational community is actively seeking to engage and support female, Black and Latino students in rigorous high school computer science and prepare them for CS in college and the workforce. Come see how the College Board-endorsed AP curriculum Beauty and Joy of Computing (BJC) is teaching students how to program and how technology impacts society using cross-subject-area projects in a visual programming language and collaborative and student-led class discussions on current events. You will collaboratively explore a hands-on introduction to programming with the Snap! language and learn about the AP Computer Science Principles course, the BJC curriculum, and our ongoing research in urban schools. We'll answer your questions about implementing this free course, the Snap! programming language, and the equity-focused research project, and leave you inspired to explore the Beauty and Joy of Computing with your students. Participants do not need any experience with programming but should bring an Internet-enabled device.

SPEAKER

Mary Fries, Senior Curriculum and Instructional Design Associate, Education Development Center, Inc.

Creating a STEM Pathway through Mentoring, Purpose, and Food Justice

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

Our Change Maker program brings together youth from Springfield, Waltham and Boston and uses a cross-age, near peer, tiered mentoring model, positive-youth development STEM focus where high school youth will support middle school youth in learning the interdisciplinary science of hydroponics while they grow crops in their urban hydroponic farms. We have established Food Justice Ambassador teams across our three cities consisting of high school youth who will mentor and teach middle school youth in after-school settings with youth alumni (college-students) serving as Food Justice Leaders. Attendees will learn how we have combined three synergistic components into a STEM pathway model: (1) a near-peer mentoring approach, (2) STEM learning, and (3) youth purpose and career development. Unlike other out-of-school STEM programs, our proposed work will not only support the learning of STEM concepts, but it will do so by taking them on a personal journey designed to help them discover the relevance of STEM skills for fulfilling future career aspirations, as well as for contributing to the lives of others. Our approach is different from the many programs that focus on teaching STEM to close the opportunity gap. Rather, our program recognizes

the potential for urban youth to become deeply knowledgeable citizens who understand the localization of food injustice within their communities and as such, can mobilize their enhanced STEM knowledge and skills to illuminate/resolve social injustices.

MODERATOR

Michael Barnett, Professor, Boston College

SPEAKERS

Heather Metallides, Director of Science, Waltham Public Schools

Marcello Rossi, Springfield ChangeMaker Project Lead, Springfield Public Schools

Andrew Trossello, Teacher, Waltham High School

Designing for Scale to Impact System-wide Student Success

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

To realize the significant change we seek in student success trajectories, solutions have to be implemented across a system at scale. However, scale can be difficult to achieve and maintain. Designing, launching, and supporting an initiative at scale brings its own unique challenges and benefits. Can an initiative launched at scale 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 designing for scale, highlighting specific instances of success, challenge, and emergent best practice. Audience members will learn about implementing an initiative at the system level (at scale) through the lens of STEM Starter Academy programming. Key steps in the process of implementing and supporting work at scale will be highlighted during this session, as well as the practices and lessons learned that have helped shape this initiative 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

Meghan Abella-Bowen, Associate Dean for STEM Initiatives, Bristol Community College

Jeremiah Johnson, Senior Research Manager, UMass Donahue Institute

Valerie Kapilow, STEM Starter Academy Project Director, Massachusetts Bay Community College

EcoMOD: Blending Computational Modeling and Virtual Worlds for 3rd Grade Ecosystems Science

Time – 1:45–2:35pm
Venue – Conference Room 210
Strand – K-12 Education

In recent years, the field of education has challenged researchers and practitioners to incorporate computing as an essential focus of K12 STEM education. Widely recognized as a "basic skill" necessary for economic opportunity and social mobility, integrating computing within K12 STEM supports learners in applying computational thinking while co- developing practices essential to mathematical and scientific expertise. The EcoMOD research project is an example of such an integration. EcoMOD is a 3rd grade science curriculum that blends scientific modeling tasks and computer programming within an immersive virtual ecosystem.

The EcoMOD curriculum interweaves a 3D virtual ecosystem and a visual block-based programming and modeling environment such that the epistemic goals of science are visible to learners. In EcoMOD, students explore an immersive virtual forest ecosystem from multiple perspectives; collecting data, embodying behaviors of focal animals using an immersive point-of-view tool, documenting change caused by the arrival of two keystone species (beavers and woodpeckers), and, finally, developing theories to explain those observed changes. Students test their theories by constructing and refining computational models of the ecosystem. Model outcomes help students link individual organism behaviors to indirect and emergent system level impacts, in turn scaffolding the development of more sophisticated theories regarding the complex causal relationships within the ecosystem.

SPEAKERS

Amanda Dickes, Postdoctoral Fellow, Harvard Graduate School of Education

Shari Metcalf, Project Director, Harvard Graduate School of Education

PM BREAKOUT I

Exciting Students in STEM: STEM Week Reflections and Lessons Learned

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

The Commonwealth's inaugural STEM Week in October highlighted the importance of engaging students at all levels in STEM education, activities, and connections to the state's workforce. In this session, STEM Week hosts, including educators, industry, and non-profit leaders, discuss strategies for building interest and excitement in STEM subjects, and specifically, how they planned STEM Week activities that galvanized students' attention and energy. The session will also look ahead to STEM Week in 2019 as participants discuss lessons learned and their ideas on how to make STEM Week successful in the years to come.

MODERATOR

Erin Hashimoto-Martell, Director of STEM,
MA Department of Elementary and Secondary Education

SPEAKERS

Chakara Cardillo, 8th Grade STEM teacher, Randolph Community Middle School

Stacey Kaminiski, Executive Director, CONNECT Partnership & Southeast Regional STEM Network

Greg Mullaney, Associate Professor of Early Childhood Education, Quinsigamond Community College

Rochelle Willis, Business Development Manager, Skanska

Fairytales & STEAM — Cross Curricular Integration Through Project Based Learning

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

Fairy tales give young children a safe way to explore the world and grapple with the conflict between good and evil. They also inspire curiosity, creativity and problem-solving, making them a natural fit for the STEAM classroom. In this session, you will be introduced to the ways you can integrate disciplines to create a more powerful learning experience for K-2 students..

MODERATOR

Samantha Buckley, Second Grade Teacher,
Framingham Public Schools

SPEAKERS

Ashley Deschenes, First Grade Teacher,
Framingham Public Schools

Sabrina Gravanti, Kindergarten Teacher,
Framingham Public Schools

Motivate Students with Free Innovative STEAM Resources from Public Libraries

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

The pipeline to prosperity begins with accessing resources your public library offers for free! Students learn better when their learning is supported in the community. STEAM emphasizes collaboration between schools, science organizations, higher education and business to prepare students for STEM jobs. Public libraries are a place where all of these institutions can come together to reach your students and their families. Public libraries have responded to STEAM with a plethora of free materials, kits, robots, programs, clubs, makerspaces and STEAM Centers. Educators for grades K-4 and school librarians will discover innovative resources available at public libraries throughout MA designed to support students, educators, classrooms, out-of-school activities and parent and community involvement. Learn about library resources specifically for K-4 students and for teacher use in the classroom or on a field trip to the library. Find out about library clubs for young coders, Skype programs with NASA, STEAM kits and centers, makerspaces and circulating telescopes. Explore new ways public librarians, school librarians and K-4 educators can form partnerships. MA Library Systems will provide an overview of statewide offerings. Learn about the Needham Free Public Library's STEAM Center and their partnership with elementary schools, STEAM Professionals and Olin College of Engineering. There will be a question and answer/discussion session on how educators and public libraries can work together to support parent and community involvement for student motivation and success

SPEAKERS

Paula Dugan, Children's Supervisor, Needham Free Public Library

April Mazza, Youth Services Consultant, MA Library Systems

Nick Tartar, Associate Dean of Student Affairs and PDSO,
Olin College of Engineering

Priming Preschoolers to Enter the Engineering Pipeline through Problem-Solving

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

Children are born curious about the natural world. Early childhood settings are the perfect environments to harness this curiosity by encouraging questioning and problem solving using principles of engineering. By supporting children as they navigate the principals of engineering, we are priming the pipeline for STEM success. Despite prior research that shows a STEM curriculum that integrates the engineering design process (EDP) encourages cognitive development and child curiosity, there is very little organized STEM or engineering instruction within early childhood classrooms. Some reasons for this include lack of preschool teacher preparation in STEM and a shortage of available early childhood STEM and engineering curricula. This presentation will offer participants the opportunity to understand how to infuse dynamic STEM opportunities into their own preschool programs by learning about Worcester Head Start's STEAM initiative and STEAM kits. Participants will also learn about Head Start's partnership with Worcester Polytechnic Institute on a federal grant to develop a problem-based preschool STEM curriculum, Seeds of STEM, which exposes preschoolers to engineering vocabulary and an adapted engineering design process

MODERATOR

Carlene Sherbourne, Education Manager, Worcester Head Start

SPEAKERS

Colleen Bostwick, Lead Teacher, Worcester Head Start

Suchira Channoi, Lead Teacher, Worcester Head Start

Bernadette Sibuma, Research Scientist,
Worcester Polytechnic Institute

The Shrinking STEM Workforce: Capitalizing on the Expanding K-12 EL Population as a Solution

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

Could the need for workers in the STEM pipeline be mitigated by capitalizing on the growing numbers of English Learners (ELs) children and young adults entering the MA K-12 system?

