Welcome to the fourth annual Tennessee STEM Innovation Summit and STEMxChange!

Dear STEM Partners –

We are excited to welcome you to Nashville to engage and learn with STEM experts from across the country as we seek to advance a vision where all students have access to high-quality STEM learning opportunities that prepare them for success in college, career, and life. This year’s event presents many opportunities to share what is working in Tennessee, learn about the promising practices of other state STEM networks, and brainstorm with new partners on how best tackle the obstacles standing in the way of student success.

We are delighted that STEMx has chosen to host STEMxChange, its annual member convening, in conjunction with the Tennessee STEM Innovation Summit. STEMx is a national, multi-state STEM network managed by Battelle that works with 20 states and territories to expand STEM learning based upon years of collective expertise in implementation. Tennessee is a member of STEMx and benefitted greatly from the partnerships with other states as we launched the STEM network in 2010. From our experience, states working as a group can deliver more attention and resources to quality STEM education than any one state in isolation.

In addition to the expertise of our national partners, we are excited about the lineup of inspirational speakers and leaders from Tennessee that will share their expertise through over 40 interactive learning sessions. Against this incredible opportunity, we will explore the conference theme of Thinking Globally. Starting Locally. We encourage participants to attend any learning session of interest, taking full advantage of the opportunity to attend sessions in the STEMx track or any of the other five tracks offered throughout the event that may advance your work back at home.

On behalf of the Tennessee STEM Innovation Network, STEMx, and the Battelle team, it is our pleasure to welcome you to Nashville for this year’s event! Thanks for your participation and for your continued commitment to advancing STEM for All.

Wes Hall
Executive Director, STEMx
@WesleyHall

Sandy Watkins
Director, Tennessee STEM Innovation Network
@Sandy4STEM

What is the Tennessee STEM Innovation Network?

In 2010, the Tennessee Department of Education partnered with Battelle Memorial Institute to launch the Tennessee STEM Innovation Network. Focusing on “kindergarten to jobs”, the Network is developing high-quality STEM programming to further ensure Tennessee students are college and career ready upon graduation. The Network utilizes Regional STEM Innovation Hubs located and STEM Designated Schools across Tennessee to increase student interest and participation in STEM fields.

TSIN supports the growth and quality of STEM education in Tennessee by:

- Connecting the best STEM schools, teachers, and administrators to one another and to national resources
- Assisting schools and communities that want to create new STEM schools and programs
- Driving local STEM innovations through a network approach for statewide impact

The Tennessee STEM Innovation Network is committed to helping the State of Tennessee inspire and train the next generation of innovative leaders. The presence of these highly skilled workers will enable the state to grow businesses and industries that can successfully compete in the global economy.

STEMx is a network of networks. The STEMx network functions as an umbrella organization to support state members in achieving individual goals while working together to grow opportunities for students at all levels. Starting with four states in 2012, STEMx has steadily grown. Today, the network represents eighteen states, the Virgin Islands, and Guam.

Members collaborate on a common agenda, research, best practices, and advocating for changes in public policy to support quality STEM education. The organization also provides direct support to individual states and advocates for them nationally.

STEMx members gather for regular webinars on key problems of practice, issue joint reports together, and gather each year for STEMxChange.

Working together to make a difference!
By Candice McQueen, Tennessee Department of Education

Dr. Candice McQueen currently serves as Tennessee’s commissioner of education. Previously, she served as senior vice president and dean of the college of education at Lipscomb University. McQueen began her career as a classroom teacher, teaching in both public and private elementary and middle schools. She also served as a higher education faculty member and department chair before being named dean in 2008.

While at Lipscomb, McQueen served as a member of the university’s executive leadership team and oversaw both her college and the 1,300 pre-K-12th grade students in three schools at Lipscomb Academy. Under her leadership, Lipscomb’s college of education and teacher preparation program were consistently highlighted as one of the top teacher training programs in the state of Tennessee for quality and effectiveness based on the Tennessee Report Card and effectiveness based on the Tennessee Report Card.

All K-12 schools serving students in Tennessee are eligible. Visit www.tsin.org/designation to learn more.
### SCHEDULE

**TUESDAY MAY 8**

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<thead>
<tr>
<th>Time</th>
<th>PM/AM</th>
<th>Session Title</th>
<th>Presenter(s)</th>
<th>Audience</th>
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<tbody>
<tr>
<td>8:00 AM</td>
<td>AM</td>
<td>Registration</td>
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<tr>
<td>8:30 AM</td>
<td>AM</td>
<td>Welcome &amp; Introductions in the Nashville Ballroom</td>
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<tr>
<td>8:45 AM</td>
<td>AM</td>
<td>Commissioner Candice McQueen presents the Tennessee Designated STEM School Awards</td>
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<tr>
<td>9:25 AM</td>
<td>AM</td>
<td>Keynote Address by Grant Imahara</td>
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<tr>
<td>10:30 AM</td>
<td>AM</td>
<td>Networking &amp; Visit the ORNL Traveling Science Fair</td>
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<tr>
<td>11:00 AM</td>
<td>AM</td>
<td>Breakout Sessions 1</td>
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<tr>
<td>11:45 AM</td>
<td>AM</td>
<td>Lunch</td>
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<tr>
<td>12:45 PM</td>
<td>PM</td>
<td>Breakout Sessions 2</td>
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<tr>
<td>1:45 PM</td>
<td>AM</td>
<td>Breakout Sessions 3</td>
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<tr>
<td>2:30 PM</td>
<td>AM</td>
<td>Break</td>
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<tr>
<td>3:00 PM</td>
<td>AM</td>
<td>Breakout Sessions 4</td>
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<tr>
<td>3:45 PM</td>
<td>AM</td>
<td>Closing Remarks and Door Prizes in the Nashville Ballroom</td>
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### BREAKOUT SESSIONS 1 - 11:00 AM

