

Transcending Boundaries:

Connecting School, Career, and Community Through STEM

A joint conference convened by SciMathMN and The Works Museum



December 3, 2019

University of Minnesota
Continuing Education and Conference Center
St. Paul, MN

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Welcome

Welcome to *Transcending Boundaries: Connecting School, Career, and Community Through STEM*, a joint conference of SciMathMN and The Works Museum.

Thank you for attending the conference! We're very excited to bring together a diverse group of colleagues from our STEM learning ecosystem. Today you'll have the opportunity to delve into the conference theme of Transcending Boundaries, and explore how breaking down barriers between organizations, learning landscapes, and STEM disciplines helps strengthen STEM learning and Minnesota's STEM ecosystem.

SciMathMN and The Works Museum share your passion for high-quality STEM education. We hope that today's conference will spark new conversations and ideas that lead to unique learning opportunities to prepare the next generation for the future.

Sincerely,

Jim Davnie
Executive Director
SciMathMN

Jill Measells
CEO
The Works Museum



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SCHEDULE & SESSIONS:

Registration, Check-in, and Breakfast

8:00 a.m. - 8:45 a.m.

Welcome, Keynote, and Q&A

8:45 a.m. - 10:00 a.m.

Morning Session 1

10:10 a.m. - 11:10 a.m.

Morning Session 2

11:20 a.m. - 12:20 p.m.

Lunch and Exhibitors

12:20 p.m. - 1:20 p.m.

Afternoon Session 1

1:20 p.m. - 2:20 p.m.

Afternoon Session 2

2:30 p.m. - 3:30 p.m.

**Exhibitor tables will be open
between 8:00 a.m. - 1:30 p.m.*

KEYNOTE:

Dr. Jayshree Seth
3M Corporate Scientist
and Chief Science Advocate



DOES SCIENCE MATTER?

Dr. Jayshree Seth will provide an overview of the 3M State of Science Index, a global survey of more than 14,000 people in 14 countries to uncover what people think of science and how they perceive its impact on their daily lives. Many of the survey findings highlight the importance of reducing real and perceived barriers to science appreciation and STEM education — in order to ensure that we have a healthy pipeline of future scientists and engineers to solve tomorrow's challenges. Jayshree will share her personal journey as she explores ways we can advocate for science and promote STEM awareness, equity, and access for all.

Morning Session 1 | 10:10 - 11:10 a.m.

STEM at the Zoo: Engineering for Animals | Room 166

Kristi Berg, Minnesota Zoo

This session will highlight the Minnesota Zoo's ZOOMS Design Challenge — which uses the lenses of engineering for animals, by animals, and from animals — to provide teachers with a new way to engage students in thinking about zoos. ZOOMS presents students in grades 3-12 with scenarios related to animal management, conservation, and zoo operations, and challenges them to design viable solutions. This session will provide a detailed looked at the year-long process required to implement ZOOMS. Participants will also be asked to think like animal enrichment specialists in a brief inquiry activity exploring animal adaptations and zoo enrichments.

The New and Improved SciGirls Strategies: Gender-Equitable and Culturally-Relevant Teaching | Room 135BD

Katie Hessen, Twin Cities PBS

SciGirls Strategies provide specific practices that any educator can use to engage girls in STEM and help all students develop positive STEM identities. Since 2010, the SciGirls Strategies have been used by over 3,000 formal and informal educators in STEM and computer science classrooms. After two years of reviewing research, these Strategies have been updated. This session will introduce attendees to the new strategies and explore how to apply them. Participants will leave the session with a copy of the strategies and inspiration to develop new gender-equitable and culturally-responsive STEM learning experiences, with a focus on computer science.