Yes, if we are proactive with assessing incoming ELs' numeracy skills when they enter the K-12 system and determine what they already know, we could meet them where they are academically in their math and science numeracy skills and provide them with proper supports so that they do not fall behind in these subjects as they learn and become proficient in the English language.

- Learn about the MA Numeracy Assessment Protocol for Students with Limited and Interrupted Education (SLIFE) who are disproportionality ELs.
- Learn how the interactive MA Mathematics Progression Chart helps: (1) identify the numeracy skills embedded in the rigorous MA Framework for Mathematics and (2) with proper placement in math and science classes.
- See an exemplar numeracy skills assessment developed for the extreme case of lack of common language.
- Have access to all of the above tools.

SPEAKERS

Sara Nino, SPED and EL Coordinator,
MA Department of Elementary and Secondary Education

Meto Raha, Math Content Specialist, MA Department of Elementary and Secondary Education

Breakout Sessions – PM Breakout II

Best Practices in STEM Space Design and Use

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

How can we engage students through the design and use of STEM learning spaces across grades K through 12? This session is centered on a presentation of initial findings of a review of best practices for K-12 STEM learning spaces commissioned by the Massachusetts School Building Authority (MSBA). The review is looking at K-12 academic STEM learning spaces, including elementary classrooms, science labs, and makerspaces, to provide recommendations for the sizing, configuration, outfitting, management, maintenance, and use of STEM learning spaces. Panelists will reflect on the importance of thoughtful STEM space design, the affordances and limitations of design for STEM learning opportunities and programming, and potential implications of initial findings. Participants will consider and reflect on how their STEM space design enables or limits local STEM programming and goals.

MODERATOR

Jake Foster, Owner & Founder, STEM Learning Design LLC

SPEAKERS

Karl Brown, Senior Architect,
Massachusetts School Building Authority

Amy Fish, Innovation Studio Facilitator,
Bourne Public Schools

Laura Smith, Consultant

Co-constructed STE Curriculum in Head Start: Partnership-Based Research for Program Improvement

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

The Readiness through Integrative Science and Engineering (RISE) project focuses on the purposeful engagement of preschool teachers and children in both the explanation-seeking behavior of science and the problem-solving behavior of engineering and technological endeavors. Specifically, RISE seeks to develop ecologically valid, culturally relevant integrative science, technology and engineering (STE) preschool curriculum components and home-school connections (HSC), forged through exploration of family knowledge, activities, and routines related to STE, to support young dual language learning (DLL) children's school success. Three Head Start teachers will provide brief presentations about how their curriculum concerning the concept of Living vs. Non-living Things unfolded. These presentations will provide the audience with clear examples of how curriculum implementation can align with, yet vary within, larger national and state frameworks, how a co-construction approach to PD can empower teachers and families, and how evaluation of curriculum and PD programs can measure fidelity to an approach rather than fidelity to a specific curricular script. Implications for application in other settings will be discussed, especially as relevant for informing culturally inclusive curriculum

MODERATOR

Christine McWayne, Professor of Child Study and Human Development, Tufts University

SPEAKERS

Heidi Chait, Early Childhood Mentor/Coach,
ABCD Head Start, Malden, MA

Suzane Croteau, Lead Teacher, ABCD Head Start,
Boston, MA

Cynthia Parker, Lead Coach for the RISE Project,
Tufts University

PM BREAKOUT II

Collaborative Design for Engaging STEM Volunteers in Middle Grades Class Projects

Time – 2:55–3:45pm
Venue – Conference Room 210
Strand – K-12 Education

Citizen Schools' Apprenticeship model has been shown through external evaluation to increase middle school students' interest in STEM careers and proficiency in Math (comparable to 4 additional months of learning).

Citizen Schools' design team has been working to develop a pilot that will allow us to engage more students in this style of learning as part of their science classes. Taking what we have learned about developing high interest, project- based learning courses with STEM in the out of school time, we set out to design an in-school model co-designed by science teachers and STEM volunteers.

This session will share the key volunteer engagement strategies we've developed for inclusion in our project-based learning units and model the design-based research methods we've used to evaluate and refine our resources for the model.

Come with an idea you have for a student project to workshop. The final component of the session with guide participants in a protocol to brainstorm their own curricular units they may want to develop (using our templates and online resources) that would be bolstered by the relevance, rigor and joy that volunteers can add to a project for middle school students – We'll work in small groups to identify roles that STEM professionals could potentially play in supporting student's authentic project work, and potential sources for recruiting those volunteers to bring the project to life!

SPEAKERS

Amy Hoffmaster, Director of Program Innovation, Citizen Schools

Nell Kisiel, VP of Strategy and Business Development, Citizen Schools

Creating Fun and Engaging STEM Learning with Toddler and Preschool Children

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

Get ready to have some fun! Filled with "A-HA" moments, this workshop is designed to promote simple science, technology, engineering and mathematics in toddler and preschool settings. Through hands-on exploration with our fun and engaging experiments and activities, participants will take away great ideas and strategies that can easily be incorporated into their classrooms.

SPEAKER

Krissy Cannizzo, Outreach Coordinator, Professional Development Trainer, Children's Museum in Easton

Cybersecurity Education Standards: Partnership Between Industry and Education

Time – 2:55–3:45pm
Venue – Meeting Room C
Strand – Workforce & Business

Using cybersecurity as an example, this session will examine the relationship between industry and education stakeholders as they developed computer science education standards. The session will follow two threads of conversation: one based on the specifics of cybersecurity and the other focused on the process. This session will examine: 1) how the sub-concept of cybersecurity was elevated to main concept status; 2) how the Standards Committee ensured that the standards include content and skills that were relevant to a fast-changing industry as well as being cognitively appropriate for the designated grade bands and; 3) the process of balancing the needs of industry and education.

The chair of the Rhode Island Computer Education Standards Advisory Committee will moderate a panel composed of a defense industry association education specialist, a high school teacher and a cybersecurity expert. They will discuss how experts in content and experts in pedagogy and educational administration worked together to develop the cybersecurity standards that were endorsed in May 2018 (as part of a larger set of CS standards) by the Rhode Island Board of Education and are currently being implemented.

After a very brief introduction to Computer Science for Rhode Island (CS4RI) and the development of the CS education standards, the panel will discuss the following questions:

- Why should cybersecurity be a stand-alone core concept in the standards?
- As risks continually evolve, how can cybersecurity be taught so it is age appropriate and relevant?
- How are content and/or perspective differences resolved?

MODERATOR

Carol M. Giuriceo, Director, Rhode Island STEAM Center @ Rhode Island College

SPEAKERS

Simon A. Cousins, Principal Client Specialist, FM Global

Linda Larsen, Director of Education Outreach & Workforce Development, Southeastern New England Defense Industry Alliance (SENEDA)

Joe Mazzone, Career and Technical Education Instructor, William M. Davies Jr. Career and Technical High School, Lincoln, Rhode Island

Integration of Computational Thinking into Math and Science Curriculum Materials

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

In recognition of the fact that digital literacy and computer science knowledge and skills are rapidly entering the realm of foundational knowledge for all K–12 students, Massachusetts was among the first states in the country to have released Digital Literacy and Computer Science (DLCS) standards. While DLCS competencies are clearly critical for students' academic and career futures, many educators in the elementary grades will find it challenging to address these standards if they feel they need to add a new subject area to their already jam-packed instructional time.