<table>
<thead>
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<tbody>
<tr>
<td>Memphis</td>
<td>Inclusive STEM Collaboration</td>
<td>Natalia Beach and Angela Stilley</td>
<td>Elementary &amp; Middle School Educators</td>
</tr>
<tr>
<td>Chattanooga</td>
<td>STEM Dual Enrollment as a Recruitment and Retention Strategy</td>
<td>Natalia Beach and Angela Stilley, Jennifer Zeth, Education Commission of the States</td>
<td>All Educators</td>
</tr>
<tr>
<td>Capitol I</td>
<td>From Concept to Scale: How to Develop, Incubate, and Share Innovative Practices</td>
<td>Michael Stone, The Innovation Hub at the Public Education Foundation, Chattanooga and Tony Dimon, STEM School Chattanooga, Chattanooga</td>
<td>All Educators</td>
</tr>
<tr>
<td>Capitol II</td>
<td>STEM Roadmap to STEM School Designation</td>
<td>Brandi Strower and Sandy Watkins, Tennessee STEM Innovation Network</td>
<td>All Educators</td>
</tr>
<tr>
<td>Nashville</td>
<td>Beauty and the Beak - An Engineering Design Project using Informational Texts and 3D Printing</td>
<td>Leslie Susan and Kristen D., TN Technological University, Knoxville</td>
<td>All Educators</td>
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<tr>
<td>Stones River</td>
<td>A Student in STEM: The Student’s Point of View About STEM Education</td>
<td>Hanna Schip, TSA Student Officer Coach and Junirot at Hardin Valley Academy, Knoxville</td>
<td>Middle &amp; High School Educators</td>
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<tbody>
<tr>
<td>Chattanooga</td>
<td>STEM Using Collaboration to Build Capacity and Increase STEM Engagement</td>
<td>Karen Peterson and Erin Hogeboom, National Girls Collaborative Project</td>
<td>All Educators</td>
</tr>
<tr>
<td>Capitol I</td>
<td>Partnerships for Innovation: Our School, Our Community, Our Future.</td>
<td>Sara Shaffer and Sharma Mckay, D-B EXCEL, Kingsport</td>
<td>All Educators</td>
</tr>
<tr>
<td>Stones River</td>
<td>Out of the Library &amp; Into the Classroom: Building a Maker Culture</td>
<td>Heather Henderson and Carla Painter, Jefferson Middle School, Oak Ridge</td>
<td>All Educators</td>
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<tr>
<td>Nashville</td>
<td>The Extraordinaires: Leveraging Student Creativity in Engineering without Technology</td>
<td>Claire Williams McGee, Metro Nashville Public Schools, Nashville</td>
<td>All Educators</td>
</tr>
<tr>
<td>Capitol II</td>
<td>Putting the sizzle in STEAM</td>
<td>Cindy Moss, Discovery Education, Charlotte, NC, David Williams, Metro Nashville Public Schools, Nashville</td>
<td>All Educators</td>
</tr>
<tr>
<td>Memphis</td>
<td>Role of Youth Engagement Programs in the STEM Pipeline</td>
<td>Elisabeth McClain, Adventure Science Center, Nashville and Chris Biskel, Nashville Zoo, Nashville</td>
<td>High School Educators</td>
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### BREAKOUT SESSIONS 3 - 1:45 PM

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<tbody>
<tr>
<td>Capitol I</td>
<td>The Future is Female... Coding for Girls!</td>
<td>Michelle Batts, East Hamilton Middle High School, Oak Grove</td>
<td>All Educators</td>
</tr>
<tr>
<td>Jackson</td>
<td>STEM - Computer Science: Becoming the Focus of STEM</td>
<td>Anthony Owen, Arkansas Department of Education and Scott Smith, Arkansas Public School Resource Center, Arkansas</td>
<td>All Educators</td>
</tr>
<tr>
<td>Nashville</td>
<td>From Reality to Reality: Developing a Sustainable STEM Culture</td>
<td>Catherine Jones and Katia Nash, Prescott South Elementary STEM School, Cookeville</td>
<td>School Leaders</td>
</tr>
<tr>
<td>Stones River</td>
<td>Cleverbots and Coding, OH MY!</td>
<td>Dr. Jenica Rixes Senior Outreach/Manager Wonder Workshop</td>
<td>Elementary &amp; Middle School Educators</td>
</tr>
<tr>
<td>Capitol II</td>
<td>Dream It, Design It: Teaching the New TN Academic Science Standards through Design Challenges</td>
<td>Adrena Higgins and Jentry Mason, Sam Houston Elementary, Lebanon</td>
<td>Science Teachers All Grades</td>
</tr>
<tr>
<td>Chattanooga</td>
<td>Learning Blade for Exciting STEM Engagement</td>
<td>Luan Albert and Megan O’Connor, Lakeland Middle Preparatory School, Lakeland</td>
<td>Middle School Educators</td>
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</tbody>
</table>
**STEM INQUIRY ACTIVITIES YIELD STUDENTS PREPARED FOR A COMPETITIVE JOB MARKET**

Tracy Anderson  
Northwestern Middle School, Knoxville

Claudene Denning  
Ross Park Magnet Middle, Nashville

Audience: Middle School Educators

Room: Memphis

Children are our future employers and employees! Sample favorite hands-on, inquiry-rich STEM activities that excite students (including 3-D printers, Science Olympiad, and other competitions), and reveal possibilities for their future careers. Take away several lessons you can use right away in class, and ideas to infuse more inquiry and career connections into your lesson plans.

