Connects All
Never Too Early, Never Too Late

SUMMER INSTITUTE
July 28-30, 2019

Organized and Supported by the
NEW YORK STATE STEM EDUCATION COLLABORATIVE
NYSSEC

Updated Conference Information and Schedule is found at the
NYS STEM Education Collaborative Website
www.nysstemeducation.org

Alfred State IT Hotline: 607-587-4357
Wi-Fi Internet access does not require ID nor Password
New York State STEM Education Collaborative

www.nysstemeducation.org

Founding Core Members
Science Teachers Association of New York State (STANYS)
New York State Technology and Engineering Educators’ Association (NYSTEEA)
New York State Technology Society of Professional Engineers (NYSSPE)
Association of Mathematics Teachers of New York State (AMTNYS)

Supporting Partner Members

Alfred State – SUNY College of Technology
American Society for Education Engineering
CNY STEM Hub
Chenango Forks STEAM
Eastern Southern Tier STEM HUB
Empire State STEM Learning Network
Greater Southern Tier STEM Education
Hofstra University Center for STEM Research
International Technology and Engineering Educators Association
Long Island STEM Hub
NASA – Endeavor Science Teaching Certificate Project
New York Institute of Technology

New York State Association for Computers and Technology in Education
New York State Girls Collaborative
New York State United Teachers
North Country STEM HUB
Northeast Education Partnerships
Rochester Engineering Society
Small World Initiative
STEM Alliance
SUNY Broome
SUNY Delhi
SUNY Maritime College
SUNY Oswego
Technology Alliance of Central New York
Western NY STEM Hub
**Our Mission Statement:** To define STEM and the STEM disciplines in a fashion that will serve as a model for New York State and throughout the nation.

AMTNYS, ASEE, NYSSPE, NYSTEEA and STANYS will work collectively and collaboratively to deliver STEM Education in the spirit and vision of the NYS MST Frameworks and Learning Standards. We must take this approach to skillfully and completely address the concerted state and national cry for STEM Literacy.

**Our Overarching Goals:**

- To transform the NYS MST Learning Standards into an effective and meaningful STEM Education Learning Standards delivery.
- To hold mutually supported annual NYS STEM Education Collaborative Summer Institute that will encourage and facilitate the sharing of successful and innovative classroom STEM practices by presenters representing AMTNYS, ASEE, NYSSPE, NYSTEEA, STANYS, and other education organizations.
- To carry forward our NYS STEM Education Collaborative foundational work with enlightening debate and constructive discussions through various means of communication and a (yet to be determined) conducive timeframe.
- To work together to ensure that accepted research and practice-based STEM principles are applied in the development of revised or new MST Standards.
- To mutually support, connect and strengthen science, technology, engineering and math P-16 instruction. All three disciplines would still maintain their separate learning standards, integrity, scope and depth but would be delivered within a cross connected methodology.
- To influence support funding, school policy, teacher training and preparation methods, with our mutually envisioned STEM Education approach.
- To foster the modification of existing assessments, with changes in written language and references, to bring about STEM connections, without changing the primary purpose and thrust of each.

**Founding Member organizations:**
# 2019 Summer Institute - Schedule

**Building KEY**
- **AGRLAB** Agriculture Science Building • **PHS** Physical & Health Sciences Building
- **CDH** Central Dining Hall • **SLC** Student Leadership Center

## Sunday, July 28, 2019

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noon, Vendor area open for vendors</td>
<td>3:00 PM to 3:15 PM, Vendors (CDH, 2nd floor) and Break</td>
</tr>
<tr>
<td>2:00 PM to 5:00 PM, Arrive, Check-in and Registration (SLC, 3rd Floor)</td>
<td>4:15 PM to 4:30 PM, Vendors (CDH, 2nd floor) and Break</td>
</tr>
<tr>
<td>3:15 PM to 4:45 PM, <strong>Tour Session A</strong> Clean Room Tour [1PD] Need to Pre-register. Maximum 20 persons; please pre-register. Meet in PHS lounge at 3:10 PM.</td>
<td>4:30 PM to 5:30 PM, <strong>Session 4</strong> Presentations (AGRLAB/PHS) [1PD]</td>
</tr>
<tr>
<td>5:00 PM to 6:00 PM, <strong>Poster Session</strong>, Networking, Exhibits [1PD] and Vendor Area Open (CDH)</td>
<td>5:30 PM to 6:00 PM, Networking, Vendors, and Cash Bar, (CDH, 2nd floor)</td>
</tr>
<tr>
<td>6:00 PM to 7:00 PM, Dinner (CDH)</td>
<td>6:00 PM to 7:00 PM, Dinner (CDH)</td>
</tr>
<tr>
<td>7:00 PM to 9:00 PM, Institute Introductions, Logistics and Updates (CDH) &amp; <strong>STEM Trivia</strong>, Have Fun &amp; Learn [2PD]</td>
<td>7:00 PM to 8:30 PM, <strong>Keynote Address- Bob Rogers</strong>, Professor of Mathematics, SUNY Fredonia (CDH) [1PD] &amp; <strong>Awards Presentation</strong></td>
</tr>
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## Monday, July 29, 2019

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:30 AM to 7:45 AM, Breakfast</td>
<td>6:30 AM to 7:45 AM, Breakfast</td>
</tr>
<tr>
<td>7:00 AM to 8:00 AM, Check-in (SLC, 3rd Floor)</td>
<td>7:00 AM to 8:00 AM, Check-in (SLC, 3rd Floor)</td>
</tr>
<tr>
<td>8:00 AM to 9:00 AM, <strong>Plenary Session</strong> (CDH) [1PD]</td>
<td>8:00 AM to 9:00 AM, <strong>Session 5</strong> Presentations (AGRLAB/PHS) [1PD]</td>
</tr>
<tr>
<td>9:00 AM to 10:00 AM, Vendors (CDH, 2nd floor) and Break</td>
<td>9:00 AM to 9:15 AM, Vendors (CDH, 2nd floor) and Break</td>
</tr>
<tr>
<td>10:00 to 11:00 AM, <strong>Session 1</strong> Presentations (AGRLAB/PHS) [1PD]</td>
<td>9:15 AM to 10:15 AM, <strong>Session 6</strong> Presentations (AGRLAB/PHS) [1PD]</td>
</tr>
<tr>
<td>11:00 AM to 11:15 AM, Vendors (CDH, 2nd floor) &amp; Break</td>
<td>10:15 AM to 10:45 AM, Vendors (CDH, 2nd floor) and Break</td>
</tr>
<tr>
<td>11:15 AM to 12:15 PM, <strong>Keynote Address-Tony Collins</strong>, President of Clarkson University (CDH) [1PD]</td>
<td>10:45 AM to 11:45 AM, <strong>Session 7</strong> Presentations (AGRLAB/PHS) [1PD]</td>
</tr>
<tr>
<td>12:15 PM to 1:15 PM, Lunch (CDH)</td>
<td>11:45 AM to 1:15 PM, Lunch, <strong>Raffle</strong>, &amp; <strong>Keynote Address-Chancellor Johnson</strong>, State University of New York (CDH) [1PD]</td>
</tr>
<tr>
<td>1:15 PM to 2:00 PM, Vendors (CDH, 2nd floor)</td>
<td>1:30 PM to 2:30 PM, <strong>Session 8</strong> Presentations (AGRLAB/PHS) [1PD]</td>
</tr>
<tr>
<td>1:45 PM to 3:00 PM, <strong>Tour Session B</strong> Agri-Robot Tour [1PD], Please pre-register. Meet at SLC Registration Table. <strong>OR</strong> 2:00 PM to 3:00 PM, <strong>Session 2</strong> Presentations (AGRLAB/PHS) [1PD]</td>
<td>2:45 PM to 3:45 PM, <strong>Tour Session C</strong> Nursing Tour [1PD]. Meet in PHS lounge at 2:35 PM.</td>
</tr>
<tr>
<td>3:00 PM to 3:15 PM, Vendors (CDH, 2nd floor) and Break</td>
<td><strong>Thank You</strong></td>
</tr>
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## Tuesday, July 30, 2019

### Professional Development Hours (CTLE Approved Credits)
- Sunday (4)
- Monday (7)
- Tuesday (6)

**STEM Institute Total Professional Development 17 hours**
NYS STEM Education Collaborative (NYSSEC)
2019 Summer Institute
Planning Committee

Dr. Craig Clark, PE  
NYSSEC Summer Institute Co-Chairperson  
Vice President for Economic Development-Alfred State

Chuck Goodwin, DTE  
NYSSEC Summer Institute Co-Chairperson & NYSSEC Immediate Past-President  
NYSTEEA Past President

Terry McSweeney  
NYSSEC Summer Institute Co-Chairperson & NYSSEC Plenary Facilitator & Communications; NYSUT-Professional Development