STEM You Can Use Tomorrow* | Room 156

Mark Nechanicky, Albert Lea Area Schools

In this session, attendees will explore a variety of STEM resources and lesson ideas, with practical tips for using them with students. Examples of topics that will be covered include: math number talks, Skypes with scientists and authors, virtual field trips, Twitter-based professional learning networks, and mixed-grade computational thinking activities — as well as how to use technology to partner classrooms for math, science, makerspace activities, and after-school coding clubs. Attendees will receive copies of resources and activities that they can implement tomorrow.

Panel – Better Together: Bridging STEM and CTE*

Room 135AC

Sarah Ness, Southeast Service Cooperative

Jinny Rietmann, Workforce Development, Inc.

Brian Cashman, Goodhue County Education District

John Double, Albert Lea Public Schools

STEM Forward and regional partners from southeast Minnesota will share their journey starting the CTEam, a multi-sector partnership that works together to bridge STEM and CTE to better align workforce development efforts for greater impact in eleven MN counties. Attendees will learn more about the dependent relationship between STEM and CTE, and review processes and tools you can use to create alignment between STEM and CTE in your region.

Create with 3D Printing | Room 155

Jazmine S. Darden, Dunwoody College of Technology

In this session, you will learn the basics of how 3D printers can be used to transform ideas into tangible objects. Participants will have the opportunity to explore CAD software (bring your own laptop), see 3D printers in action, and check out a variety of 3D-printed parts. We will also talk about the variety of ways 3D printing is used throughout industry and how it can be utilized in the classroom as a tool for project-based learning.

*Participating member of Southeast Service Cooperative's STEM Forward

Morning Session 2 | 11:20 a.m. - 12:20 p.m.

Teaching with the UN's Sustainable Development Goals in the STEM Classroom | Room 155

Mallory Tuominen & Erica Ahlgren, World Savvy

This session will highlight World Savvy's approach to problem-based learning and design thinking using the United Nations' Sustainable Development Goals (SDGs) as a framework. Participants will be introduced to World Savvy's approach and will experience a design thinking activity to explore the SDGs through a STEM lens. The interactive and action-based session will conclude with examples from World Savvy's work in STEM.

Panel – Bringing Today's Students Forward into Tomorrow's STEM Professionals: A Practical Conversation of Workforce Needs | Room 135AC

Engineering Alliance Minnesota

Kerry Cooley Bruggemann, Michaud Cooley Erickson

Cameron Klos, Burns & McDonnell

Thomas Lorentz, IDOM

Michael O'Connor, Medtronic

Sean Swartz, Braun Intertec

Ross Tillman, Bolton & Menk, Inc.

Moderator: Ron Bennett, University of St. Thomas

Representatives from STEM employers both in engineering consulting and in industry will come together for this Q&A-focused panel to discuss: the real hiring needs today in Minnesota's engineering economy, how students coming out of school today align with those needs, what young professionals today are saying matters to them, and how STEM organizations and schools can continue to work together to bridge real workplace needs. Engineering Alliance Minnesota (formerly Minnesota Society of Professional Engineers) and its foundation, Engineering Alliance Foundation Minnesota, which hosts Minnesota MATHCOUNTS and provides scholarships in STEM, will moderate this discussion.

Panel – Building Kids Through Building Robots | Room 166

Ponytail Posse FTC Team Alumni

Joining a high-school robotics team is an opportunity for students to explore STEM fields, develop and apply technical and life skills, be part of a community, and participate in a long-term collaborative project. Learn first-hand from recent alumni and mentors of the Ponytail Posse — an all-girls FIRST Robotics team that competed together for nine years. They'll talk about their experiences in the program from elementary through high school, and also discuss how you can get involved with FIRST robotics or start a new robotics program.

Minnesota Engineering Design Challenges | Room 135BD

Melissa Huppert, Minnesota State Engineering Center of Excellence

Michael Compton, Minnesota 4-H

Participants will explore science and engineering practices and experiential learning through Engineering Design Challenges offered by MN 4-H and the MN State Engineering Center of Excellence (MNECoE). These challenges use Rube Goldberg machines to inspire youth and bring math and science standards to life. The session will introduce the MN 4-H Engineering Design Challenge (grades 3-12) and the MNECoE Engineering Machine Design Contest (grades 5-12). Working in collaboration, MN 4-H and MNECoE offer learner-centered and competitive opportunities for youth through experiential learning, teamwork, and skill development. All workshop attendees will receive a copy of the free curriculum.