**“LEARN BY DOING” THE 4-H WAY!**

Lisa Vasser  
University of Tennessee WPR Stidley 4-H Center, Columbia

Daniel Sarver  
University of Tennessee, Knoxville

Audience: Middle School Educators

Room: Chattanooga

Learn how to catapult youth into lifelong learning with the 4-H “Learn by Doing” philosophy. For over 100 years, 4-H educators have inspired youth to learn STEM principles by doing fun projects designed to actively inspire them to learn more. Come find out what the “Game of Thrown” is, and the STEM principles behind this and other exciting hands-on 4-H STEM activities!

**STEM™ CHALLENGE GRANTS PANEL**

Jill Lanning  
New York

Sueie Teague  
South Carolina

Brett Stowers  
West Virginia

Audience: Elementary & Middle School Educators

Room: Capitol I

Last Fall, the National STEMx network launched the Challenge Grant Program to provide states with up to $15,000 to develop solutions to pressing STEM education issues. Join STEMx state leaders to learn how the program coalesced partners around solving a pressing state issue in computer science, workforce develop, and state-level “Grand Challenges.”

**STOP BOGUS SCIENCE BEFORE IT ERODES STEM THINKING**

Lee Barth  
Cherry Ross Elementary, Murfreesboro

Audience: All Educators

Room: Capitol II

Need ideas for banning bogus science and promoting authentic discovery and understanding? In this session, learn how one school re-designed professional development to be based in genuine science practice and crosscutting concepts, resulting in deeper conceptual understanding for all.

**GETTING CREATIVE WITH CHROMEBOOKS: BOOSTING STUDENT ENGAGEMENT THROUGH TECHNOLOGY**

Mary Coulter  
Midway High School, Kingston

Audience: All Educators

Room: Capitol II

As technology becomes more and more ubiquitous in our classrooms, it’s essential that teachers have unique strategies for engaging students. In this session, we will demonstrate how to incorporate programs such as WikiPages, video software, and simulations into your classroom environment. Bring your own device to practice using the apps we discuss.

**INCORPORATING GEOSPATIAL TECHNOLOGIES INTO THE CLASSROOM**

Kurt Butefisch  
Tennessee Geographic Alliance, Knoxville

University of Tennessee, Knoxville

Audience: All Educators

Room: Nashville Ballroom

Humans have been making maps for thousands of years, but geospatial technologies have grown by leaps and bounds in our lifetime, and now permeate our daily lives. Learn what they encompass (Get the pun? A compass is a mapping tool!) and how to effectively incorporate geospatial tech into your classroom using problem-based learning tools designed for K-12 education, Story Maps and Georoutines. These tools are particularly effective for cross-curricular learning in English Language Arts. Bring your devices to play along!

**STEM™ USING COLLABORATION TO BUILD CAPACITY AND INCREASE STEM ENGAGEMENT**

Karen Peterson  
Erik Hagedorn  
National Girls Collaborative Project

Audience: All Educators

Room: Chattanooga

Come learn about the National Girls Collaborative Project (NGCP), a model for sustainable collaboration among cross-sector stakeholders. Participants will engage in hands-on activities designed to facilitate collaboration and leverage resources and expertise, learn about current research on the importance of collaboration, and be introduced to the free tools available from the National Girls Collaborative.

**PARTNERSHIPS FOR INNOVATION: OUR SCHOOL. OUR COMMUNITY. OUR FUTURE.**

Sarah Shaffer  
Shanna Hensley  
O-DE Global Support

Audience: All Educators

Room: Capitol I

“It takes a village to raise a child,” and therefore it takes a community to raise a school. Come participate in brainstorming activities with your colleagues to uncover how to utilize community partnerships to meet your school’s vision, while learning effective strategies to engage your community with student projects and work-based learning.

**OUT OF THE LIBRARY & INTO THE CLASSROOM: BUILDING A MAKER CULTURE**

Heather Henderlight  
Cailie Painter  
Jefferson Middle School, Oak Ridge

Audience: All Educators

Room: Stones River

Makerspaces encourage learning through inventing and creating but have been traditionally constrained to school libraries. This hands-on session will inspire you to embrace the maker culture and provide strategies for developing standards-supported maker activities in your classroom.

**THE EXTRAORDINAIRES: LEVERAGING STUDENT CREATIVITY IN ENGINEERING WITHOUT TECHNOLOGY**

Claire Williams  
McDoe  
Metro Nashville Public Schools, Nashville

Audience: All Educators

Room: Nashville Ballroom

Join the ranks of the Extraordinaires!, a design studio that engages student interest in engineering with open-ended guided questioning. The design studio lends itself to paper and pencil design that students can then take to the next level using basic makerspace items, found (free!) materials, or structured materials such as clay. You will leave this session with integrated lessons that can be implemented with zero cost in the classroom as well as guides to assist in planning. The Extraordinaires lessons align to the new Tennessee State Science Standards and are cross-curricular in ELA and Math.

**PUTTING THE SIZZLE IN STEAM**

Cindy Moss  
Discovery Education, Charlotte, NC

Audience: All Educators

Room: Capitol II

In this session attendees will learn about how MNPS is using research-based STEAM strategies with their middle schools to engage all types of learners and infuse fun into classrooms. Attendees will be exposed to the data indicating this is a necessary step, strategies with their middle schools to engage all types of learners and infuse fun into classrooms. Attendees will be exposed to the data indicating this is a necessary step. Attendees will be exposed to the data indicating this is a necessary step. Attendees will be exposed to the data indicating this is a necessary step. Attendees will be exposed to the data indicating this is a necessary step. Attendees will be exposed to the data indicating this is a necessary step.