Denise Brownell  
External Event Planner & Director of Dining Services-Alfred State

Charlie Crumb  
CTE - Technical Assistance Center of NY

Ellen Falk  
NYSSEC Trivia Coordinator; AMTNYS; NASA Endeavor Project

Timothy Fowler  
NYSSEC Vendor Facilitator  
Network for Youth Success; NYS STEAM Girls Collaborative

Gwendolyn Maturo-Grasso  
NYSSEC Margaret Ashida Awards co-Coordinator

Maranda Miller  
NYSSEC Social Media Coordinator; Assistant Director of Learning Support-SUNY Maritime

Mary Ann Nickloy  
NYSSEC STEM Liaison for AMYNYS & NEATEC 7-12 Curriculum Developer

Phyllis O’Donnell, PhD  
NYSSEC Event Program; Associate Professor-SUNY Broome; STANYS

Timothy Ott  
Director CTE Technical Assistance Center

Fred Pidgeon  
NYSSEC Vice-President; STANYS Past President

Hilary Reilly  
NYSSEC Margaret Ashida Awards co-Coordinator; Science Integration Specialist-Questar III BOCES

Dr. Robert Rogers  
NYSSEC Vendor Facilitator & Trivia Coordinator; Past President AMTNYS;  
Distinguished Teaching Professor-SUNY Fredonia

Frank Roma, PE  
NYSSEC President; NYSSPE

Josephine Salvador  
NYS Master Teacher Outreach

Ricardo Rowe  
NYSSEC Webmaster

Barbara Scherer  
Assistant Manager Outreach & Workforce Development-SUNY Delhi

Dr. Mark Vaughn  
NYSSEC Plenary Facilitator; Technical Talent Pipeline Manager-Corning Inc.;  
Southern Tier STEM HUB Facilitator

Donna Yerdon  
NYSSEC Treasurer; Immediate Past President AMTNYS

Dr. Joseph Zawicki  
NYSSEC Secretary; NYSSEC Program & Communications; STANYS; WNY STEM Hub;  
Professor-Buffalo State

2019 STEM Institute Support and Planning
We Thank & Support Our Sponsors

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nysut | A Union of Professionals

CORNING

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We Thank & Support Our Vendors
Honoring the
New York State STEM Education
Collaborative’s 2019 Summer Institute
at Alfred State College

WHEREAS, It is the sense of this New York State Senator to
acknowledge the efforts of organizations who promote an enhanced education
for the residents of this great Empire State; and

WHEREAS, Attendant to such concern, this member of the New York
State Senate is justly proud to honor the New York State Science, Technology,
Engineering and Math (STEM) Education Collaborative’s 2019 Summer
Institute, at Alfred State College from July 28 to July 30, 2019; and

WHEREAS, The NYS STEM Education Collaborative is an outstanding
consortium of organizations, including the Association of Mathematics
Teachers of New York State (AMTNYS), New York State Society of Professional
Engineers (NYSSPE), New York State Technology & Engineering Educators
Association (NYSTEEA), and the Science Teachers Association of New York
State (STANYS), working to promote the scope and integration of STEM
education on a statewide and national platform; many professionals ensure
that a STEM education approach provides students, from pre-kindergarten
through graduate school, with all of the necessary tools to strengthen the
overall learning experience of students in preparation for their post-secondary
and professional careers; and
WHEREAS, The 2019 Summer Institute’s theme is STEM Connects ALL: Never Too Early—Never Too Late; it is certain that with a variety of keynote and plenary speakers to attend the summer institute, they will have a profound and lasting impact on the future of education; presentations will include all learning levels (k-20); STEM proposals currently include STEAM which takes these proposals to the next level of innovation with up to 50 diverse STEM/STEAM presentations via 8 sessions; and

WHEREAS, At the direction of Craig Clark, PE, PhD, and many others, it has been made possible for Alfred State College to be a leader with the NYS STEM Education Collaborative; it is certain that this annual event continues to be a highly monumental success; and

WHEREAS, Observing that special recognition should be given to those who work assiduously and make significant contributions to the citizens and communities in this great Empire State; now, therefore, by way of this Proclamation;

SENATOR CATHARINE M. YOUNG honors the New York State STEM Education Collaborative’s 2019 Summer Institute, and a copy of this Proclamation, suitably engrossed, should be transmitted to Craig R. Clark, PE, PhD, Chuck Goodwin, DTE, and Terry McSweeney, Co-Chairs of the NYS STEM Education Collaborative’s 2019 Summer Institute.

Proclaimed July 28, 2019, By Order Of,

Catharine M. Young
New York State Senate
57th Senate District
June 2, 2019

Greetings and welcome to the 2019 STEM Summer Institute,

This is the seventh Institute since the founding of the NYS STEM Education Collaborative. It is being sponsored by Collaborative and SUNY Alfred State. We hope you find the Institute relevant and useful.

Thank you to our Co-Chairpersons: Dr. Craig Clark, Alfred State, Chuck Goodwin, NYSTEEA and Terry McSweeney, NYSUT for their efforts. We thank Denise Brownell and the Alfred State staff for making our stay comfortable.

We thank our sponsors and vendors for their support. We want to thank the Keynoters, the Plenary Panel, and the presenters. Lastly, let me thank you, the participants. We appreciate you support. We hope you can enjoy Alfred State, learn from others, see new products, and network with others.

The Institute provides a forum for a variety of topics and methods—demonstrations, hands-on, lecture, and use of the internet.

We congratulate the Margaret Ashida Award winners. Margaret was a pioneer in STEM and your contributions to the field reflect Margaret’s vision.

Please enjoy the Institute and please complete the evaluations which have been used to make modifications in the Institute.

Thank you.

Frank P. Roma, P.E.
President, NYSSEC, Inc
July 17, 2019

Welcome Participants,

Alfred State is pleased to once again host the NYS STEM Summer Institute.

At Alfred State, we have a wide variety of STEM-related programs, from the skilled trades on the Wellsville campus to engineering technology, health sciences, agriculture, architecture, management and many more on the Alfred campus. Our commitment to STEM programming will continue to be at the core of who we are.

The College is proud of its focus on educating students for 21st century STEM workforce careers and realizes the benefits of science technology, engineering, and math and the impacts these fields have on our lives every day. Additionally, our interest in non-traditional students in the STEM Workforce will continue to be a focus.

This conference is a great professional development opportunity that includes networking from the elementary level through higher education and beyond. Fittingly, this year’s theme is “Connects All Never Too Early, Never Too Late.” We strive to inspire future technicians, engineers, scientists, and mathematicians, no matter their age.

The ability for New York State to support existing and new companies is based on the ability to educate students in STEM careers. Alfred State commends the NYS STEM Education Collaborative on developing this conference and realizes the importance of its mission. We are honored that you have again chosen to be at Alfred State in Western New York, and hope you consider this your home for this annual conference.

Please enjoy yourselves and learn from stimulating and inspiring sessions, and one another. These conversations will allow us to continue serving our students and changing lives in these important fields of study. If you have questions please contact us.

Have a terrific conference!

[Signature]

Dr. Skip Sullivan
President
28 July 2019

Dear STEM Institute Participants,

Greetings from the Empire State STEM Learning Network! Comprised of ‘STEM Hubs’ from across New York State, we are part of the national STEMx initiative that is managed by Battelle – the world’s largest nonprofit research and development organization. I’m delighted to welcome you to the sixth Summer Institute of the NYS STEM Education Collaborative! The Institute’s theme expresses a need which is more important than ever before – “STEM Connects ALL: Never too early never too late”. The ideas you will share, and the skills you will gain, over the next few days are essential in helping to continue to improve STEM education in New York State.

It is well known that students who complete a degree in the STEM disciplines have a strong chance of entering a productive career track, and this is a credit to their teachers. As Neil deGrasse Tyson has said, “STEM is hard”… and if it wasn’t for their outstanding teachers many students might not master it. In learning STEM, students often also master the essential ‘soft skills’ of teamwork, collaborative learning and problem solving, communication of complex ideas, and perseverance in the face of learning complex and challenging material.

The 2019 Institute host, The State University of New York at Alfred is providing a great setting for STEM learning and networking. Many thanks to the planning committee for all its hard work to create this opportunity to integrate and innovate. Most of all, thanks to all participants for everything you do to advance high quality STEM education for all!

Sincerely,

[Signature]

Phillip Ortiz, Ph. D.
Assistant Provost for Undergraduate and STEM Education Coordinator, Empire State STEM Learning Network
Phillip.Ortiz@SUNY.edu
July 2019

Dear STEM Institute Attendees,

On behalf of the Science Teachers Association of New York State, welcome to the 2019 STEM Summer Institute. It is a pleasure to join each of you at this institute and to explore opportunities around this year’s theme of STEM Connects All. Future citizens need educational experiences within and beyond the classroom that transcend traditional boundaries of science, technology, engineering, and mathematics. This institute provides an opportunity to collectively discover how STEM can provide a powerful lens to understand our world and address societal dilemmas.