This session will share the work of one project that is addressing the challenge by integrating standards from the computational thinking DLCS strand into math and science lessons. This project is a collaboration between Education Development Center (EDC), Massachusetts Department of Elementary and Secondary Education (DESE), and teachers from 15 school districts throughout the state.

In this session, attendees will get a brief introduction to computational thinking, engage in a computational thinking-rich activity, and have a chance to explore and discuss an integrated science-computational thinking task from one of the project-developed lessons. Anne DeMallie, DESE's Computer Science and STEM Integration Specialist, will be on hand to discuss the DLCS standards and their implementation with attendees.

MODERATOR

Marian Pasquale, Senior Research Scientist,
Education Development Center (EDC)

SPEAKERS

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

Kristine Thayer, Teacher (Grade 3),
Glenwood Elementary School, Rutland, MA

Kevin Waterman, Project Director,
Education Development Center (EDC)

Nudging to STEM Success: Supporting Persistence and Completion in STEM Pathways

Time – 2:55–3:45pm
Venue – Meeting Room A
Strand – Higher Education

Evidence is growing that "nudges" grounded in behavioral science can help students persist through college. This session will discuss lessons and early outcomes from a national initiative using behavioral nudging and intelligent software to increase STEM success and completion. Early experimental results show that the nudging support resulted in a 10 percentage-point increase in spring-to-fall persistence.

Beginning in summer 2017, Persistence Plus and Jobs for the Future launched an initiative to support students at four community colleges with text message nudges for college completion. Serving more than 10,000 students, the Nudging to STEM Success project aims to increase persistence rates for entering students, with an emphasis on success in introductory STEM courses. Nudges are grounded in behavioral science and engage students via text message. These interventions are designed to help students develop a strong college-completion and STEM identity by connecting their STEM studies to their personal values and goals. Nudges also encourage students to set and follow through on academic goals and utilize campus supports like tutoring and advising, while revealing hidden barriers and misconceptions that hinder student success. Attendees will learn how schools in this initiative are leveraging behavioral science and mobile technology to help students navigate through college, and see examples of what interactive nudging via text message looks like from the student perspective.

SPEAKER

Serena Fahnbulleh Crain, Program Operations Lead,
Persistence Plus

Robots and Screen-Free Coding for Your Youngest Learners — Come Play With KIBO!

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

Come play with the KIBO robot! Get hands-on with this screen-free coding and robotics kit for children in K-2 classrooms, while you hear ideas for integrating these activities within existing curriculum. We'll share how easy it is to integrate robotics within the classroom to engage young students to learn STEAM concepts. Using K-2 classroom examples, like our first-grade students using robotics to drive home science learning initiatives, such as wind and weather instruction. Barbara Tennyson, an experienced STEM teacher and technology integrator, will share examples of using robotics to support in-class curriculum as well as meet computer science and digital literacy standards. Learn how to incorporate robotics into your existing classroom instruction to emphasize lessons with hands-on play!

SPEAKERS

Jason Innes, Manager of Training and Curriculum Development,
KinderLab Robotics, Inc.

Barbara Tennyson, Instructional Technology Specialist,
Needham Public Schools

Vertically Aligned Life Sciences Lab & Career Experiences – An Opportunity for MS & HS

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

Would your students benefit from hands-on and inquiry-based life sciences activities in their classrooms, industry guest speakers and visits to local biotechnology companies and college campuses? Would your students benefit from up-to-date information on the workforce development and job skills trends in the life sciences?

MassBioEd & Science from Scientists, both recognized as premier STEM educational initiatives in Massachusetts, are launching a new joint program. We will provide middle and high school life sciences teachers and students with lab experiences and curriculum relevant to the life sciences industry. Students served in middle school will revisit the lab experiences and curriculum with greater sophistication in high schools supported by equipment and training grants.

Through our partnerships with area colleges and life sciences companies, these same students will explore college and career opportunities in an effort to build a connected pipeline of classroom to career experiences for students and teachers.

We will provide potential partners with 1) much-needed technology and laboratory equipment, 2) robust, field-tested and frameworks-relevant lessons, 3) instruction for teachers in the effective implementation of labs and lab-based courses, 4) support to incorporate in-school mentoring to overcome implementation barriers, and 5) increased student access to college and career exploration opportunities.

We are seeking to build teams of middle & high school teachers, faculty and district administrators that are committed to sustaining life science experiences, college and career opportunities. Each team will be supported by equipment and transportation grants, with mentoring and technical assistance from MassBioEd & Science from Scientists.

SPEAKERS

Michelle Mischke, Director of Education,
MassBioEd Foundation

Amanda Schutt, Chief Operations Officer,
Science from Scientists

Karla Talanian, Manager, Labor Market Research,
MassBioEd Foundation

What Can Your Library Do for STEM?

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

North Andover's Public Library and Elementary Schools have each received grants to expand STEM resources available to students, educators, families, and the greater community. These resources include manipulatives that encourage learning through play and experimentation while developing a coding and engineering mindset. This workshop will give K-12 educators practical advice in creating a partnership between organizations and give educators the opportunity to explore new or deepen existing partnerships with local organizations.

Participants will learn about the collaborative efforts of these seemingly disparate groups and how they have used STEM materials across the curricula. Presenters will bring manipulatives and engage attendees in an interactive demonstration of how STEM materials were incorporated into a lesson on poetry. Examples of effective ways students have demonstrated their learning using STEM tools will also be shared. Attendees will have access to lesson plans to download.

At the conclusion of the session, participants will brainstorm possible partnerships and how they can use these ideas in their own roles. Additionally, they will have hands-on time with manipulatives such as robots, circuits, and building materials.

SPEAKERS

Courtney Ahearn, Library Media Specialist,
North Andover Public Schools

Charlotte Arrendondo, Head of Children's Services,
North Andover's Stevens Memorial Library

Kara Larcome, PK-12 STEM Director,
North Andover Public Schools

Dale Osborne, Library Media Specialist,
North Andover Public Schools

Liz Sinclair-Fisher, Library Media Specialist,
North Andover Public Schools & Stevens Memorial Library

Exhibits

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

Lobby Sub Zero

A Handouts

B UMass Donahue Institute

C UMass Amherst

D UMass Boston / UMass Lowell

E UMass Dartmouth

F

Title: Northbridge High School – Epic Challenge Program

Organization: Northbridge High School

Overview: Several Northbridge High School students will present their engineering design projects which was developed as part of the NASA Epic Challenge program to support a sustainable human colony on Mars.

G

Title: Create AR and VR Models Using Fusion 360 Software

Organization: Mashpee Middle-High School

Overview: Students from Mashpee Middle-High School will demonstrate how to build complex 3D printed models and create Augmented and Virtual Reality scenes using Fusion 360 software from Autodesk. Students will lead attendees through hands-on interactive demonstrations of the AR and VR scenes using IPad tablets, Google Cardboard and Oculus 3D goggles.

H

Title: Building an Elementary Robotics Program, K-6

Organization: Pentucket Regional School District

Overview: At this exhibit, visitors may try out Bee Bot, Dash, and Mindstorms EV3 robots and learn about Pentucket's K-6 Coding with Robots program. Lessons and teacher-created materials will be on display. Participants in the annual 2017-2018 Wonder League Robotics Competition will share their experience and answer questions.

I

Title: FIRST Is Not Just Robots and It Is Not Only For Kids!

Organization: FIRST in New England

Overview: Students representing MassFIRST will share with visitors the multiple benefits of FIRST programming in K-12 education and will demonstrate an FLL level robot. Information for starting teams will also be available, alongside updates on the group's efforts to be the first state in the US to have a FIRST program in every school district.

1 Massachusetts National Guard

2-5 WGBH

6

Title: NOVA Education

Organization: NOVA

Overview: Experience the latest in science games, interactives, and immersive virtual reality produced by NOVA, the most-watched science documentary series on American television.

Exhibit in the Lobby | Sponsor | Early Education | K-12 Education | Higher Education

EXHIBITS

7 **Title:** Citizen Science Travel Programs for STEM Career Exploration and Educator Professional Development

Organization: Earthwatch Institute

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 exploring careers in science.