**ROLE OF YOUTH ENGAGEMENT PROGRAMS IN THE STEM PIPELINE**

Ellis McClain  
Adventure Science Center, Nashville

Audience: High School Educators

Room: Memphis

Youth Engagement Programs in informal learning environments aim to better prepare students for future STEM careers pathways through effective programming, interpretation, and career exploration. This session will focus on how middle Tennessee programs, providing program outcomes, example activities, and training strategies used in the Adventure Science Center “Youth CRSEW” and Nashville Zoo “ZooTeen” programs.
**INCLUSIVE STEM COLLABORATION**

Natalie Beach  
Amy Bilberry  
Prescott South Elementary School, Cookeville  
**Room: Chattanooga**  

- Gain tried and tested tips (in communication, visual supports, classroom structure, and academic scaffolding) for planning a STEM project to make it more accessible for students with disabilities, while highly effective for all learners, and more manageable for teachers.

**STEM™ DUAL ENROLLMENT AS A RECRUITMENT AND RETENTION STRATEGY**

Natalie Beach  
Amy Bilberry  
Jennifer Zinth  
Education Commission of the States  
**Room: Chattanooga**  

- Research tells us that dual enrollment can play a powerful role in enhancing students’ postsecondary aspirations, enrollment, and completion. But can dual enrollment also play a role in increasing the number of female and underrepresented minority students in STEM degree programs? This session will explore what a dual enrollment program is, and what the key policies, incentives, and financial support are related to access and finance. We will also discuss how to ensure course quality, with the goal of motivating students to pursue STEM credentials and degrees.

**FROM CONCEPT TO SCALE: HOW TO DEVELOP, INCUBATE, AND SHARE INNOVATIVE PRACTICES**

Michael Stone  
The Innovation Hub at the Public Education Foundation, Chattanooga  
Tony Donen  
STEM School Chattanooga, Chattanooga  
**Room: Chattanooga**  

- In 2017-2018, Hamilton County Schools opened 8 digital fabrication labs, dubbed “Volkswagen e.Labs,” with a $1 million investment from Volkswagen, in partnership with the State of Tennessee and the Public Education Foundation. Learn how the Tennessee STEM Hub works with STEM School Chattanooga to develop, incubate, and scale innovative practices from a platform school to the rest of the region. From Virtual reality to digital fabrication, Tony and Michael will share specific strategies to integrate these exciting new practices in any setting.

**BEAUTY AND THE BEAK AN ENGINEERING DESIGN PROJECT USING INFORMATIONAL TEXTS AND 3D PRINTING**

Leslie Sutters  
Kristen Traut  
IZ Technological University, Knoxville  
**Room: Nashville Ballroom**  

- Join us in a hands-on session that allows you to use engineering design to address the real-world problem of designing prosthetics for animals! Bring your own laptop to research and design a prosthetic limb for an “injured” pet (stuffed toy) using the online CAD program Tinkercad. We will 3D print your completed design and allow you to pick them up at a designated area after the session.

**A STUDENT IN STEM: THE STUDENT’S POINT OF VIEW ABOUT STEM EDUCATION**

Hanna Selph  
TSA Student Officer/Counselor and Junior at Hardin Valley Academy, Knoxville  
**Room: Stones River**  

- In this session, hear from Hannah Selph, a junior at Hardin Valley Academy in Knoxville, as she tells her STEM story. From finding a Career Technical Education community in middle school to pursuing state and national STEM leadership opportunities in high school, Hannah is personally seeing how STEM can positively affect and motivate middle school to pursuing state and national STEM leadership opportunities in high school. The rest of the region. From Virtual reality to digital fabrication, Tony and Michael will share specific strategies to integrate these exciting new practices in any setting.

**THE FUTURE IS FEMALE...CODING FOR GIRLS!**

Michelle Betts  
East Hamilton Middle High School, Ooltewah  
**Room: Capitol I**  

- Is the lack of female representation in STEM classes at your school noticeable? What can you do to encourage females? Teach them to code! Successful skill-building in coding, combined with role models, hands-on opportunities, and real-world career connections, has been shown to increase girls’ confidence in math and science classrooms, develop their growth mindset towards all things STEM-related, and in turn raise the enrollment of females in STEM classes across the board. Bring your devices to play along!

**STEM™ COMPUTER SCIENCE: BECOMING THE FOCUS OF STEM**

Anthony Owen  
Arkansas Department of Education  
Scott Smith  
Arkansas Public School Resource Center, Arkansas  
**Room: Chattanooga**  

- Through the bipartisan actions of the General Assembly and Governor, Arkansas led the nation by being the first state to offer computer science in every high school. The state is continuing to implement a successful statewide CS initiative that is being replicated in other states. In this session, participants will learn how effective partnerships can support building an effective state K-12 CS initiative.

**FROM REACHING TO REALITY: DEVELOPING A SUSTAINABLE STEM CULTURE**

Cathrina Jones  
Katie Nash  
STEM School Chattanooga, Chattanooga  
**Room: Nashville Ballroom**  

- Learn an easy process to guide you through the development of a STEM implementation plan at your school, promoting a strong STEM school culture! Layers of STEM practices will be shared to spark ideas you can use upon returning to your own campus. Learn an easy process to guide you through the development of a STEM implementation plan at your school, promoting a strong STEM school culture! Layers of STEM practices will be shared to spark ideas you can use upon returning to your own campus.