A connected approach to learning where rigorous academic concepts are coupled with locally and culturally relevant phenomena are an important component of a STEM education. As students apply these four disciplines in integrated contexts that make connections between school, community, work, and global enterprise, it enables the development of STEM literacy and with it the ability to compete in the new economy. Findings within STEM Integration in K-12 Education: Status, Prospects, and an Agenda for Research (National Research Council, 2014) indicate useful connections between STEM disciplines may be exhibited as improvements in student performance, learning and transfer, and interest and motivation. Working on complex, authentic problems which often call upon multiple disciplines has the potential to support students in short-term learning and long-term transfer to new contexts.

STEM literacy cultivates habits of mind essential for citizenry in the 21st century including knowledge, skills, and dispositions to develop questions and identify problems in life situations that apply evidence-based explanations to the natural world. Students will be called to fill a variety of future roles-workers, parents, consumers, voters—in which they apply knowledge and skills to navigate a changing world. An awareness of and a willingness to engage in STEM related issues connects all of us as concerned and reflective citizens. The future belongs to those nations that have through education, built bridges among these four disciplines leading to an understanding of the importance of connecting STEM to confront issues at local, national, and global levels.

Sincerely,

Kenneth L. Huff
2019-2020 STANYS President
June 10, 2019

On behalf of the New York State Technology and Engineering Educators' Association, I welcome you to the STEM Summer 2019 Institute at Alfred State College. This year's theme: STEM Connects ALL: Never Too Early – Never Too Late! highlights the importance of integrating all STEM fields, and is especially relevant to Technology and Engineering Educators who strive to bring design and problem solving skills to students of all ages through problem-based learning.

NYSTEEA believes that Technology and Engineering Education is at the heart of STEM education. Our definition of Technology and Engineering Education is the application of tools, materials, and knowledge to solve problems. In Technology Education laboratories around the state, teachers utilize math, science, and technical content in the context of engineering design and problem solving. Students entering a rapidly changing technological world need integrated and collaborative STEM experiences now more than ever.

I look forward to meeting you at the STEM Summer Institute and discussing how our disciplines can work closer together to provide all students with integrated and collaborative STEM experiences. Together we can prepare our students to apply STEM problem solving skills and pursue future careers in STEM fields.

Mark W. Hardy, Ph.D.
2018-2020 President, NYSTEEA
May 17, 2019

Dear STEM Institute Participants,

It is a great pleasure to welcome all those attending the STEM Institute 2019.

On behalf of the New York State Society of Professional Engineers (NYSSPE), I would like to commend all the participants of this significant program on providing leadership and taking the initiative to ensure that our children are receiving the highest quality education possible.

NYSSPE is grateful to all educators as you skillfully inspire the next generation of science and engineering professionals. Your commitment and dedication to the cultivation of STEM education in your schools and communities, creates an innovative and collaborative environment that will benefit everyone.

I trust that this event will be a positive experience for all and further the continued success of the Institute.

Sincerely,

James J. Kuhn, PE
NYSSPE President
Dear STEM Institute Attendee,

It is my pleasure to welcome you to the 2019 New York STEM Education Collaborative Summer Institute at Alfred State College. “STEM Connects ALL: Never to Early-Never Too Late!” promises to be an outstanding conference. I am confident that you will enjoy the program while learning innovative ideas to take back to your classroom.

This is a wonderful time to be a STEM educator. The Summer Institute is an excellent way to gain useful knowledge. Gaining knowledge that will help ignite new lessons when you return to school in the fall. It is our responsibility as educators to provide opportunities for our students to connect learning in our classrooms to other classrooms and their world. By attending this conference, you have shown the willingness to accept this great responsibility.

Over the next three days, you will be able to hear from outstanding keynote speakers and attend diverse STEM or STEAM sessions. Take the time to thank the many outstanding presenters who are willingly giving of themselves to share their work with all of us. You will also have the opportunity to network with your colleagues from around the state and region, which in many ways is one of the most beneficial parts of this institute.

On behalf of AMTNYS, thank you for being a part of this collaborative event. I wish you the best of luck in the future and hope to see you as part of our AMTNYS family. Please consider joining us for our 69th Annual Fall Conference: Strength in Numbers in Rochester on November 14-16th this fall.

Sincerely,

Caryl Lorandini
AMTNYS President
July 2019

Dear STEM Institute Participants:

I am delighted to send greetings to educators from around the state attending the New York State 2019 STEM Education Summer Institute: “STEM connects ALL: Never Too Early-Never Too Late!” at Alfred State SUNY College of Technology. NYSUT is proud to support the 2019 Summer Institute and the work of the New York State STEM Education Collaborative.

NYSUT is a staunch supporter of professional development and recognizes the professional development needs of our members to be effective in the classroom to ensure our students have the skills necessary to succeed in STEM and STEM related fields. The STEM Institute allows educators from all stages of the education system to better understand the importance of STEM education and to see the continuum of STEM skills necessary for their students.

The offerings at the STEM Institute support this with a wide range of STEM integrated topics, knowledgeable and experienced presenters representing all levels of learning, a plenary panel, keynote speakers, networking opportunities, and an array of STEM connected vendors. The institute will provide educators with experiences that can greatly enhance and expand their instructional strategies.

This Institute serves as a model for making STEM education relevant, practical and meaningful for all educators and to make connections for their students at all grade levels.

Thank you for your hard work, dedication and commitment to STEM education and to our students.

Sincerely,

[Signature]

Andrew Pallotta
President

AP/TM/me-107700
Anthony Collins
President, Clarkson University
Monday, July 29, 11:15 AM - 12:15 PM (1 PD)
Currently serving as Clarkson’s 16th President, Anthony Collins is a regional and national advocate for higher education - industrial partnerships that couple research discovery and engineering innovation with enterprise for commercialization and economic development with a focus on advancing sustainable energy solutions and environmental technology innovation. In June 2017, Gov. Andrew Cuomo nominated President Collins to sit on the board of trustees of the NYS Higher Education Services Corp. (HESC) as a representative of private higher education and was approved by the New York Senate in June 2018. New York State’s higher education student financial aid agency. In May 2014, President Obama nominated Dr. Collins to serve on the Advisory Board of the Saint Lawrence Seaway Development Corporation. NY Governor Andrew Cuomo appointed Dr. Collin to serve as co-chair for the North Country Regional Economic Development Council from July 2011 – February 2019. Dr. Collins served on a commission, established by Governor Cuomo in November 2012 to investigate and study utility companies’ storm preparation and management; and to recommend reforms to overhaul regulation of the entire system to better deal with emergencies. He is also the president of the Seaway Private Equity Corporation that invests in new technology companies based in St. Lawrence County, New York; and is a member of NYSERDA’s Technology & Market Development Advisory Committee which provides technical and policy guidance to NYSERDA on energy and environmental research and market development initiatives.
In service to the higher education sector, President Collins is the past chair of the National Association of Independent Technological Universities and a chair emeritus of New York’s Commission of Independent Colleges and Universities. In addition, he serves on the boards of the CenterState Corporation for Economic Opportunity and the NYS Business Council.

“Preparing High School STEM Students for a 21st Century Education” K-12 students heading towards a STEM career should expect a four-year academic experience at a college or university that develops not only their skillset but also their mindset. Both of these aspects should be reinforced by experiences that prepare them to be innovators and entrepreneurs for the 21st century economy. All three components, skillset, mindset and experience need to expose students to collaborative, interdisciplinary opportunities. Preparation for this college experience would ideally involve exposing K-12 students to unstructured, challenging problems that require out-of-the-box thinking.

Robert Rogers
Professor of Mathematics, SUNY Fredonia
Monday, July 29, 7:00 PM – 8:30 PM (1 PD)
Robert Rogers is a SUNY Distinguished Teaching Professor of Mathematics in the Department of Mathematical Sciences at SUNY Fredonia. His original area of research is Operator Theory, but he has since focused more on applying the history of mathematics to the teaching of mathematics. He is also interested in bringing more STEM applications into mathematics courses. He is coauthor (with Dr. Eugene Boman, Penn State - Harrisburg) of the open source real analysis textbook "How We Got from There to Here: A Story of Real Analysis" available through the SUNY Open Textbook Program. He is a past chair and governor of the MAA - Seaway Section, a past president of the Association of Mathematics Teachers of NYS, and a member of the governing board the NYS STEM Education Collaborative. He is former editor of the NYS Mathematics Teachers’ Journal. He is a recipient of the SUNY Fredonia President’s Award for Excellence in Teaching, the MAA - Seaway
“Beyond Career Training: STEM as Part of General Education” Often STEM Education evolves into career training which focuses on technical expertise. This is certainly important, but another aspect is STEM as part of a non-expert's general education. It would be ideal to create general education courses which focus on an appreciation of STEM without trying to teach technical proficiency, but this is not always feasible. We will discuss examples of what such courses could contain or if it is possible to infuse such topics into standard STEM courses.