“SHE” (STEM Heroines Empowered) is our Future: If She

Can See It, She Can Be It | Room 156

Amanda Svedarsky & Jennifer Granner, Million Women Mentors

Sandy Marshall, Project Scientist

With balanced exposure, experience, and encouragement, lady leaders of all ages can bring their STEM ideas and inspirations to a global scale for good. So what does that mean for how organizations conduct community outreach, engage and retain talent, and evolve their workplace cultures to empower these incoming STEM heroines? Join us to learn about local and global strategies to engage students, professionals, and companies to empower the next generation of STEM superstars.

Afternoon Session 1 | 1:20 - 2:20 p.m.

Working Together to Shape the Future: Career Pathways and Beyond | Room 156

Jennifer Moore, White Bear Lake Area Schools

Building a strong Career Pathways program takes more than funding. It takes bold, innovative collaboration between multiple stakeholders. What's necessary to make this happen? This workshop will discuss the Career Pathways Program in White Bear Lake Area Schools (WBLAS) and how it relates to workforce readiness applicable to all careers. Utilizing WBLAS's collaboration model, attendees will explore how to set up and advance a similar program and create customized action items for your school or district. Attendees will leave the session with tools and connections to build strong career pathways for your students and community.

Panel – The Beltway Battle for K-12 STEM Equity

Room 135AC

Fredrick Blocton, UpNet Technologies

Rev. Dr. Melvin G. Miller

Russell Fraenkel, MN State IT Center of Excellence

Dr. Michael G. Wulf, MN State IT Center of Excellence

Join in discussion with business leaders, community education champions, and STEM professionals as they discuss the challenges, barriers, and potential solutions to advancing STEM and STEAM education for students of color within the Twin Cities Interstate 494/694 beltway. This conversation will address barriers of entry to STEM, lessons learned, funding, outcomes, and engagement. Topics include: current and emerging technology-focused STEM pathways, opportunities to create deeper collaborations, and effective non-profit and for-profit engagement models.

Think Tank – K-12 Computer Science in Minnesota: Data and Policies | Room 135BD

Jennifer Rosato & Cassandra Scharber, CSforAll MN

CSforALL MN is a group of educators, researchers, and tech industry personnel committed to increasing the number and diversity of students who have access to high-quality computer science learning opportunities by supporting state-level computing education reforms. In this session, participants will connect with other computer science teachers, curriculum coordinators, and administrators; learn more about the work of CSforALL MN; examine preliminary state CSEd data; and share perspectives and ideas for expanding CS education throughout Minnesota.

Journey Toward Exploratory and Experiential Learning

Room 166

Amanda Kopischke & Angela Anderson, Incubate to Innovate

Incubate to Innovate equips and empowers educators to reframe mindsets and learning so that students can navigate a complex, rapidly-changing world. In this session, attendees will explore the process, framework, and practical methodology we've designed that offers new approaches to creating and sustaining exploratory and experiential learning environments while simultaneously transforming school culture. When space and time are given to foster and encourage collaborative problem-solving skills, powerful ideas surface that can transform schools and the lives of students.

Interactive Storytelling with Twine* | Room 155

John Bartucz, Rochester CTECH

Let your students unleash their creativity with non-linear storytelling! In this session, you will learn the basics of Twine — a free online tool — and create your own adventure game playable in any web browser. Twine is designed for middle and high school, though upper-elementary teachers have also had success. Novices can get started in five minutes and experts can customize to their heart's content. An activity that truly incorporates all aspects of STEAM, teachers in every discipline are encouraged to attend. Bring your own laptop for maximum engagement. Leave this session with your own working game, as well as resources to use in the future.