8-13 MA STEM Regional Networks

14 MATHCOUNTS

15 **Title:** Taking STEM Learning Outside: A Pipeline to Green STEM Careers

Organization: Mass Audubon

Overview: Visit with Mass Audubon educators to learn how environmental education and taking science learning outside engages students and open doors to STEM learning and green careers. Model programs, field study equipment, digital tools and simulations will be on exhibit for teachers to learn to get students excited about STEM.

16 LRIG / Boston Business Journal

17 **Title:** Teaching Algorithms with Board Games

Organization: Lincoln Sudbury Regional High School

Overview: In the programming classes at Lincoln Sudbury Regional HS, we're using board games to get students excited about computational thinking. Come see how well you really understand some of your favorite games.

18 **Title:** Pathways through the STEM Pipeline: Bringing Educators, Students, Out-of-school Providers Together

Organization: Museum Institute for Teaching Science (MITS, Inc.)

Overview: Informal institutes are resources for providing multiple pathways for students to move through the STEM Pipeline, providing exposure to science/engineering concepts and practices programs through on-site and classroom programs, educator professional learning programs and out-of-school time programs. MITS promotes STEM education through collaborations of informal institutions, STEM related businesses, research institutions and formal educators.

19 Biogen

20 **Title:** REC Foundation Offers VEX IQ Challenge, VEX Robotics Competition, & VEX U to Engage Students in STEM through Robotics

Organization: Robotics Education & Competition Foundation

Overview: The REC Foundation offers the VEX IQ Challenge, VEX Robotics Competition and VEX U to serve students in elementary school through college with hands-on robotics engineering experience to encourage their interest in STEM. Currently, over 20,000 VEX Competition teams participate throughout the season in over 50 countries. Visit us to drive and program robots and learn more about advancing all students in STEM!

21 **Title:** How Computers Works From Building To Coding

Organization: Southern Kennebec Child Development Corporation (SKCDC)

Overview: Computers, Robotics and Coding can be done in PK classrooms. See team work, Science and problem solving all come together as one well taking a journey with your classroom through a computer.

22 **Title:** Nurturing Our Youngest Scientists, Technologists, Engineers, and Mathematicians: Head Start Resources

Organization: New England Head Start Regional Training and Technical Assistance Network

Overview: This exhibit will highlight resources and materials developed by or with the US Office of Head Start and by Massachusetts Head Start educators to promote STEM awareness, learning, and enthusiasm for infants, toddlers, and preschoolers, as well as their families and their teachers.

23 Bay Path University / Bose

24 **Title:** Converse with Students about their Research/ Innovation Projects & Grants for Science Fair Programs

Organization: Massachusetts State Science & Engineering Fair (MSSEF)

Overview: Come meet young students eager to discuss their scientific research findings and engineering 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. Get scholarship information about courses to bring science/engineering practices into your classroom.

Exhibit in the Lobby | Sponsor | Early Education | K-12 Education | Higher Education

EXHIBITS

25 **Title:** Reaching for New Realities: VR & AR Implementation in STEM

Organization: Fitchburg Public Schools

Overview: Meet with educators to experience virtual and augmented reality, explore district resources designed to aid implementation and discuss how school districts can align Google Expeditions with the 2016 STE Frameworks.

26 Worcester Polytechnic Institute

27 **Title:** Engage, Empower & Inspire K-12 Students in CS, Engineering and Biomedical Pathways through PLTW

Organization: Project Lead The Way

Overview: Explore PLTW's standards-based STEM pathways that engage K-12 students in problem-solving and critical thinking related to Engineering, Computer Science and Biomedical Science. Experience student activities to learn about our activities, projects, and problems-based curriculum.

28 Verizon

29 **Title:** Funding and Grants Services Toward Prosperity Program

Organization: Ward's Science / VWR International

Overview: Come to our exhibit to learn about our free, no obligation grants program from Ward's Science/VWR International and get high quality resources for grants and partnerships. Talk with our team of teachers and grant professionals about resources that facilitate student growth and prosperity. Bring your grant proposal drafts for feedback.

30 **Title:** MySTEM – Mentoring Youth for STEM Success

Organization: Big Brothers Big Sisters of Central MA / Metrowest

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.

31 Raytheon

32 **Title:** IEEE REACH – Free Resources That Bridge STEM with Social Studies Through the Lens of History

Organization: IEEE History Center at Stevens Institute of Technology

Overview: Experience the interdisciplinary and dynamic nature of STE through the lens of History with IEEE REACH, an OER program that provides free educational resources that focus on the history of technology and engineering in a social context. The resources include inquiry units, hands-on activities, short engaging videos and primary source materials, as well as background information for teachers.

33 **Title:** Genes in Space – a Contest that Combines Science and Technology to Send Student Experiments to Space

Organization: Genes in Space

Overview: Genes in Space is an innovation challenge that invites teachers and students in grades seven through 12 to design a pioneering DNA experiment for the International Space Station and provides a range of opportunities to engage including educational videos, the Lab in a Box loaner program, hands-on workshops and #GenesInSpaceChat events.

34 EDC / IBM

35 **Title:** STEM Explored Through the Fine Arts in Early Education

Organization: Bright Horizons Family Solutions, Hingham Shipyard

Overview: STEM can be introduced to Preschool and Kindergarten Prep children through artists like Monet, Kandinsky, and others.

36 **Title:** What Does Weight Have to Do with It?

Organization: GLCAC, Inc. Head Start

Overview: Our exhibit uses documentation boards to show the development of STEM concepts to our question, "What does weight have to do with it?" Early childhood teachers tell their stories of how concepts develop and twist and turn into new challenges; how children use and refine their knowledge base; and how problem solving and the STEM process is used.

37 VMware

Exhibit in the Lobby | Sponsor | Early Education | K-12 Education | Higher Education

EXHIBITS

38 **Title:** STEM GOES STEAM: The Creative Side of Science, Technology, Engineering and Math

Organization: STEM BEGINNINGS, LLC

Overview: STEM goes STEAM! Let's nurture children's creative side in using Art as an effective tool for innovative STEM learning. Explore Art activities – in relation to the topic of Force & Motion.

39 **Title:** Makerspaces - Hot Places to Spark Interest, Create Awareness and Democratize STEM in Your School

Organization: MIT Edgerton Center

Overview: Educators in every grade and subject are using Maker projects to spark enthusiasm, promote STEM awareness, and inspire students to choose STEM courses. Come explore teacher-tested, student-created Maker Projects, learn about our Maker Methodology for K-12 educators, and try out Maker tools (3D printer, Vinyl Cutter, electronics).

40 **Title:** Beyond Benign: Green Chemistry & Sustainable Science Education

Organization: Beyond Benign, Inc.

Overview: By teaching sustainable science at all grade levels, educators inspire students to solve real-world using STEM concepts they learn in the classroom. Through open-access curriculum and professional development, Beyond Benign equips educators to prepare students with the skills needed for the emerging sustainability economy.

41 Massachusetts Life Sciences Center

42 **Title:** EVERFI: Digital STEM Resources at No Cost

Organization: EVERFI

Overview: EVERFI delivers digital resources that help teachers equip students with critical skills. Thanks to hundreds of partners who share our mission, we deliver STEM resources to K-12 schools free of charge.

43 **Title:** Discovery Museum's Traveling Science Workshops

Organization: Discovery Museum

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 Museum's 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.

44 General Dynamics Mission Systems

45 **Title:** BSCES K-12 OUTREACH PROGRAM & COMPETITIONS

Organization: Boston Society of Civil Engineers Section (BSCES)

Overview: We will have two bridge models: a large foam block arch bridge and a cable-stay model (like the Zakim Bridge) made from Fedex boxes. We will also have a table full of information about our programs. We plan to have two volunteers on-hand to assist attendees.

46 **Title:** BoSTEM: Partnering to Invest in the Future of Boston's Youth

Organization: United Way of Massachusetts Bay and Merrimack Valley

Overview: United Way of Mass Bay, Boston After School & Beyond, and Boston Public Schools have partnered to create BoSTEM, a city-wide initiative focused on enhancing STEM learning opportunities for middle schoolers, working in partnership with OST programs and corporations to provide opportunities to apply STEM skills in exciting, real-world contexts.