Dr. Kristina M. Johnson
Chancellor of the State University of New York System
Tuesday, July 30, 12:00 PM – 1:00 PM (1 PD)
Dr. Kristina M. Johnson joined The State University of New York as its 13th chancellor in September 2017. Immediately prior to joining SUNY, Dr. Johnson was co-founder and CEO of Cube Hydro Partners, LLC, a clean-energy infrastructure company focused on building and operating hydropower plants in North America. She also previously served as Under Secretary of Energy at the U.S. Department of Energy. Dr. Johnson served as provost and senior vice president for Academic Affairs at Johns Hopkins University from 2007 to 2009, and as dean of the Pratt School of Engineering at Duke University from 1999 to 2007. Dr. Johnson received her BS, MS, and PhD in electrical engineering from Stanford University. After a NATO post-doctoral fellowship at Trinity College in Dublin, Ireland, she joined the University of Colorado-Boulder’s faculty in 1985 as an assistant professor and, later, full professor. Among her many awards and distinctions, Dr. Johnson received the Dennis Gabor Prize for creativity and innovation in modern optics (1993) and the John Fritz Medal (2008), widely considered the highest award in engineering. Dr. Johnson is a member of the National Academy of Engineering, the National Academy of Inventors, and the National Inventors Hall of Fame. She holds 118 U.S. and international patents and has five honorary degrees.

STEM Trivia Night - Have Fun & Learn (2 PD)
Sunday, July 28, 7:00 - 9:00 PM
Central Dining Hall

Don’t forget to fill out VENDOR CONTACT FORMS to be eligible for RAFFLE prizes. Raffle drawing is during the July 30th Keynote Address.
2019 Summer Institute
Plenary Panel Session
Monday, July 29 • 8:00 - 9:00 AM (1 PD)
Central Dining Hall

PLenary MODERATOR

Mark D. Vaughn, Ph.D.
Technical Talent Pipelining Manager & Lead for Technology Community Office of STEM at Corning Incorporated

Liz Gallo
STEM Professional Developer
Technology & Engineering Teacher
Founder of WhyMaker
Past President of NYSTEEA
Professor, Iona College

Richard Partch, Ph.D.
Distinguished Senior University Professor
Clarkson University - Chemistry
Multimillion Research Dollar Club
Northern NY STEM Network Awardee

Michele A. Snyder, Ph.D.
Associate Vice President and Dean of STEM
SUNY Broome Community College

Jeff Stevens
Dean - School of Applied Technology
Alfred State College of Technology
SUNY

Joe Zuniga
NYSUT - Subject Area Committee
NYSED - Instructional Specialist
STANYS - Board of Directors & CNY Chair
Teacher, Rochester City School District
Adjunct Instructor, SUNY Empire State & Adelphi University
To honor the memory of Margaret Ashida, the New York State STEM Education Collaborative will honor a STEM Leader in K-12/Higher Ed/STEM Workforce each year with a “Margaret Ashida STEM Leadership Award.” Margaret was an outstanding woman who created waves of change by her tireless efforts to create connections between business/industry and STEM educational leaders in colleges and the K-12 sector, not only here in New York State, but across America! She was a “thought leader” often creating ideas and connections between and among educators and business/industry to further the implementation of pathways for developing America’s STEM workforce. Through her advocacy, the NYS State STEM Hubs were created, pulling together New York communities in unique ways to foster the development of STEM career pathways. The Margaret Ashida STEM Leadership Award seeks to honor persons who are making significant STEM connections within their community through their time, actions, talents and dedication. The honorees selected serve as a role model for STEM Leadership as they are striving to enhance the STEM workforce through their connections between business/industry and STEM educational leaders.

The Mission of the Empire STEM Learning Network (STEM Hubs): to advance STEM education to prepare all students – regardless of their career goals – for college and career success, to fuel innovation and economic vitality in the Empire State.

Margaret was the Founding Chairperson for the Empire STEM Learning Network, a statewide, community-led collaborative; and a board member for the NYS STEM Education Collaborative (NYSSEC), a coalition of AMTNYS, NYSSPE, NYSTEEA, and STANYS. The Founding Members and Supporting Partner Members of the NYSSEC work collectively and collaboratively to deliver STEM Education in the spirit and vision of New York State’s MST Frameworks and Learning Standards and to skillfully and completely address the concerted national cry for STEM Literacy. Margaret will be missed but forever remembered by her work ethic, her dedication to excellence and her friendship to all she met.

Please consider nominating an outstanding STEM Leader from your community for the

**2020 Margaret Ashida STEM Leadership Awards!**

**Nominations October-March** [http://www.cnystem.com/](http://www.cnystem.com/)

**Committee Co-Chairs:** Gwendolyn Maturo-Grasso (glmatur@syr.edu) & Hilary Reilly (HReilly@questar.org)

**Thank you to committee members:** Joe Vargo, Chuck Goodwin, Mark Vaughn
2019 Margaret Ashida STEM Leader, K-6 Education

Jennifer Leonberger

Ms. Leonberger’s journey with STEM education began when she was a second-grade classroom teacher. The district she worked for informed her they would be acquiring a new, integrative, science curriculum (FOSS) and consequently provided monthly training. Once she began learning more about STEM and teaching through inquiry, it not only changed how she taught students, it also changed the way she thought about education. “I knew right away it was a field I was interested in becoming part of!” Ms. Leonberger applied for a job entitled “STEM Curriculum Mentor” with her local BOCES (GST). Today, she continues to work in the STEM field educating teachers and students alike.

2019 Margaret Ashida STEM Leader, 7-12 Education

Ellen Falk

Educated in New York and teaching mathematics for the past 33 years, Ms. Falk has made it her passion to keep mathematics real and relevant for her students. She truly believes that “STEM content provides excellent pathways for students to see value in what they learn and why they are learning it.” She enjoys spreading the word through professional development purporting the value of STEM experiences in mathematics curricula. Ms. Falk encourages other teachers to take risks and share their experiences as well. Ellen Falk is currently a mathematics teacher at North Salem High School and is active in AMTNYS, NYSED, and the NYS STEM Education Collaborative.

2019 Margaret Ashida STEM Leader, Higher Education

Lorena Harris, Ph.D.

Dr. Lorena Harris is the Director of Collegiate Science and Technology Entry Program (C-STEP) and Louis Stokes Alliances for Minority Participation Program (LSAMP) at SUNY Schenectady where she teaches. Dr. Harris is the coordinator of the Summer STEAM Academy for Capital Region students and responsible for the establishment of a NYS Regional Crypto-Club in coordination with NY STEAM Girls Collaborative Project. After her NIH Fellowship in Cancer Research and a year teaching at a College in Boston, Ms. Harris joined SUNY Schenectady in 2012 as participant in the Math, Science, Technology and Health Internship Program for the Development of Minority Faculty. Ms. Harris holds a Ph.D. in Biological Sciences and Molecular Biology from Bowling Green State University.
Margaret Ashida STEM Leadership Awards

2019 Margaret Ashida STEM Leader, District Level

Lisa Blank

M.A.T. Mathematics and Science Education, University of Wisconsin
M.Ed. in Educational Administration, Grand Canyon University

Ms. Blank is the Director of STEM Programs for Watertown CSD, a member of the leadership team of the North Country STEM Learning Network, and a STEM Ecosystems LEAD STEM Fellow. Her experience in STEM/STEAM education and technology implementation includes working as a classroom educator, district technology coordinator, and grant writer, coordinator and reviewer. Ms. Blank is passionate about creating enriching STEM learning opportunities that bring joy to learning. She sees the value of STEM as a tool for empowering students, resulting in the development of skills and dispositions for success well beyond high school.

2019 Margaret Ashida STEM Leader, Workforce

James King

Jim King, Partner
King + King, Architects
jimking@kingarch.com
@JimKing77720605

Mr. King is partner-in-charge of the K-12 Education Design Studio, specializing in the K-12 education market with an excellent reputation among educators as a collaborator and instructional space specialist. Jim holds a Bachelor of Architecture from Syracuse University and has been a licensed architect since 1983.

As an employer in a STEM field, Mr. King understands the importance of partnering with education at all levels. He frequently serves as an in-class resource for project-based learning activities, provides opportunities for job shadowing, and hosts professional development sessions for educators. He frequently hosts students in his office for “problem-solving days.” Mr. King believes that engagement of students from diverse backgrounds with STEM businesses is critical to increasing the numbers who choose STEM focused careers.