*Participating member of Southeast Service Cooperative's STEM Forward

Afternoon Session 2 | 2:30 - 3:30 p.m.

Bringing STEM Professionals into Classrooms: A Practical Model for Inspiring Youth | Room 156

Renee Piersa & Jill Paule, Science from Scientists

Learn about Science from Scientists (SfS) and how it is changing the learning landscape for students by connecting elementary and middle school classrooms to STEM professionals. Using spotlight videos from educators and STEM professionals, participants will hear about the opportunities, challenges, and needs from each partner's perspective. Then, work in small groups to generate ideas for your community.

Teaching Computer Science with Low-Cost Robots

Room 155

Dan McCreary, CoderDojo Twin Cities

Over a three-year period, a team at CoderDojo Twin Cities designed and tested a \$25 Arduino robot that can be used to engage both beginning and advanced students in fun and learning of more than 20 computer science concepts through a variety of hands-on labs. Participants will have a chance to experience this robot, learn how AI concepts can be taught using Raspberry Pi, discover available resources, and consider how to integrate these materials into their classrooms or programs.

Introducing the 2019 Minnesota Science Standards

Room 135BD

Doug Paulson, Minnesota Department of Education

The new K-12 Academic Standards in Science present new approaches to teaching and learning science. Learn about the pedagogy associated with the new standards, the timeline for implementation, resources for professional learning, and suggestions for educators in using the standards. We will also explore ideas for how informal educators, professional development providers, and others can interact with and support the new standards.

Think Tank – STEM/Trade Rotational Hands-On Education

Room 166

Terra Carbert, SHEOps Talent

STEM employers have a high level of interest in developing the talent pipeline. STEM educators strive to provide students with meaningful and relevant learning experiences. What can we do together to ensure that what students learn in school is better matched to future workforce needs? What if multiple companies banded together to develop a rotational program to provide experiential learning on the “shop floor” in multiple STEM areas in order to provide students with exposure to what’s possible? In this Think Tank session, possible scenarios will be shared to prompt discussion, brainstorming, and ideas for action.

Advanced Career: Preparing Students for Both College and Career | Room 135AC

Jason Bruns, Minnesota State Engineering Center of Excellence

The Southern Regional Education Board, the nation’s largest school improvement network, has developed Advanced Career — a STEM and project-based curriculum that, through four increasingly challenging courses, prepares high school students for college and career in high-skill, high-demand, and high-wage fields. Learn about how these pathway programs require students to apply college and career-readiness standards in reading, writing, math, science, and technology skills to solve real workforce problems in the classroom.

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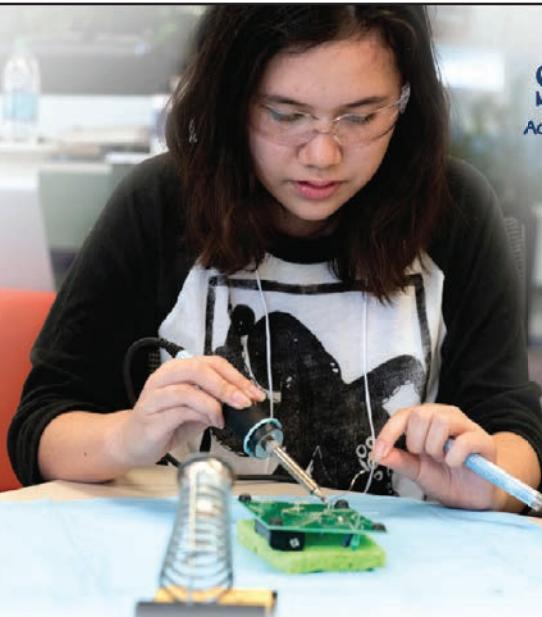
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*Exhibitor tables will be open between 8:00 a.m. - 1:30 p.m.



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