47 **Title:** Making The Most of Mathematical Moments: How To Use Talk Moves To Engage Students In Purposeful Discussions

Organization: Millbury Street Elementary School, Grafton, MA

Overview: Participants will gain a sense of the productive "talk moves" teachers use to intentionally guide conversations with students toward identified mathematical concepts and skills. Participants will also explore the methods teachers use to encourage students to share mathematical authority as they engage with others in meaningful discussions.

48 **Title:** Boston College: Innovations in Urban Science Education

Organization: Boston College

Overview: Our exhibit will demonstrate how to use hydroponics, solar energy, robotics, and coding to create an interdisciplinary science learning experience for students. We have examples of the equipment that are used, examples of the lessons and learning activities, and the complete curriculum and links to where to download the curriculum. To answer questions about the programs look like in a classroom we will have experienced teachers available to answer questions.

Exhibit in the Lobby | Sponsor | Early Education | K-12 Education | Higher Education

EXHIBITS

49 **Title:** Mini MDs: Anatomy and Physiology for the Preschool Set

Organization: Communities United Inc.

Overview: Our hands-on, innovative display will leave teachers with effective ways to teach young children about the inner workings of their own bodies.

50 **Title:** Learning Electronics by Doing: STEM Workforce and Career Preparation from Ages 8 through 80

Organization: Applied Inspirations, LLC

Strand: Higher Education

Overview: Learning Electronics by Doing is the best way to learn as students retain 90% of what is taught with over 90% graduation rate. Our hands-on kits/courses teach real electronics and prepare students from Elementary to College and can help them find a career in electronics.

51 Discover Central MA

52 IntellADAPT / Mount Wachusett CC

53 Thermo Fisher

54 **Title:** Zebrafish: Faster than Fast Plants

Organization: Boston Children's Hospital

Overview: Researchers at Boston Children's Hospital have collaborated with biology teachers at Boston Latin School to bring zebrafish into the classroom. This hands-on one-week program brings zebrafish into classrooms to enhance conceptual understanding of life science content while exposing students to the use of zebrafish as model organisms for scientific discovery.

55 TERC

56 **Title:** Massachusetts State Police Museum STEAM based lessons / Careers in the MSP

Organization: Massachusetts State Police Museum and Learning Center

Overview: The MSPMLC will have project based, teacher-led STEAM lessons on display, and handouts for Summit participants will be available. We explore various careers in the MSP such as forensics, evidence gathering, accident reconstruction, road trooper, mounted unit, canine unit and more! Through experiential learning, creativity and ingenuity are encouraged, while careers are explored.

57 **Title:** STREAM Around the Globe: A School-Community Partnership for STEM Education

Organization: Alhuda Academy

Overview: STREAM Around the Globe describes a successful community event that brings together rigorous STEM learning, problem solving, Arts, and moral values of the community. A team from Alhuda Academy in Worcester MA designed and implemented a successful community event that motivated students and teachers about STREAM and engaged the community in building bridges between countries, cultures, and religions.

Exhibit in the Lobby | Sponsor | Early Education | K-12 Education | Higher Education

OFFICE OF THE GOVERNOR
COMMONWEALTH OF MASSACHUSETTS
STATE HOUSE • BOSTON, MA 02133
(617) 725-4000

CHARLES D. BAKER
GOVERNOR

KARYN E. POLITO
LIEUTENANT GOVERNOR

November 14, 2018

Dear Friends:

On behalf of the Commonwealth of Massachusetts, we welcome you to the 15th Annual STEM Summit at the DCU Center in Worcester.

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

We also want to thank Congressman Joseph Kennedy III and Dr. Jeffrey Leiden, who co-chair the STEM Advisory Council along with the Lt. Governor, as well as the rest of the Council for working with our Administration and Education Secretary James Peyser. The Council's energy, enthusiasm, and commitment are 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 very pleased that so many people – educators, parents, business, and community leaders – come to this summit to 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, 2018

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, through the leadership of the Baker-Polito Administration, the STEM Advisory Council has focused its efforts around three priorities:

- Ensuring that all students develop foundational skills in STEM subjects throughout their PK-12 experience
- Increasing awareness and interest in STEM careers among students and parents, and developing high-quality, integrated STEM pathways from secondary school to college and beyond
- Deepening partnerships among employers, vocational-technical schools, community colleges, universities, and adult education providers to promote career opportunities in STEM fields

Through these initiatives, 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, earning college credits, and experiencing innovative curricula tied to real-world applications – is the key to inspiring our next generation.

The STEM Advisory Council is grateful for all of your contributions to these critical efforts, especially so during the launch of the Commonwealth's first annual STEM Week this past October. We look forward to continuing to work and collaborate with all of you to help our students build "pipelines to prosperity."

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, 2018

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 – Pipelines to Prosperity – touches upon a key challenge facing employers: finding employees with the skills necessary to fill open jobs. The problem is particularly acute in the STEM fields. So employers are utilizing a variety of strategies to address this shortage, from investing in training programs and professional development, to developing partnerships with community and education institutions to ensure a pipeline of talent. The work that all of you are doing to create that pipeline is critical to the students you serve, the employers who will eventually hire them, and our regional economy, whose calling card is its deep well of talent. So…thank you.

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. The state's STEM Council gets this. Led by Lieutenant Governor Karyn Polito, Congressman Joe Kennedy III and Jeff Leiden, the CEO of Vertex Pharmaceuticals, the Council is energized and focused on this issue, implementing strategies to build a STEM pipeline to support the state's economy. This year's "STEM Week" activities provide great examples of this. 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,

Bob Rivers
Chairman & CEO
Eastern Bank
Chair, MBR

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

JD Chesloff
Executive Director

University of Massachusetts
Amherst • Boston • Dartmouth • Lowell • Medical School • UMassOnline

Martin T. Meehan
President

November 14, 2018

Dear STEM colleagues,

On behalf of the University of Massachusetts, I'd like to welcome you to the 15th annual Massachusetts STEM Summit. In keeping with today's theme of "Pipelines to Prosperity," this event will explore strategies to create a robust STEM educational pathway for students that begins in pre-kindergarten and continues through higher education and into the workforce. We are proud to once again collaborate with the Massachusetts Business Roundtable and the Governor's STEM Advisory Council in organizing this important event.

As the Commonwealth's public land-grant university, we embrace our responsibility to support the Massachusetts economy and educate the state's workforce, and we are committed to meeting the growing demand for STEM graduates. Today, more than one-third of all UMass students are enrolled in STEM fields, and nearly 90 percent of our $670 million research portfolio 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. We are also 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. All of these efforts help to ensure that today's students are prepared for tomorrow's jobs and that Massachusetts remains a leader in the global innovation economy.

I'd like to thank the organizers — the Massachusetts STEM Advisory Council, the Massachusetts Business Roundtable and the UMass Donahue Institute — for their work in making this event a success. I'd also like to thank the many sponsors who have supported this event with their contributions.

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

I hope you enjoy the summit.

Sincerely,

Martin T. Meehan
President

One Beacon Street | 31st Floor | Boston, MA 02108 | P: (617) 287-7050 | F: (617) 287-7167 | www.massachusetts.edu

November 14, 2018

Dear STEM Stakeholders,

It is an honor to participate in the 2018 Massachusetts STEM Summit. At Verizon, we understand how important it is to engage educators, business leaders, nonprofit partners, and public officials to strengthen Science, Technology, Engineering, and Math (STEM) skills while bridging the digital divide to ensure all of our students are equipped to reach their full potential.

Millions of students in the United States lack the access to technology and the skills they need to succeed in the digital world. To address this issue, Verizon has been working to help solve this problem holistically through a transformative program called Verizon Innovative Learning.

Verizon Innovative Learning provides free technology, free internet access, and hands-on learning experiences to help give underserved students the education they deserve. Powered by a next-gen, technology-infused curriculum that fundamentally changes the way teachers teach and students learn, Verizon Innovative Learning is giving kids the ability to do more. To achieve more. To learn more. To create more. And the results are nothing short of amazing. Students in the program show improvements in math and reading, and they're more engaged in school.

Since 2012, we have committed a total of $400 million. We've helped more than a million students get free tech education. We'll help 2 million more by 2021.