Mr. King also serves on the leadership teams of the Central NY and Northern NY STEM Hubs, the Empire State STEM Learning Network, and the ESM and North Country STEM Learning Ecosystems. This involvement has helped fuel his passion to change the way education is delivered in NY State and beyond. King + King, under Jim’s leadership, is a founding partner in the Collaborative Educator Summit, a two-day, cost-free professional development experience for school-based teams.
Margaret Ashida Legacy
STEM Leadership Past Awardees

2015

STEM Workforce: Cheryl Davidson
Executive Director of Long Island Works Coalition

PK-12 Education: Donna DeSiato, Ph.D.
Superintendent East Syracuse Minoa Central Schools

Higher Education: Dean Nina Leonhardt
Associate Dean at Suffolk County Community College

2016

PK-12 Education: Mr. Marvin Cadornigara
Teacher New Explorations into Science, Technology and Math NYC

PK-12/Higher Education: Michelle Kavanaugh, Ph.D.
Retired Superintendent of Schools; President WNY STEM Hub

STEM Workforce: Frank Roma, P.E.
NYS STEM Education Collaborative President-Elect

2017

PK-20 Education: Mark D. Vaughn, Ph.D.
Manager, Technical Talent Pipelining for Corning Inc and Lead, Technology Community Office of STEM-Corning Incorporated

Higher Education: Dr. Candice Foley
Chemistry Professor Suffolk County Community College

STEM Workforce: Marc A. Chiffert, P.E.
Managing Member of CHIFFERT Engineering P.C.

Outstanding: Craig Clark, P.E., Ph.D.
Vice President for Economic Development-Alfred State

2018

PK-12 Education: Mr. Omer Zengin
High School Math, Robotic Team Advisor-Syracuse Academy of Science

Instructional Coach: Aaron Straus
Instructional Coach of STEAM-Salamonca City Central School District

District Level: Kathy Southwell
Executive Director of Curriculum, Learning and Instruction-East Syracuse Minoa School District

Higher Education: Mary Margaret M. Small, Ed.D.
Office of Educational Partnerships-Clarkson University
The Empire State STEM Learning Network is a statewide, community-led collaborative. The Network’s mission is to advance STEM education to prepare all students for success in school, work and life to fuel innovation and economic vitality in the Empire State.

The Network is made up of 10 regional councils across the state. These Regional Councils include the following groups:

**Capital Region**
- Capital Region Center for Economic Growth

**Central New York**
- CNY STEM Hub

**Finger Lakes**
- Finger Lakes STEM Hub

**Long Island**
- Long Island STEM Hub

**Mid-Hudson**
- Lower Hudson Valley Region STEM HUB P-20 Educators

**Mohawk Valley**
- Mohawk Valley BOCES

**New York City**

**North Country**
- North Country STEM Hub

**Southern Tier**
- Greater Southern Tier BOCES Science / STEM Resource Center
- Eastern Southern Tier STEM Hub

**Western New York**
- WNY STEM Hub
The CNY STEM Hub is focused on impacting students in the classroom by implementing new teaching strategies in multi-disciplinary/inquiry-based methodologies with real world applications.

**Vision**

The CNY STEM Hub will design and incubate educational models of excellence empowering all PK-12 students to excel in a rapidly changing world.

**Mission**

The CNY STEM Hub will interconnect business, higher education, community organizations and PK-12 schools to design, develop and demonstrate innovative, sustainable and transferable STEM learning experiences.

**CNY STEM Hub Goals**

1. By 2020, the CNY STEM HUB will exemplify the attributes of a professional metropolitan learning community by creating and sharing knowledge and successful, innovative learning experiences that ignite and strengthen problem solving and critical thinking abilities in K-12 learners for success in our global society.

2. By 2020, the CNY STEM HUB will strengthen instructional practices in K-12 STEM HUB classrooms through professional development for teachers and administrators in inquiry and design learning models.

3. By 2020, the CNY STEM HUB schools will design and develop trans-disciplinary learning experiences through design and inquiry with real-world context/application.

4. By 2020, the CNY STEM HUB will design, develop and incubate STEM literacy educational models that prepare students for college and career through the integration of 21st Century knowledge and skills.

5. By 2020, the CNY STEM HUB will systematically document effects of new learning experiences on short term and long term student learning, student motivation, and college and career trajectories and performance, with the intent to regularly publish new findings in the education literature.

**Contacts:**

*Joe Vargo*
Partners for Education & Business
Phone: (315) 445-1012

*Dr. Donna DeSisto*
ESM School District
Phone: (315) 434-3012

*Lisa Mondello*
SRC, Inc.
Phone: (315) 452-8302

[Link to CNY STEM Hub website: www.cnystem.com]
The Finger Lakes STEM Hub is a network of K-12 and college educators, community organizations, and businesses. It serves as a catalyst for collaboration and communication promoting quality STEM education and career exploration opportunities. It covers a nine county region of Greater Rochester and the Finger Lakes.

The Hub is managed by a director and assistant/web manager and advised by an executive committee. A roundtable of network members convenes monthly. Volunteers serve on its committees. Major supporters include AT&T, Siemens Industry, Rochester Museum & Science Center, Wards Science, Monroe Community College, SUNY Brockport, WXXI PBS, and Genesee Valley School Library Services.

A strategic plan was adopted for 2017-2022. Its initiatives/actions include the annual recognition of quality STEM programs, and a professional development institute/series of day long workshops for educators at different STEM industries to learn about the skills and training needed for success in that career field and how to apply what they learned in the classroom. A new website is under development. Hub sponsors Fall Forums on major STEM topics. For the second year the Hub has received funding from AT&T for pilot STEM projects. In 2017 it partnered with the RCSD, RMSC, and BSA Exploring to expose students to STEM careers in Rochester and this year with Greater Rochester Afterschool Alliance, Boys and Girls Club of Rochester, Girl Scouts of Western NY and Seneca Waterways BSA in a Teen Technology Challenge.

Hub members meet periodically with local members of the NYS Board of Regents to discuss STEM education related policy and practice matters.

www.empirestem-fl.org

flxstem.org (under development)

Contact: Joe Marinelli, Ph.D, Director of Finger Lakes STEM Hub at josephjmartinelli@aol.com or 585-704-4659

5/14/18
The mission of the Greater Mohawk Valley STEM Hub is to: Advance STEM education through innovative teaching and collaboration to prepare all students for success in the 21st century.

WHY STEM? WHY NOW?

- Create a workforce with 21st century skills, strong in STEM; connect education and private enterprise to create jobs; prepare for tomorrow by encouraging learning opportunities in STEM; leverage existing partnerships and build new and deeper collaborations.
- Align workforce and education investments with priority on building STEM programs.
- Ensure that the region’s K-12 students develop 21st century skills aligned with specific industry clusters.
- Address regional workforce shortages in clean technology, biomedical, nanotechnology, information technologies, cyber security, healthcare, agriculture, and other key fields.
- Need for investment in K-12 education and for STEM programs to motivate children to pursue higher education in fields such as math, science and engineering.
NORTH COUNTRY STEM NETWORK
Transforming Education in the North Country
Established in 2012

Vision
The North Country STEM Learning Network fosters collaboration and innovation among all community resources to empower diverse learners with 21st Century Skills for educational and career success.

Mission
The North Country STEM learning network will be the catalyst to energize and focus community resources to design, develop, implement and demonstrate innovative, sustainable, and transferable STEM learning experiences for economic vitality and exceptional quality of life.

Goals
- Inspire student engagement in STE(A)M to improve academic achievement and foster lifetime learning through increased learning opportunities
- Enhance the capacity of educators (teachers, guidance counselors, administrators, home school networks) to deliver high quality interdisciplinary STEM instruction and project-based and inquiry-based learning
- Implement a comprehensive communication plan to make school, business and community stakeholders aware of and invested in STEM instruction and the skills to meet global, national and local workforce needs
- Strengthen local workforce to attract and retain STEM-oriented businesses and increase community vitality

Annual Events:
- Manufacturing Day: 30 companies and 1200+ students participate in factory tours and presentations
- Career Jam: 100 businesses engage 2000+ students for hands-on career exploration
- GPS for Success in partnership with WPBS, BOCES, and The Community Foundation: Career focused video series highlighting local opportunities in all 16 workforce sectors.
- STEM Champion Awards for K-12 Educator, Higher Education Professional, and Community Partner
- Northern New York Business Plan Competition includes a high school division to promote entrepreneurship
- Beekmantown and Salmon River Middle Schools, model program sites for integrated PBL experiences, host numerous school visitations

For more Information contact: www.northcountrystem.org
Mary Margaret Small, Ed.D. Hub Coordinator mmsmall@clarkson.edu 315-268-3791
The very first meeting of the group that would become the Greater Southern Tier STEM Learning Network was held on September 21, 2005…kicked off with this opening statement: “Life is a technology-driven enterprise: If so, then an interest in and an understanding of the embedded importance of science, technology, engineering and math to life-long learning and success is ‘mission critical’”. Today the network is an active consortium of leaders and laity from PreK-12 education, Higher Education, Business and Industry and Science Museums on a mission to reenergize, revitalize and refocus attention, interest and understanding of the embedded importance of STEM to life-long learning and success. This mission is informed by our regional priorities as they pertain to STEM education. The priorities are fidelity of implementation and sustainability, regional assessment, development and/or deployment of STEM curricula at all grade levels, maintenance of R & D databases for data-driven decision making and the creation of systems solutions. Together, these priorities drive the realization of our primary objective: To significantly increase the numbers of STEM-capable GST graduates in general and, in particular, the numbers of students from GST schools who enter the workforce in the areas of science, engineering and advanced manufacturing.