**DREAM IT, DESIGN IT: TEACHING THE NEW TN ACADEMIC SCIENCE STANDARDS THROUGH DESIGN CHALLENGES**

Adrena Higgins  
Jenni Massey  
Stu Houston Elementary, Lebanon  
**Room: Science Teachers in all Grades**  

- Learn strategies to implement a STEM Design Task into your classroom using the new TN Academic Standards for Science. See how a Kindergarten teacher and a Fifth Grade Teacher incorporate STEM challenges in both of their classrooms, and how each teacher used different criteria, constraints, and rubrics to assess their students in each grade level.

**LEARNING BLADE FOR EXCITING STEM ENGAGEMENT**

Learn Albert  
Megan Criner  
Hardin Valley Academy, Knoxville  
**Room: Chattanooga**  

- Learning Blade is a multi-disciplinary online learning tool that connects STEM career exploration and academic standards in thematic units. In this interactive demonstration, participants will see how Learning Blade is a helping hand in the middle school classroom, across subjects. Bring your devices to play along!
Keynote Speaker - Wednesday, May 9

Joseph Acaba
NASA Astronaut

Joseph M. Acaba was selected by NASA in 2004. The California native has logged a total of 506 days in space during three missions. In 2009, Acaba flew aboard STS-119 on the Space Shuttle Discovery to the International Space Station to deliver the final pair of power-generating solar array wings and a truss element. During this mission, he conducted two spacewalks. In 2012, Acaba flew aboard a Soyuz spacecraft to the space station where he worked as Flight Engineer for the Expedition 31/32. During this mission, the first commercial resupply spacecraft, SpaceX Dragon, arrived at the station. Acaba also served as Director of Operations for NASA in Star City supporting crew training in Soyuz and Russian Segment systems, and most recently served as Flight Engineer on the International Space Station for Expedition 53/54, landing back on Earth on February 28, 2018.

Prior to arriving at NASA, Acaba taught one year of high school science at Melbourne High School, Florida, and four years of middle school math and science at Dunnellon Middle School, Florida.

SCHEDULE

WEDNESDAY MAY 9

8:00 AM - 8:30 AM | Registration
8:30 AM - 8:45 AM | Welcome & Morning Remarks in the Nashville Ballroom
8:45 AM - 9:25 AM | STEM Excellence Awards and MakerMinded Prizes
9:25 AM - 10:30 AM | Keynote Address by NASA Astronaut Joseph Acaba
10:30 AM - 11:00 AM | Networking and Visit the ORNL Traveling Science Fair
11:00 AM - 11:45 AM | Breakout Sessions 5
11:45 AM - 12:45 PM | Lunch
12:45 PM - 1:30 PM | Breakout Sessions 6
1:45 PM - 2:30 PM | Breakout Sessions 7
3:00 PM - 3:15 PM | Closing Remarks and Door Prizes in the Nashville Ballroom

Congratulations to our 2018 STEM Excellence Awards winners!

TENNESSEE STEM INNOVATOR

Dr. Tony Donen
Principal, STEM School Chattanooga

Dr. Tony Donen is the founding principal of STEM School Chattanooga and is committed to helping improve STEM education throughout the country. Since the inception of STEM School Chattanooga, the school has become a national leader in STEM education and a model for innovative teaching practices and real-world student engagement. The school has been recognized by America Achieves as one of thirty schools worldwide designated as a “World-Leading Learner School” and by the Fab Foundation for prominence in digital fabrication education. Tony has led professional development throughout Tennessee as one of the lead principals for the Innovative Leaders Institute for school leadership teams and provides opportunities for teachers and leaders from across the country to visit STEM School Chattanooga’s innovative campus.

TENNESSEE STEM ADVOCATE

Billy Hix
Professor Emeritus at Motlow College and Director of STEM Outreach Program

Billy Hix is a product of a very rural, high poverty school where he wanted to learn about the night sky and dreamed of working for NASA. He is passionate about sharing his love of learning and astronomy with students from similar backgrounds. Billy is Professor Emeritus at Motlow State Community College where he started the STEM Outreach Program to pique the curiosity of students across the state. Additionally, Billy manages a visiting planetarium program, where he provides students from across the state with the opportunity to be awed by the night sky. Since its inception, Billy has impacted the lives of over 50,000 students through the mobile planetarium. Billy also created the Teacher Outreach Program (TnSh) to prepare students and teachers for the Eclipse of 2017. These videos were viewed over 5,000 times by teachers across the country. In 2018, he was selected as a NASA Solar System Ambassador and is one of three nominees for the American Astronomical Society Outreach national award.

TENNESSEE STEM ADVOCATE

Sharon Clark
Teacher, East Side Intermediate School, Henderson County Schools

Sharon Clark teaches STEM and Technology Enrichment to 4th and 5th grade innovators at East Side Intermediate School in Brownsville, TN. Clark is a 2018 PBS Digital Innovator All-Star, a member of the Rural TN STEM Collaborative Cohort, and a member of the University Tennessee Transformational Leadership Alliance. Clark enjoys empowering students through STEM education, raising community awareness about the purpose of and need for STEM, and engaging community members with her students through STEM-related activities. She is passionate about sharing her STEM experience with other teachers from across West Tennessee.

EXCELLENCE IN STEM LEADERSHIP

Erie Thurston
Principal of Chattanooga Jack Anderson Elementary, Sumner County Schools

Erie Thurston serves as the STEM Facilitator at Jack Anderson Elementary School in Hendersonville, TN. In her role, she works closely with teachers and administrators to provide various opportunities for all students to apply grade level standards in ways that incorporate the Engineering Design Process. Erin prides herself on exposing her students to STEM practices that help cultivate critical thinkers while also nurturing creativity and developing communication and collaborative skills necessary for their next steps. She began her journey with Jack Anderson in the role of a Parent. As the PTO president, Erin worked alongside administration to secure funding for a fully functioning STEM lab. Her role has now expanded to include securing community partnerships, seeking and organizing all STEM resources, designing STEM seminars, and supporting teachers in their implementation of Project Based Learning Units. Erin was a participant of the 2016-2017 Innovative Leaders Institute Cohort, where she was able to visit and learn from many other STEM schools across Middle Tennessee. Erin has witnessed the transformation that she has witnessed at Jack Anderson since its implementation of STEM and often speaks about it at conferences.