We are eager to collaborate with Summit participants to ensure Massachusetts students have the tools necessary to succeed in educational and career opportunities that are fueling our local and global economies. Thanks to your efforts, Massachusetts continues to be a national leader in STEM student achievement.

We don't wait for the future. We build it.

Sincerely,

Donna Cupelo
Region President – Verizon New England

Rose Kirk
Chief Corporate Social Responsibility Officer and Marketing Executive - Verizon

Invested in the workforce of the future.

At BNY Mellon, we're committed to building the next generation's business and technology skills to contribute to society in a digital world.

We are proud to support the Massachusetts STEM Summit.

We commend their dedication and commitment to the community.

BNY MELLON

bnymellon.com

GENERAL DYNAMICS
Mission Systems

Pushing the Bounds of Innovation

Engineers create innovative solutions to complex problems, redefining what is possible. From the machines that make our clothes to the vehicles we drive and the cell phones we use, engineers have brought these technologies to life.

General Dynamics Mission Systems is committed to advancing STEM education and inspiring the next generation to continue pushing the bounds of innovation.

www.gdmissionsystems.com

Grow with Google

The Grow with Google initiative helps people across the United States grow their skills, careers, and businesses by offering free tools, training, and events.

JOB SEEKERS

Job seekers can grow their skills in order to find new jobs and advance their careers.

TEACHERS

Teachers can learn how to put the latest technology to work inside and outside of the classroom.

SMALL BUSINESSES

Small business owners can build their online presence and find new customers.

STARTUPS

Startups can learn how to get their ideas the exposure they need to succeed.

DEVELOPERS

Developers can sharpen their current skills and master new ones.

Grow with Google addresses a growing opportunity gap in the United States:

44%

Only 44% of 18- to 25-year-olds believe their education gives them the skills they need to enter today's workforce[1]

1/3

One in three jobs in 2020 will require skills that aren't common today[2]

+18%

Digital-based middle skill jobs are growing **2.5x faster** and offer **18% higher wages**[3]

[1] "Driving the skills agenda: Preparing students for the future." The Economist Intelligence Report, April 2015

[2] "The Future of Jobs Report." World Economic Forum, January 2016

[3] "The Digital Skills Gap in the Workforce." Burning Glass Technologies, March 2015

Visit google.com/grow to learn more.

Inspiring Future Scientists and Engineers Together.

Learn more: iRobot.com/STEM

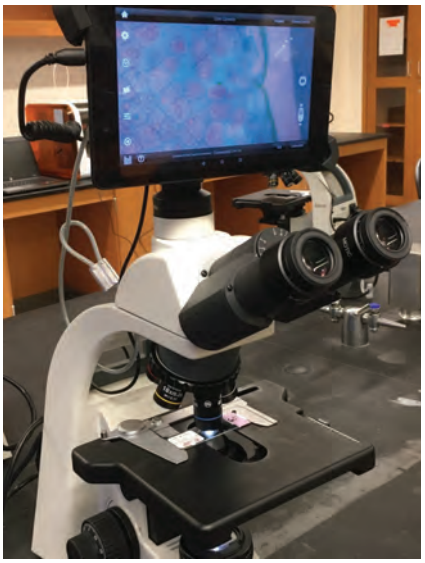
Proud partners in STEM:

iRobot® | BOSTON RED SOX

INVESTING IN THE NEXT GENERATION OF SCIENTISTS, ENGINEERS, AND ENTREPRENEURS

The Massachusetts Life Sciences Center is dedicated to supporting the development of the life sciences in Massachusetts, home to the most verdant and productive life sciences ecosystem in the world. Through public-private funding initiatives, we support innovation, education, research & development, commercialization, and manufacturing activities in biopharma, medical device, and digital health.

Our strategy is to simultaneously advance scientific and economic development. We are a catalyst for companies and individuals that intersect at innovation, academic and workforce development, community and regional development, great science, and positive patient outcomes.



DEDICATED TO BUILDING A ROBUST AND DIVERSE WORKFORCE PIPELINE

MLSC Investments:

- 100+ paid internships yearly and pre-internship lab training programs for high school students from underserved communities
- Nearly 3,800 internships with 750 companies for college and university students
- Grants to colleges and economically disadvantaged high schools to renovate/construct labs and purchase state-of-the-art STEM equipment
- $16.5 million awarded to 170 high schools and middle schools
- $28 million awarded to 16 two-year/community colleges

MASSACHUSETTS LIFE SCIENCES CENTER

1000 Winter Street, Suite 2900
Waltham, MA 02451
info@masslifesciences.com
781-373-7777

CONNECT WITH US AT WWW.MASSLIFESCIENCES.COM

nationalgrid

Marcy L. Reed
President Massachusetts and
EVP Policy & Social Impact

November 14, 2018

Dear STEM Stakeholders,

One of my favorite activities is championing the need for a workforce grounded in science, technology, engineering and math. As a member of the Governor's STEM Advisory Council, I am pleased to welcome you to the 2018 Massachusetts STEM Summit.

Your presence today affirms the critical role that a STEM-literate workforce plays in our shared success. We know that the concepts at the heart of STEM – curiosity, creativity, collaboration and critical thinking – provide invaluable training that creates a brighter future for us all.

In our industry, recruiting and retaining skilled personnel is a pressing challenge, with an estimated 25 percent of employees eligible to retire in the next five years. Cultivating the future STEM workforce is of critical importance to not only the energy sector but all of the industries in attendance today.

At National Grid, we depend on STEM-trained professionals to lead the way in solving pressing energy challenges. To that end, we are proud to invest in several Worcester-area organizations dedicated to enhancing and expanding STEM opportunities:

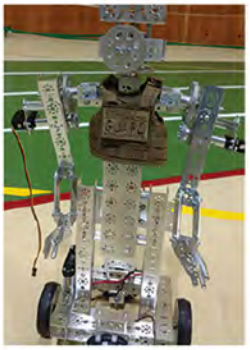
> **Girls Incorporated:** Providing girls with high quality STEM training and support throughout the school year and summer months.
> **Becker College:** Summer STEM Camp for 7th and 8th grade girls.
> **Bottom Line:** Assisting students through the college application process and mentoring through college graduation. We are proud that students from this program now work at National Grid.

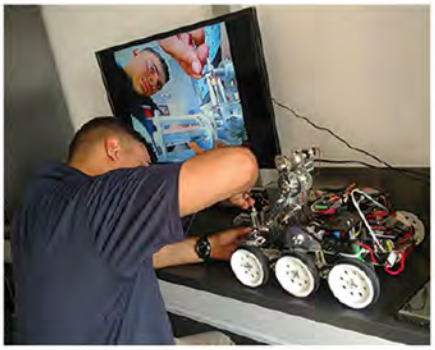
I look forward to your active participation today. Please gather ideas and proposals from the many lectures, presentations and workshops with an eye toward successful implementation across our communities. Thank you for your commitment to STEM education.

Sincerely,

Marcy L. Reed

40 Sylvan Road, Waltham, MA 02451
T: 781-907-1760 ■ marcy.reed@nationalgrid.com ■ www.nationalgridus.com



STEM ROBOTICS

For future scientists and engineers, the typical classroom often is not enough. Recognizing this, we are proud to be able to offer our *Urban Search & Rescue Robotics Challenge* to them at no cost.

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

SCIENCE TECHNOLOGY

MASSACHUSETTS NATIONAL GUARD

NATIONALGUARD.com/MA

ENGINEERING MATHEMATICS

COMMUNITY SUPPORT

IN THESE FACES,
WE SEE THE FUTURE.

Raytheon salutes the UMass Donahue Institute, Massachusett Business Roundtable and Massachusetts STEM Advisory Council. Your efforts enrich our community and help shape the leaders of tomorrow. Thank you for ensuring opportunities for our young people.

Raytheon.com/responsibility

@Raytheon

Raytheon

Raytheon

sunovion

Innovation today, healthier tomorrows

Sunovion is Proud to Support Massachusetts STEM Summit 2018

Sunovion is a global biopharmaceutical company with a spirit of innovation driven by the conviction that scientific excellence paired with meaningful advocacy and relevant education can improve lives. We have an ongoing commitment to STEM education. Sunovion works in partnership with organizations that stimulate interest in science and encourage students to pursue career paths in these fields. In Massachusetts, where Sunovion is headquartered, we are focused on helping to fuel the talent pipeline and inspire the next generation of innovators.