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The Eastern Southern Tier STEM (Science, Technology, Engineering, Math) Hub, located in Binghamton NY, is designed to cultivate the physical and financial resources necessary to keep our young people engaged in STEM programming and to educate and inspire tomorrow’s scientists, engineers and mathematicians. The School-to-Careers Partnership is the conduit for funding this initiative, employing the experience of BOCES’ regional partners and 15 component school districts, as well as that of Binghamton University and SUNY Broome Community College. The STEM Hub has Pillar events which we help to coordinate and promote, our current pillar events are: Summer Steam Academy, Engineering Day, Steam Pathways Event, and Stem Hub/SUNY Broome Robotics Day. We also assist local businesses and organizations to help coordinate events such as Space Day with Kopernik Observatory & Science Center, Girls in Engineering at Lockheed Martin, and Engineering Explorer Post at BAE. Over the past 4 years we have funded over 37 grants for local schools who are focusing on a variety of STEM projects ranging from Lego stem robotics, Vex robotics, and Cubelets, to makerspace and mobile science labs, and a mission to mars. For the fourth year The STEM Hub, with the Greater Binghamton Education Outreach Program, organized the STEAM Pathways Event at Binghamton University’s Innovative Technologies Complex. The STEAM Pathways Event was designed to engage both parents and their children in science, technology, engineering, the arts, and math by inviting local businesses to set up tables with activities and information. This event also had sessions designed for both parents and youth so that each group could meet with authorities on the subject at hand. Over 200 students and parents attended this event. We are currently able to run our programs thanks to a generous donation by Lockheed Martin. Our goal is to work with more of our local businesses to help with the financial sustainability for our Stem Hub so that we can continue to offer events and programming to everyone in our Broome-Tioga BOCES region. [https://eststem.com/](https://eststem.com/).
Preventing today's learners to be tomorrow's innovators.

We bring together Western New Yorkers to advance STEM learning in support of our region.

Learn more at www.wnystem.org

New York State STEM Education Collaborative Summer Institute Series

2010 SUNY Oswego
2012 Syracuse University
2014 SUNY Alfred State College
2015 SUNY Alfred State College
2017 SUNY Alfred State College
2018 SUNY Alfred State College
Stuart Chen - Christian Central Academy

**Flipped vs Traditional Teaching of Statics: Some Experiences from the Trenches**

Poster Abstract: “Flipped” vs traditional classroom teaching approaches are contrasted in terms of student performance and administration of the Statics course taken by most Sophomore-level Engineering students at the University at Buffalo (UB) of the State University of New York (SUNY) for four semesters during which this course was taught by the author. Overall, student performance was measurably, if modestly, improved as a result of the 1st-time instructional shift away from traditional approaches to a “flipped” approach. In particular, poor students still perform poorly, but the mediocre students improve markedly. The “flipped” approach also is accompanied by improved academic integrity. But this instructional shift away from the traditional classroom to the “flipped” classroom requires more instructional staff resources. Student survey opinions were also obtained about their exposure in a separate semester to both approaches in the same course in the same semester. Those opinions were both strong and mixed, the principal lessons from which argue for a consistent approach semester-long and increased flexibility to accommodate various student learning styles.

Winston Martey – 9-12th grade Mathematics Instructor

**History-Infused Mathematics Teaching**

Poster Abstract: The purpose of this research was to develop and implement a history-infused mathematics curriculum through teacher-researcher collaboration. History is used as the main context to introduce mathematics concepts because history has the natural tendency to provide us with meaningful learning. Our knowledge of history of mathematics facilitates learners’ thoughts, dove-tailed into conceptual units. History-infused mathematics instruction is meant to provide an engaging hook to give students a deep conceptual understanding of current algorithms in a natural progression (Katz, 1997; Kelley, 2000). We posit that employing the history of mathematics in school curricular can (1) increase students’ motivation and develop a positive attitude towards mathematics and (2) help explain difficulties and confusion that students encounter via an analysis of the development of mathematics.

Pam O’Brien - STEMscopes / Accelerated Learning, Inc

**Data Literacy Using Real-World Datasets and PhET Simulations**

Poster Abstract: When describing and explaining phenomena, scientists and engineers gather data and use mathematics and computational thinking to make it meaningful. Come learn about two tools that allow students explore relevant phenomena in the classroom. TUVA data sets: A new tool for thinking about data, allowing students to easily explore and manipulate data to create graphs and charts as well as promoting conceptual understanding of important mathematical and statistical concepts and ideas. PhET Simulations: Interactive elements that engage students while providing opportunities to practice learned content knowledge and skills as well as enabling teachers to assess that learning in unique ways.

Richard Partch - Senior University Professor, Clarkson University

**STEM MEeTS World Needs: Humanity Deserves Its Applications**

Poster Abstract: The acronym, STEM, is now thoroughly engrained in everyday public conversation and writings. Its four letters represent areas of learning that have existed for centuries, areas now realized as basic to civilization’s advancement and comfort. In order to relate STEM principles to audiences of all ages a presenter must use examples of consumer goods used every day. This brief presentation attempts to do just that.
**QFT - Generating Questions to Learn**

Poster Abstract: The Next Generation Science Standards, as adapted by New York State (NYS), engage learners with phenomena - events to be studied. After initially considering the "experience," students are encouraged to generate questions that might be examined in order to understand how the phenomena works. NYS Master Teacher Emeritus Sarah English, New Teacher Sara Dannebrock, and Science Educator Joe Zawicki will share instructional techniques, resources and provide examples of the implementation of this new teaching approach.

Joseph Zawicki - SUNY Buffalo State College, WNY STEM Hub, STANYS
Sara Dannebrock - SUNY Buffalo State College
Sarah English - NYS Master Teachers, Sweet Home School District

**Developing New and Evaluating Extant NGSS Resources**

Poster Abstract: This session will focus on tools for creating (or evaluating) NGSS lessons that are being created or that currently exist. The New York State adaption of the NGSS incorporates the use of phenomena, disciplinary core ideas, science and engineering practices and cross-cutting concepts. Students use silent sustained writing and mathematical analysis to formulate questions and to explore phenomena related to relevant scientific concepts and processes. Participants will review several evaluation tools and will receive a lesson from the SEPUP collection.

Poster Audience: K-4, 5-8, 9-12, 13-16
Poster Disciplines: Science, Technology, Engineering, Math, ELA

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**SUNY Alfred Townhouse Check-out Information**

- For Monday and Tuesday between 7:00 - 9:00 am, please check-out in the Student Leadership Center (SLC), 3rd floor.
- For Monday and Tuesday after 9:00 am, please deposit keys in drop-box in the Townhouse Common Building.
- For those taking the Tuesday tours, please check-out with Residence Life Representatives in the Townhouse Commons Building from 3:00 - 5:00 pm.
2019 Summer Institute
Alfred State College - Tours

Please register for the tours at the time of check in.

Tour Session A - Cleanroom Tour and Presentation (1 PD)
Sunday, July 28, 2019
3:15 - 4:45 PM
Gather and meet Professor Aric Bryant at the lounge in the Physical and Health Sciences Bldg at 3:10 PM
Tour the facilities, the equipment used, and the classes that utilize the Cleanroom. In this session, there will be opportunity to view the student projects that have been completed using the Cleanroom.

Tour Session B - Agriculture Automation and Robotics Tour and Presentation (1 PD)
Monday, July 29, 2019
1:45 - 3:00 PM
Gather and meet Virginia Chamberlain at the Registration Table in the Student Leadership Bldg at 1:45 PM.
Tour the Automation and Robotic Milking at the Alfred State Farm to see science and applied engineering in action. This automation laboratory at the farm is part of the new Agricultural Automation & Robotics program.