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Each of these winning schools is preparing the future generation of advanced manufacturers and engineers by engaging their students in hands-on STEM opportunities, both in the classroom and the community.

Congratulations to our 2017-2018 MakerMinded Schools of Distinction!

Please join us for the MakerMinded awards and learning session to learn more about this free resource and statewide competition that encourages teachers and students to explore STEM. To learn more visit www.tm.makerminded.com.
### BREAKOUT SESSIONS 5 - 11:00 AM

<table>
<thead>
<tr>
<th>ROOM</th>
<th>SESSION TITLE</th>
<th>PRESENTER(S)</th>
<th>AUDIENCE</th>
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</thead>
<tbody>
<tr>
<td>Stones River</td>
<td><strong>Hometown Pride: Inspiring Rural Students to Explore Local STEM Careers</strong></td>
<td>Sharon Clark, East Side Intermediate School, Brownsville</td>
<td>Educators, All Grades</td>
</tr>
<tr>
<td>Capitol II</td>
<td><strong>Assets Matter: Developing Sustainable Financial Partnerships</strong></td>
<td>Sylvia Pastor and Diane Ward</td>
<td>Roane State Community College, Harriman</td>
</tr>
<tr>
<td>Jackson</td>
<td><strong>STEM = Taking on the STEM Grand Challenges: What might you learn from South Carolina’s approach?</strong></td>
<td>Grace Dorosens, Tom Peters and Susie Tegue, SC Coalition for Math and Science and 100x10</td>
<td>All Educators</td>
</tr>
<tr>
<td>Chattanooga</td>
<td><strong>The Culture Club</strong></td>
<td>Becky Ash, LAN STEM Academy and George Ash, Hardin Valley Academy STEM, Knoxville</td>
<td>TBD</td>
</tr>
<tr>
<td>Capitol I</td>
<td><strong>The STEAM Book Cafe and Makerspace</strong></td>
<td>Dr. Ralph Kapp and Beth Wilson</td>
<td>Red Bank Elementary, Chattanooga</td>
</tr>
<tr>
<td>Nashville Ballroom</td>
<td><strong>STEM = MakerMinded for STEM Career Awareness</strong></td>
<td>Heather Sherman, Oh, STEM Learning Network, Ohio</td>
<td>Middle &amp; High School Educators</td>
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### BREAKOUT SESSIONS 6 - 12:45 PM

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<tbody>
<tr>
<td>Capitol I</td>
<td><strong>STEAM = TSIn Rural STEM Collaborative</strong></td>
<td>Brandi Strodeker and Erin Cuman, Tennessee STEM Innovation Network</td>
<td>All Educators</td>
</tr>
<tr>
<td>Chattanooga</td>
<td><strong>Business Partnerships Bring STEM to Life with Modular LEGO Buildings</strong></td>
<td>Rob Porter, Cummins Filtration, Cookeville</td>
<td>All Educators</td>
</tr>
<tr>
<td>Nashville Ballroom</td>
<td><strong>TeamUP 2 GreenUP: Promoting a Sustainable School Culture</strong></td>
<td>Tracy Leake, Shelby County Schools, Memphis</td>
<td>All Educators</td>
</tr>
<tr>
<td>Capitol II</td>
<td><strong>SOLE-Student Organized Learning Environment</strong></td>
<td>Nikki Russell and Mary Austin, Berger Academy, Chattanooga</td>
<td>All Educators</td>
</tr>
<tr>
<td>Stones River</td>
<td><strong>Computer Coding in the Elementary Classroom</strong></td>
<td>Kettle Nash and Carolyn Fos, Prescott South Elementary School, Cookeville</td>
<td>Elementary Educators</td>
</tr>
<tr>
<td>Memphis</td>
<td><strong>Integrate STEM Career Awareness with Learning Blade</strong></td>
<td>Josh Spreeman, Learning Blade</td>
<td>Middle School Educators</td>
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</table>

### BREAKOUT SESSIONS 7 - 1:45 PM

<table>
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<tbody>
<tr>
<td>Chattanooga</td>
<td><strong>Purposeful Partnerships: Engaging Community Members in Family STEM Nights</strong></td>
<td>Lynne Hodge and Karen Chang, University of Tennessee, Knoxville</td>
<td>All Educators</td>
</tr>
<tr>
<td>Jackson</td>
<td><strong>STEM = How Public Private Partnerships are Changing the Landscape of STEM in Idaho</strong></td>
<td>Angela Higgenway, Idaho STEM Action Center and Anne Soifer, Idaho National Laboratory, Idaho</td>
<td>All Educators</td>
</tr>
<tr>
<td>Stones River</td>
<td><strong>Our STEM-tastic Journey to Becoming A STEM School</strong></td>
<td>Tricia Sander and Erin Thorton, Jack Anderson Elementary, Hendersonville, TN</td>
<td>Elementary &amp; Middle School Educators</td>
</tr>
<tr>
<td>Capitol I</td>
<td><strong>Get Your Class Flowing With Technology</strong></td>
<td>Christy Shepherd and Tara Brooks, Northeast Elementary, Cookeville</td>
<td>All Educators</td>
</tr>
<tr>
<td>Capitol II</td>
<td><strong>Making a Future with STEM</strong></td>
<td>Sally Randus and Scott Edits, Midland Oakley STEM Center and Tennessee Tech</td>
<td>Middle School Educators</td>
</tr>
<tr>
<td>Nashville Ballroom</td>
<td><strong>Dream Big Movie Screening</strong></td>
<td></td>
<td>All Educators</td>
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THE TENNESSEE RURAL STEM COLLABORATIVE

Brandi Stroesser
Even Curren
Tennessee STEM Innovation Network

Interested in place-based education? Hear how the Tennessee Rural STEM Collaborative leverages PBE to increase rural educator's capacity to connect with valuable expertise and access assets that focus on STEM locally. Join us to hear from current collaborative members and how you can become involved!