Visit **www.sunovion.com** and connect with us on **Twitter @Sunovion** and **LinkedIn** to learn how we Take on Tomorrow™.

The world leader in serving science

Educating the next generation of scientists is our investment in the future

Find out more at **thermofisher.com**

ThermoFisher SCIENTIFIC

Interested in STEM?

SCIENCE TECHNOLOGY ENGINEERING MATH

Choose UMASS AMHERST

MAKE A POSITIVE DIFFERENCE IN THE WORLD

- Excellent faculty and programs
- Broad STEM curriculum
- Interactions with faculty
- Undergraduate research opportunities
- Support for students in need
- Summer job opportunities

EXPLORE EXCITING CAREER PATHS

EXPLORE ALL the exciting STEM Programs *including the* ***NEW MAJOR:*** **INFORMATICS** *in the* COLLEGE OF INFORMATION AND COMPUTER SCIENCES.

www.umass.edu

University of Massachusetts Amherst

UMass Dartmouth is inventing the future

Academic, personal, and professional preparation is essential to meet the need for an agile workforce. UMassD is uniquely positioned to deliver on that imperative.

- A Tier 1 national research university with undergraduate and graduate STEM programs
- Hands-on experiences that ensure mastery
- Interdisciplinary research focus on the Blue Economy, Community Resiliency, and Homeland Security
- Educational and Research expertise in engineering fields, marine science, biology, chemistry, mathematics, data science, computer science, physics, STEM education

www.umassd.edu

285 Old Westport Rd., Dartmouth, MA

UMass | Dartmouth

THE SCIENCE *of* POSSIBILITY

Vertex aims to create new possibilities in medicine to cure diseases and improve people's lives.

We work with leading researchers, doctors, public health experts and other collaborators who share our vision for transforming the lives of people with serious diseases, their families and society.

VERTEX

www.vrtx.com

WGBH
One Guest Street
Boston
Massachusetts
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 UMASS Donahue Institute for their ongoing and extraordinary commitment to STEM education and for convening this summit, now in its fifteenth year.

As a public media producer and pioneer in digital learning, 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 *Design Squad Global*, an evolution of *Design Squad* that includes engaging challenges, videos, and international after-school clubs that expose students to using the engineering design process to solve real world problems. *Design Squad Global* has brand-new resources that aim to get kids thinking about environmental responsibility. These resources stimulate thinking, collaboration, creativity, inventiveness and other skills that are essential for young people's success in our digital, highly-connected world, creating true pipelines to prosperity. At the STEM Summit, we will be joined by Massachusetts-based educators who will share how they use these resources with their students.

From programs for younger children like *PEEP and the Big Wide World* and *Curious George*, through digital inititatives like *Plum Landing* and *Design Squad Global* aimed at 'tweens and teens, and our award-winning science series *NOVA*, WGBH has resources for STEM learning at every stage of life. We will have information about all of these programs at our exhibit tables, as well as special presentations about our new Space Science resources from our *Bringing the Universe to America's Classrooms* collaboration with NASA.

WGBH salutes Massachusetts Governor Charlie Baker, the Commonwealth's Department of Education, the participants in today's summit, and educators statewide for their dedication to STEM education. We are excited to join with you in making a real difference in the lives of students and their families.

Jonathan C. Abbott
President and CEO

Worcester Polytechnic Institute

From the start, with our pre-collegiate programs, we **inspire** young minds to become STEM enthusiasts …

GREAT MINDS INSPIRE

GREAT MINDS TRANSFORM

teaching them to learn *how to learn* through our **transformative** project-based approach to education …

preparing them to find solutions to the world's problems, collaborating with other great minds to **multiply the impact**.