Tour Session C - Nursing Simulation Manikin Tour and Presentation (1 PD)
Tuesday, July 30, 2019
2:45 - 3:45 PM
Gather and meet Professor Jess Lippa at the lounge in the Physical and Health Sciences Bldg at 2:35 PM
Tour where nursing students participate in an innovative and interactive experience using a high-fidelity simulation manikin in a safe, non-threatening learning environment. Changes in the acute medical condition allow the student to react and provide the appropriate interventions.
2019 Summer Institute Presentation Schedule

See Previous Page for Complete Tour Details

Sunday, July 28, 2019
Tour Session A, 3:15 - 4:45 PM

Monday, July 29, 2019
Session 1, 10:00 - 11:00 AM
Tour Session B, 1:45 - 3:00 PM or Session 2, 2:00 - 3:00 PM
Session 3, 3:15 - 4:15 PM
Session 4, 4:30 - 5:30 PM

Tuesday, July 30, 2019
Session 5, 8:00 - 9:00 AM
Session 6, 9:15 - 10:15 AM
Session 7, 10:45 – 11:45 AM
Session 8, 1:30 – 2:30 PM
Tour Session C, 2:45 – 3:45 PM

Image KEY

-------- Grade Levels --------

K-4  5-8  9-12  13-16  Science  Technology  Engineering  Mathematics  English Language  Arts

July 28, 2019
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Cleanroom Tour and Presentation
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QFT - Questioning for Learning
The Next Generation Science Standards, as adapted by New York State (NYS), engage learners with phenomena - events to be studied. After initially considering the "experience," students are encouraged to generate questions that might be examined in order to understand how the phenomena works. NYS Master Teacher Emeritus Sarah English, New Teacher Sara Dannebrock, and Science Educator Joe Zawicki will share instructional techniques, resources and provide examples of the implementation of this new teaching approach.

The Next Step in STEAM
Overview of misconceptions of STEAM and how STEAM can look in the K-12 educational setting from the perspectives of two instructional coaches.

Demystifying the NY-NGSS: Use Phenomenon-based Learning to Make Learning Come Alive!
Science is about explaining the phenomena that occur in the world around us. In this session, participants will experience a transition to NY-NGSS (with the 3 dimensions) to show how phenomena is used during instruction. Learn how to develop your own anchor and investigative phenomena to drive their lessons. Attendees are requested to bring their own lap top computer or device in order to participate fully in this class.

Getting Started with STEM and Camps and Clubs
- As demand for STEM careers continues to increase, schools are scrambling to find ways to help their students learn about coding, engineering and other STEM-related fields. Texas Instruments works with teachers to help bring coding and STEM to students who may have never been exposed. We will explore making music, building a digital mood ring, driving car, and other STEM projects
1E Physical Health Sciences Building - PHS 219
Mary Ann Nickloy - NEATEC
Kelly Fehrenkopf - NEATEC

Transitioning Concepts of Nanotechnology from Elementary to Secondary Students with Sand
Nanotechnology is a constantly changing and developing field in both academia and industry. To encourage our students to pursue this area of study in higher education, it is imperative that we expose them to the concepts beginning at an early age. Generating excitement among our students is critical to creating a pipeline of students to study nanotechnology at the secondary and post-secondary levels. This presentation will showcase two NEATEC learning modules on hydrophobic sand and its connection to nanotechnology. The presenters will demonstrate how fundamental information can be introduced to elementary students and then expanded upon at the secondary level as students mature and gain additional skills and knowledge.

1F Agriculture Science Building – AGRLAB 226
Stuart Chen – Christian Central Academy

"Flipped" vs Traditional Teaching of Statics: Some Experiences from the Trenches
“Flipped” vs traditional classroom teaching approaches are contrasted in terms of student performance and administration of the Statics course taken by most Sophomore-level Engineering students at the University at Buffalo (UB) of the State University of New York (SUNY) for four semesters during which this course was taught by the author. Overall, student performance was measurably, if modestly, improved as a result of the 1st-time instructional shift away from traditional approaches to a “flipped” approach. In particular, poor students still perform poorly, but the mediocre students improve markedly. The “flipped” approach also is accompanied by improved academic integrity. But this instructional shift away from the traditional classroom to the “flipped” classroom requires more instructional staff resources. Student survey opinions were also obtained about their exposure in a separate semester to both approaches in the same course in the same semester. Those opinions were both strong and mixed, the principal lessons from which argue for a consistent approach semester-long and increased flexibility to accommodate various student learning styles.

Tour Session B, Monday, 1:45 – 3:00 PM
Please register for the tours at the time of check in.

Gather and meet Virginia Chamberlain at the Registration Table in the Student Leadership Bldg at 1:45 PM

Agriculture Automation and Robotics Tour and Presentation
Tour the Automation and Robotic Milking at the Alfred State Farm to see science and applied engineering in action. This automation laboratory at the farm is part of the new Agricultural Automation & Robotics program.
Session 2, Monday, 2:00 – 3:00 PM

2A Agriculture Science Building – AGRLAB 226
Edward Keller – Smart Science Education

**Supercharging Science Instruction with Real Virtual Science Labs**

Giving our students great hands on labs is often very challenging due to cost, time and safety concerns, and as science teachers we want to keep the real world and measurement techniques associated with doing hands-on labs. Virtual labs can offer an affordable and accessible solution to these issues but many are just animation or simulation which is not real science. In this session the presenter will guide you on a new real world based virtual lab solution and how this can bridge the gap between the benefits of virtual science labs and the real world - and we will cover the 3 most important ways you can supercharge science instruction by carefully embedding these virtual labs into your classes. Students are native digital learners and will have great success when given high quality online learning tools. Join us to learn more about this powerful method to give your students the best of both worlds - real science on any internet device anytime anywhere.

2B Agriculture Science Building – AGRLAB 224
Mark Belden – NYS Master Teacher

Part 1 of 2 – This is a double session and continues in Session 3B

**Robot Virtual Worlds and cs2n.org**

If you are looking for a new or better way of teaching robotics, this session is for you. Robot Virtual Worlds (RVW), RobotC and cs2n.org provide a method of teaching Robotics and Coding without a VEX or Lego Robot. You will learn how to create programs, download them to a virtual VEX or Lego robot and track your student progress on cs2n.org. This method is not just about the Robot, emphasis is placed on solid pedagogy (videos and quizzes), problem solving and logical thinking in a Student Centered Classroom. No cords, no cables, no red leds flashing low battery and no broken robots! If you want to download programs to VEX or Lego Robots, RobotC and cs2n.org also work great for that. Mr. Belden, a NYS Master Teacher is a graduate of the National Robotics Engineering Center and has used cs2n.org, RobotC and RVW with 390 students over the the last two years. We will also have staff and Instructors from Carnegie Mellon University and the National Robotics Engineering Center working with us through video link. Attendees are requested to bring their own laptop computer or device in order to participate fully in this class.

2C Physical Health Sciences Building - PHS 107
Russell Rittenhouse – Alfred State College

Part 1 of 2 – This is a double session and continues in Session 3C

**Inspiring Young Minds to Computer Networking and Cybersecurity**

The younger generation has had the internet since birth. This has created many issues and problems. Keeping all the activities that are done on the internet safe is called cybersecurity. So how do you promote interest in these topics? How do you teach the topic of cybersecurity? This presentation will cover those questions and with a little bit of gamification and fun to inspire any age to learn about topics of computer networking and cybersecurity. Attendees are requested to bring their own laptop computer or device in order to participate fully in this class.
Part 1 of 2 – This is a double session and continues in Session 3D

**Using the power grid to solve technical problems**

Using the power grid to solve technical problems is a hands-on workshop, where the students will do activities with a model power grid. They will learn the parts of our power system. They will role play as they wire the system and run into technical problems to deliver electrical power to their customers.

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**Creatively Challenging Students in the STEAM Classroom**

Teachers can help students develop creativity. This program will focus on ways teachers can encourage students in building cooperative skills, and becoming more creative and confident problem solvers. We will look at verbal and hands-on activities that must be solved in a specific amount of time using materials that are easy to find. We will also discuss picture books that have a creativity focus, ways to introduce students to STEAM careers that might be of interest and how classroom design can promote creativity.