BUSINESS PARTNERSHIPS BRING STEM TO LIFE WITH MODULAR LEGO BUILDS

Bob Porter
Cummins Filtration, Cookeville

Learn about working with business partners in your community as Cummins Filtration shares how they have partnered with the Millard Oakley STEM Center, Participates in Middle School, and Cookeville High School to advance STEM learning over the past 5 years. The Cummins Filtration STEM program uses Lego based hands-on STEM activities, which are easily paired with simple, industry-relevant demos for students!

TEAM UP 2 GREENUP: PROMOTING A SUSTAINABLE SCHOOL CULTURE

Tracy Leaks
Shelby County Schools, Memphis

Participants will explore exciting and innovative strategies to engage students in sustainability efforts at school and learn how to conduct an energy audit of a school utilizing a STEM energy audit toolkit! Community partnerships that increase the environmental literacy of students will be explored.

SOLE-STUDENT ORGANIZED LEARNING ENVIRONMENT

Nikki Russell
Mary Auvens
Karger Academy, Chattanooga

Have you had trouble finding the time to incorporate projects into your instruction? Join us to learn the benefits of a problem/project-based learning (PBL) unit by utilizing the SOLE (Student Organized Learning Environment) strategy, start to finish project process in 1 hour! We will share how this process can be customized to fit your classroom needs.

COMPUTER CODING IN THE ELEMENTARY CLASSROOM

Katie Nash
Carolyn Fox
Prescott South Elementary STEM School, Cookeville

The ability to code and understand the power of computing is crucial for a student’s success in a hyper-connected world! Join us as we emphasize the “why” behind computer coding in the elementary classroom and have fun experiencing both unplugged and plugged coding activities!

INTEGRATE STEM CAREER AWARENESS WITH LEARNING BLADE

Joshua Sniderman
Learning Blade, Chattanooga

The TSIN provides Learning Blade free of charge to all middle schools in TN to enhance access to a blended learning approach to STEM. In this session, educators will take part in a hands-on Learning Blade training to learn how to immediately integrate this web-based STEM career awareness program into their middle school activities. Bring your own device to demo both student and teacher accounts and walk away fully trained on the strategies for creating and managing student accounts.

PURPOSEFUL PARTNERSHIPS: ENGAGING COMMUNITY MEMBERS IN FAMILY STEM NIGHTS

Lynn Hodge
Kwan Chang
University of Tennessee, Knoxville

In this session, we will share the approach and lessons learned in designing and implementing Family STEM nights. Learn practical tips in building sustainable university and school partnerships through community events and explore activities that have been successful in making STEM more accessible to students and families!

THE HOW PUBLIC PRIVATE PARTNERSHIPS ARE CHANGING THE LANDSCAPE OF STEM IN IDAHO

Angela Hermsmeyer
Idaho STEM Action Center

This interactive session will highlight successful approaches to STEM partnerships including providing mentorship and volunteer opportunities to serve in K-12 schools and out-of-school programs, expanding work-based experiential learning programs, expanding STEM and CS camps, competitions, and family events.

OUR STEM-TASK-TIC JOURNEY TO BECOMING A STEM SCHOOL

Tressa Sander
Erin Thurstun
Jack Anderson Elementary, Hendersonville, TN

Come discover the steps Jack Anderson Elementary took to becoming a STEM focused school. We are excited to share the key design elements that support project-based, interdisciplinary STEM instruction through a four-phase immersion process. If you are ready to start your own STEM journey or want to enhance your elementary STEM program, come join us!

GET YOUR CLASS FLOWING WITH TECHNOLOGY

Christy Shepherd
Tara Brooks
Northeast Elementary, Cookeville

Want your students to take ownership in their learning and be excited about it? Then this session is for you! Keep your students engaged throughout your lessons by effectively integrating technology. During this session we will be using Classflow, quizlet, quizizz, edpuzzle, google classroom, and kahoot!

MAKING A FUTURE WITH STEM

Sally Purdue
Scott Eddins
Millard Oakley STEM Center at Tennessee Tech

We remember what we make! In this session, participants will learn ways to bring making and manufacturing career knowledge into the classrooms of today to help build the future of tomorrow. Instructors will provide some of the best practices being shared in the Upper Cumberland region by teachers from 16 primarily rural counties who have been meeting together as a professional learning community for the past two years. You will be lead through shorted versions of these teacher’s favorite activities and curated resources for connecting math and science to manufacturing careers.

DREAM BIG MOVIE SCREENING

Jenny Brandon
Ripley Middle School, Ripley

Join us for a short screening of Dream Big, a movie designed to show students the power of engineers in bettering our world. Then, join Dr. Brandon from Lauderdale County Schools as she shares how she used the Dream Big lesson plans and tools to inspire her students through hands on STEM in the classroom and provides resources to use in your own classroom.
Thank you to our event exhibitors and sponsors!