GREAT MINDS MULTIPLY IMPACT

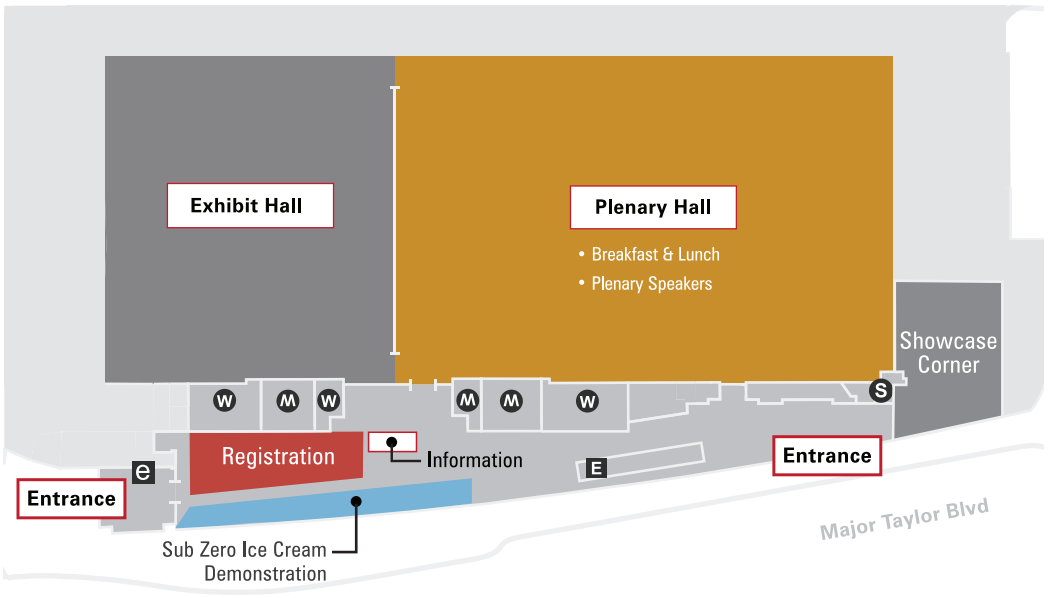
wpi.edu

Notes

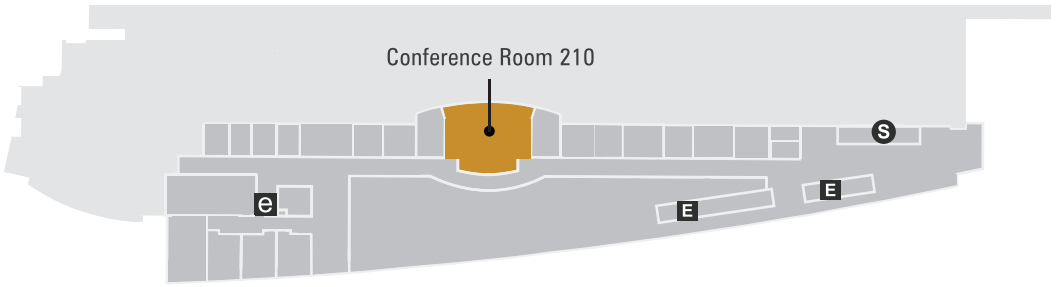
BREAKOUT SESSION ROOM ASSIGNMENTS

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:** Design Squad Global: New, sustainable invention activities to spark interest in solving community problems with STEM			
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	**K-12 Education:** Discover Massachusetts Maritime Academy's Follow The Voyage – Share The Experience Program	**Workforce & Business:** The Pipeline Doesn't End: Developing a Sustainable Culture of Digital Literacy in the Workplace	**K-12 Education:** EcoMOD: Blending Computational Modeling and Virtual Worlds for 3rd Grade Ecosystems Science	**K-12 Education:** Collaborative Design for Engaging STEM Volunteers in Middle Grades Class Projects
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:** STEM4Girls: Hands-on Experience to Engage 3rd-8th Grade Girls in STEM	**K-12 Education:** STEAMathon: Engaging Families in STEAM Activities	**K-12 Education:** Exciting Students in STEM: STEM Week Reflections and Lessons Learned	**K-12 Education:** Integration of Computational Thinking into Math and Science Curriculum Materials
Grand Ballroom Center	**Workforce & Business:** Who's Nurturing the Next Generation of Innovators? Effective STEM Programs to Build Workforce Talent	**K-12 Education:** Energy House Design Challenge	**Workforce & Business:** Amp It UP! Industry Driven Lessons	**K-12 Education:** What Can Your Library Do for STEM?
Grand Ballroom North	**Early Education:** Developmentally Appropriate Precoding Experiences for Preschoolers	**K-12 Education:** Closing the Digital Equity Gap: Ensuring Every Student's Access to Technology Jobs	**K-12 Education:** Beauty and Joy of Computing: A CS Principles Course	**K-12 Education:** Robots and Screen-Free Coding for Your Youngest Learners – Come Play With KIBO!
Meeting Room A	**All Strands:** A Deeper Dive Into the Digital Divide	**Workforce & Business:** The Flipped Internship: A New Partnership Strategy between Technology Companies and High Schools	**K-12 Education:** Creating a STEM Pathway through Mentoring, Purpose, and Food Justice	**Higher Education:** Nudging to STEM Success: Supporting Persistence and Completion in STEM Pathways
Meeting Room B	**K-12 Education:** Project Based Learning Pathways: Reflections on a 6th Grade Public Middle School PBL Classroom Pilot	**Early Education:** Supporting a Home-to-School Approach in Preschool Curriculum with Low-income Immigrant Families	**K-12 Education:** The Shrinking STEM Workforce: Capitalizing on the Expanding K-12 EL Population as a Solution	**K-12 Education:** Vertically Aligned Life Sciences Lab & Career Experiences – An Opportunity for MS & HS
Meeting Room C	**Higher Education:** Pathways to STEM Student Success and Workforce Development	**K-12 Education:** Invention Education and STEM: Preparing Students from Diverse Backgrounds for the Innovation Economy	**Higher Education:** Designing for Scale to Impact System-wide Student Success	**Workforce & Business:** Cybersecurity Education Standards: Partnership Between Industry and Education
Meeting Room D	**Workforce & Business:** Tech Apprentice: 10 Years of Learning to Inform Employer Engagement	**Higher Education:** Job Simulations: An Exercise Connecting Students and Employers in a Meaningful, Time-efficient Way	**K-12 Education:** Motivate Students with Free Innovative STEAM Resources from Public Libraries	**Early Education:** Co-constructed STE Curriculum in Head Start: Partnership-Based Research for Program Improvement
Meeting Room E	**K-12 Education:** Closing the Access Gap to STEM for Underserved Student Populations	**K-12 Education:** A Vision for Implementation: Current Initiatives for Supporting Pre-K-12 STEM Education in Massachusetts	**K-12 Education:** Fairytales & STEAM - Cross Curricular Integration Through Project Based Learning	**K-12 Education:** Best Practices in STEM Space Design and Use
Junior Ballroom	**K-12 Education:** Full STEAM Ahead: A Kinetic Sculpture Project	**Higher Education:** A Data-Driven Approach to Aligning Higher Education Programs With Workforce Needs	**Early Education:** Priming Preschoolers to Enter the Engineering Pipeline through Problem-Solving	**Early Education:** Creating Fun and Engaging STEM Learning with Toddler and Preschool Children

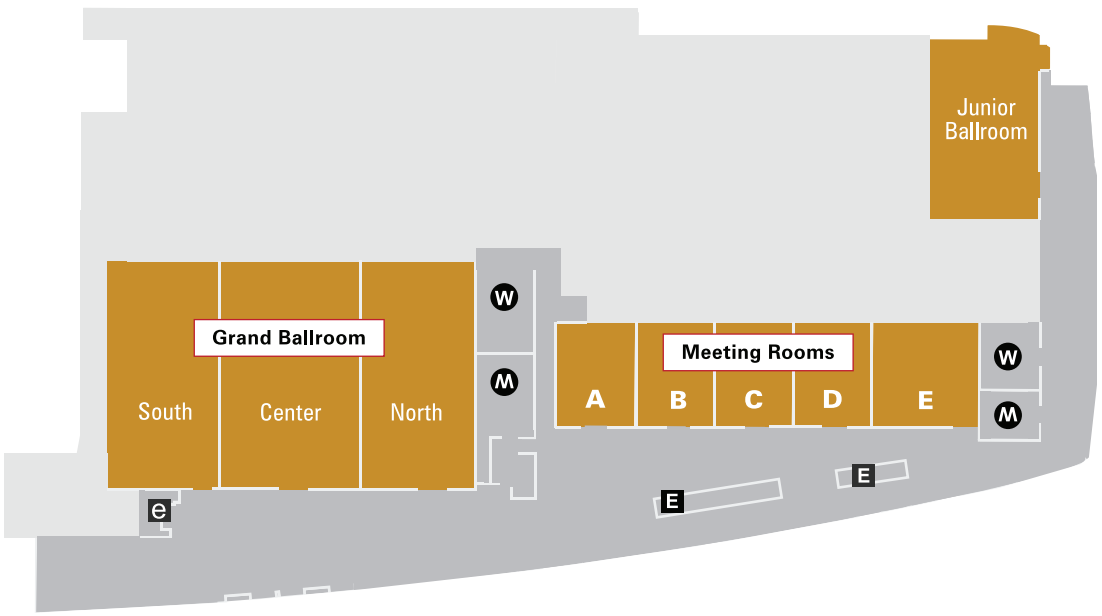
LEVEL 1



LEVEL 2



LEVEL 3



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

Special Thanks

Cora Beth Abel, Massachusetts State Science & Engineering Fair (MSSEF)
Rusti Berent, Ward's Science
Ignacio Chaparro, MA Department of Higher Education
Sarah Clark, Tower School, Marblehead
Keith Connors, MA Department of Higher Education
Carla Crisafulli, Hopkinton High School
Sarah Dunton, UMass Amherst
Ryan Flynn, Massachusetts Business Alliance for Education
Jennifer Green, Foth
Tracey Gustafson, Big Brothers Big Sisters of Central Mass/Metrowest
Jessica Haggett, Big Brothers Big Sisters of Central MA / Metrowest
David Harelson, Woodmeister Master Builders
Jane Heaney, Lynch School of Education, Boston College
John Henshaw, Mount Wachusett Community College
Brian Hoffman, The Children's Museum in Easton
Christophe Huestis, Agawam High School
Ruth Joseph, Fitchburg State University
Ebru Korbek-Erdogmus, UMass Boston
Heather Krieger, Teach For America
William Lee, Consultant
Laurie Link, Fitchburg State University
Wendy Marino, Milford Public Schools
Sean McCaffery, The PEAR Institute: McLean Hospital & Harvard Medical School
Maureen McDonald, UMass Donahue Institute
Kerri Murphy, Oliver Ames HS in Easton, Exploring CS, MA STEM Teacher of the Year
Eva Nyutu, SVSU
Maryellen Rancourt, Essex North Shore Agricultural and Technical School District
Ruth-Ann Rasbold, UMass Donahue Institute
Mary Jane Rickson, Athol Royalston Regional School District
Anne Ryan, St Petersburg College
Larisa Schelkin, Global STEM Education Center, Inc
Sheila Sulliva-Jardim, Brockton Area Workforce Investment Board
Patricia Suomala, Worcester Technical High School
Maggie Yi

UMass Donahue Institute STEM Summit Staff

Jacqueline Adams
Aileen Avigliano
Chris Bell
Shannon Bernacchia
Dana Bienkowski
Moira Clingman
Katera Como
Kristin Cormier
J. Lynn Griesemer
Eric Heller
Beth Johnson
Ken LeBlond
Carol Anne McGowan
Jon Pike
Debbie Rice
Audrey Sullivan
Jean Supel
Suzanne Tanty
Brendan Trainor
Jacob Ward
Marcus Widitor
Jaclyn Wise
Theresa Wodecki

We take this opportunity to honor **J. Lynn Griesemer, Ed.D., M.P.A.** for her passionate commitment to the Massachusetts STEM community. As a former mathematics teacher, Lynn brought her STEM commitment to the UMass Donahue Institute in her role as Deputy Director, and continued this dedication through her role as Executive Director of the Donahue Institute and Associate Vice President for Economic Development for the President's Office.

Since the first STEM Summit in 2004, Lynn has worked tirelessly to help develop this event into the Summit you see today. With a wide variety of sponsors, presenters, exhibitors, and leaders from government, industry, and education, Lynn's dedication has been building a foundation on which greater things can continue to be built.

With great pride we say: Thank you, Lynn.