**Gold Level**

- C2 Education
  - www.c2educate.com
  - Leslie Jenkins and Jason Isaacs
  - Exhibit table 18

- Carnegie Learning
  - carnegielearning.com
  - Mark Tipton
  - Exhibit table 17

- Great Smoky Mountains Institute at Tremont
  - www.gsmit.org
  - Rebekah Long and Jessa Goldner
  - Exhibit table 4

- National Inventors Hall of Fame
  - www.invent.org
  - Shawn Wilson
  - Exhibit table 16

- Science Guys
  - www.mrbondscienceguy.com
  - Carol Buttenham (Cosmic Carol) and Kari Donovan (Dr. E)
  - Exhibit table 6

- The STEAM Train
  - thesteamtrain.cc
  - Aram Perez and Sandra Perez
  - Exhibit table 5

- Cambridge Assessment International Education
  - www.cambridgeinternational.org
  - Keith Lucey and Aparajita Nandi
  - Exhibit table 14

- Discovery Education
  - www.DiscoveryEducation.com
  - Aimee Tait and Rob Warren
  - Exhibit table 7

- Learning Blade
  - learningblade.com
  - Sheal Boyington and Joshua Sneideman
  - Exhibit table 15

- Presentation Solutions, Inc.
  - www.presentationsolutions.com
  - Regina Martin
  - Exhibit table 10

- Tennessee Geographic Alliance
  - www.tngeographicalliance.org
  - Kurt Butefish and Mike Camponovo
  - Exhibit table 1

- Vernier Software & Technology
  - www.vernier.com
  - David Carter
  - Exhibit table 8

- Camcor
  - www.camcor.com
  - Mike Winstlett and Mike Jones
  - Exhibit table 12

- Engineer Your World from The University of Texas
  - www.engineeryourworld.org
  - Marie Girardot and Cheryl Farmer
  - Exhibit table 2

- Learning Labs, Inc.
  - www.learninglabsinc.com
  - Ben Richardson
  - Exhibit table 3

- Project Lead the Way
  - www.pltw.org
  - Paul Zurek
  - Exhibit table 11

- Texas Instruments, Inc.
  - www.education.ti.com
  - Ron Thomas
  - Exhibit table 9

- Wonder Workshop
  - www.makewonder.com
  - Dr. Katrina Keene and Bryan Miller
  - Exhibit table 13

**Silver Level**

- Cambridge Assessment International Education
  - www.cambridgeinternational.org
  - Keith Lucey and Aparajita Nandi
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  - www.DiscoveryEducation.com
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Thank you, Tennessee educators, for continuing to introduce students to STEM careers while incorporating TN state standards.

TN Teachers, sign up for FREE at www.LearningBlade.com/TN

Email info@LearningBlade.com for free training or more info.
The Innovative Leaders Institute is a year-long training and mentoring experience for educators led by some of the top innovative school leaders in Tennessee. The Innovative Leaders Institute provides participants opportunities to network with other building-level leaders from across the state, visit innovative schools to examine different models of STEM integration, and share best practices and resources with the expectation of having an immediate impact on leader practice.

Focuses on 4 Key Areas:
- Instructional Leadership for Continuous Improvement
- Culture for Teaching and Learning
- Professional Learning and Growth
- Resource Management

The TWSC is approved for 24 hours of professional development credit. Applications open in early Summer. Visit www.tsin.org/programs/pd for more information.

Thanks to our 2017-2018 TRSC participants!

Forty-Three educators across 24 counties impacted over 9,000 students with their STEM engagement initiative.

Cohort members interact with work-alike groups both regionally and statewide that concentrate on a specific area of focus:

- Community & Postsecondary Partnerships
- STEM Integrated Curriculum & Instruction
- Family Engagement

For each area of focus, participants engage in targeted professional development, meet experts in the field, and implement a targeted STEM initiative at their home school or district!
Regional Hubs are committed to giving educators the resources and skills they need to expand STEM learning both inside and outside of the classroom. Through coordination with the Network, the Regional Hubs provide targeted and aligned professional development on a variety of topics through Innovative Educators Workshops.

**May 31**
Innovations in K-20 STEM Education Conference
Jackson - West Tennessee STEM Hub & Northwest Tennessee STEM Innovation Hub
http://www.dscc.edu/NWTN-STEM

**May 31 - June 1**
STEM and Literacy in Education (SLICE) Conference
Tri-Cities – Northwest Tennessee STEM Innovation Hub
https://www.tinyurl.com/jgavqhub

**June 13**
Innovative Code Academy
Dyersburg – Northwest Tennessee STEM Innovation Hub
http://www.dscc.edu/NWTN-STEM

**June 2, 9, 16, 23**
STEMulating Ideas Conference
Knoxville – East Tennessee STEM Hub
https://goo.gl/Grm65C

**June 18-21**
Chattanooga Fab Institute
Chattanooga – Public Education Foundation
https://www.vwlab.org/chattfab

**June 25-26**
TSTA Summer Institute at the Oakley STEM Center
Cookeville – Upper Cumberland Rural STEM Initiative
http://www.tsta.wildapricot.org

Innovative Educator Workshops

Sign up for a professional learning opportunity in your area!

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**Tennessee STEM Innovation Hubs**

ETSU NE TN STEM Innovation Hub
Johnson City
netstemhub.com

Northwest TN STEM Innovation Hub
Dyersburg
www.dscc.edu/NWTN-STEM

East Tennessee STEM Innovation Hub
Knoxville
ceems.utc.edu/STEM-hub

West Tennessee STEM Hub
Memphis
westtnstem.org

Upper Cumberland Rural STEM Initiative
Cookeville
ucrsi.org

PEF INNOVATION HUB
Chattanooga
pefinnovationhub.org

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Big Machine Label Group

**LAWRENCE BLANK-COOK**
National Technology Director, Deloitte

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TVA

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(R) - Hixon

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