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**Session 3, Monday, 3:15 – 4:15 PM**

**Science: Transcending Boundaries and Supporting Students for Their Future**

The Science Teachers Association of New York State (STANYS) lead synergy will bring the public and science education shareholders together to expand understanding of the New York State Science Learning Standards. This synergy is based upon engaging the public in science education. Science transcends boundaries because the standards were written to educate the whole student. It is important the public realize science education today is more than learning the order of the planets in the solar system – it’s about educating students about the world around them and preparing them to solve problems of the future. The vision of the science standards centers on students “doing” science and engineering as scientists and engineers do in their work. Participants in this session will learn how to speak with and enlighten parents about innovations in the New York State Science Learning Standards. Emphasis will be on helping parents better understand the benefits of science and engineering and why these disciplines matter to their children and their future.
Part 2 of 2 – This is a double session and continues from Session 2B

Robot Virtual Worlds and cs2n.org
If you are looking for a new or better way of teaching robotics, this session is for you. Robot Virtual Worlds (RVW), RobotC and cs2n.org provide a method of teaching Robotics and Coding without a VEX or Lego Robot. You will learn how to create programs, download them to a virtual VEX or Lego robot and track your student progress on cs2n.org. This method is not just about the Robot, emphasis is placed on solid pedagogy (videos and quizzes), problem solving and logical thinking in a Student Centered Classroom. No cords, no cables, no red leds flashing low battery and no broken robots! If you want to download programs to VEX or Lego Robots, RobotC and cs2n.org also work great for that. Mr. Belden, a NYS Master Teacher is a graduate of the National Robotics Engineering Center and has used cs2n.org, RobotC and RVW with 390 students over the the last two years. We will also have staff and Instructors from Carnegie Mellon University and the National Robotics Engineering Center working with us through video link. Attendees are requested to bring their own lap top computer or device in order to participate fully in this class.

Part 2 of 2 – This is a double session and continues from Session 2C

Inspiring Young Minds to Computer Networking and Cybersecurity
The younger generation has had the internet since birth. This has created many issues and problems. Keeping all the activities that are done on the internet safe is called cybersecurity. So how do you promote interest in these topics? How do you teach the topic of cybersecurity? This presentation will cover those questions and with a little bit of gamification and fun to inspire any age to learn about topics of computer networking and cybersecurity. Attendees are requested to bring their own lap top computer or device in order to participate fully in this class.

Part 2 of 2 – This is a double session and continues from Session 2D

Using the power grid to solve technical problems
Using the power grid to solve technical problems is a hands-on workshop, where the students will do activities with a model power grid. They will learn the parts of our power system. They will role play as they wire the system and run into technical problems to deliver electrical power to their customers.
**Mental Math Tips and Tricks: “You Mean Those Properties Can Be Useful?!”**

Fluency in arithmetic - the ability to rapidly and accurately perform mental calculations - is a valuable tool to ease the solution of a variety of problems from upper level calculus and evaluation of engineering data to estimating the cost of groceries. We'll discuss how application of properties such as the associative and distributive properties can enhance practical problem-solving and then practice these skills.

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**One and Done ... now teaching is fun!**

20% of your students take up 80% of your time. All too often, the majority of that 80%-time slot is spent on disruptive, inappropriate classroom behavior or off-task student issues. These minor classroom disturbances are robbing both you and your students of valuable and precious teaching time. Sadly, an average of 3 to 9 hours per 30-hour school week, ultimately evaporates and is lost forever when dealing with these minor daily occurrences. Just image, speaking to your troublesome student(s) just once and, it ends there. It can happen, and it does!

Learn a research-based, time-tested and proven philosophy, that creates:
- a decrease in discipline issues (which regains that lost valuable teaching time)
- an increase in academic performance
- a more positive environment in your classroom and school building.

Administrator, veteran teacher or new to the classroom, this is the session you need to attend.

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**Combining Multiple Pedagogical Approaches to Promote Student Understanding of the Carbon Cycle**

Hands-on activities and service-learning activities are considered to be some of highest impact educational activities, offering more opportunities than traditional lecturing to enable students to make connections between STEAM knowledge and its application to real world problems. The presenters will describe a doable series of classroom activities that combine service/field work, brainstorming, and laboratory activities to connect students to how climate change and the carbon cycle is influenced by vegetation. Each component of the series of activities can be modified to the constraints inherent
in any classroom. For our presentation, the audience members will be able to experience the laboratory activity, measuring CO$_2$ in chambers containing plants using the pencil-box sensing system designed and built by Dr. Piechnik and her students. The pencil-box sensing system consists of a CO$_2$ sensor and an Arduino microcontroller housed in a pencil box and connected to a computer. College students at Pitt-Bradford have used this system for numerous years in laboratory activities monitoring respiration in yeast and other organisms. The three-part combination of service/field work, laboratory work, and brainstorming provides a particularly powerful way for students to become personally engaged with the carbon cycle.

**E² - Engaging Events**

Ever wonder how to gather community support for STEM programs and initiatives? Want to show the value of STEM or STEAM programming in providing a link to workforce opportunities? Feel a need to convince colleagues of the value of STEM programming in schools, helping them understand that STEM is not just a fad, but a means of equipping students with valuable skills (critical thinking, creativity, communication, collaboration, problem solving, and more) to adapt to an ever more rapidly changing world? Do you want to be more effective in helping youth and their families understand the tremendous opportunities and benefits of STEM learning and careers in STEM?

If these are questions you’ve faced, come learn about a variety of approaches to engage your community! Learn effective ways to bring together students and families, preK-12 schools, higher education, community organizations, and businesses to support STEM education. Approaches will include STEM Nights, Science & STEAM Fairs, STEM Camps, STEM Competitions, Career Jam, and more. Participants will receive helpful information, guidance, and documents to assist them in establishing their own engaging events.

**Equity in STEM Education**

All students should have access to high quality learning opportunities in Science, Technology, Engineering and Math (STEM). The career and labor demands and the need for a diverse and representative workforce in STEM fields highlights the necessity for equitable opportunities in the classroom. We will be examining approaches to instruction and activities, tools and resources that can be more inclusive and motivating for diverse populations.
**Teaching "Computational Thinking" in K-12**

Is "Computational Thinking" just the most recent buzzword to trouble STEAM educators? Join Mrs. Harp, a retired electrical engineer and current Technology Teacher, on a journey through the definition of CT and its application in STEAM education. Free, hands-on resources will be available for your scrutiny. *You need not be computer-savvy to attend.* Attendees are requested to bring their own lap top computer or device in order to participate fully in this class.

**GETT Ready for Stem Camp**

Girls involved in creating things with electronic tools build stronger interests and garner skills in STEAM. This will be our 5th year running GETT ("Girls Empowered Through Technology") as a summer camp. The camp encourages girls to explore and thrive, while empowering them to find solutions using technology. Our girls flourished as trailblazers, resulting in new courses, clubs and opportunities, now available to all our students K-12. Soft skills were also introduced including community service, interviewing skills, and public speaking. Community members were excited to be invited and involved in these camps, coming to speak and guide the girls in developing their professional presence. GETT girls were invited to speak at community service organization meetings, as well as co-presenting at NYSCATE annual conference. Lynne and Kim presented GETT at ISTE in Chicago, June 2018. These invitations to present allowed the replication of this successful camp across New York. In our session we plan to encourage participants to interact with the various technologies that our campers have used. Timeline and resources for our successful camp will be shared.

**Developing Perseverance in STEM Activities to Improve Reading**

STEM activities help students learn collaboration, perseverance, creativity, and critical thinking. If you are attending this conference, you likely already see the relevance. But what about other stakeholders - teachers, administrators, and parents? How do we connect STEM activities to the rest of the curriculum to get buy-in and increase its use?

Guiding students to reflect on their strengths and challenges as young engineers can elicit important information about perseverance. How can we help students transfer this from a STEM challenge to their reading? By moderating a discussion based on their metacognition about themselves as engineers, we can flesh out some specific strategies that we can connect to challenges in reading and help students improve as reflective readers.

In this practical workshop, you will have the opportunity to participate in a STEM challenge, reflect on the process, and share out your ideas in a group discussion. During this discussion, your responses will be connected to struggles young readers face, including decoding unknown words and reading comprehension. Then, you will put these ideas into practice while reading a new text to see how TRANSFER occurs.
July 30, 2019
Session 5, Tuesday 8:00 - 9:00 AM

K-4  5-8  9-12  13-16

5A Physical Health Sciences Building - PHS 216
Jennifer Buelin – ITEEA
Part 1 of 2 – This is a double session and continues in Session 6A
Jumpstarting I-STEM for All Children
The future of our nation is dependent on the children in our care. In an age of continually advancing technologies and a society more global than ever before, we must do better in preparing our students to contribute to and thrive in their world. The reliance upon a high-quality, robust, and equitable STEM education system for our nation’s children has never been more paramount. It has been estimated that 65% of the children entering elementary school today will ultimately end up working in completely new job types that have not yet been envisioned. It is incumbent upon all stakeholders involved in STEM education to dedicate themselves, through collaborative efforts, to ensuring our children have the academic and experiential preparation necessary for them to pursue the STEM pathway of their choice that leads them toward college and career. Join us in exploring integrative STEM education through hands-on design challenges that address social good, computational thinking skills, and technological and engineering literacy.

5B Agriculture Science Building - AGRLAB 224
Mark Belden - NYS Master Teacher
Jeff Branson - Sparkfun Education
Part 1 of 2 – This is a double session and continues in Session 6B
Java Coding with Processing
If you are looking for a straightforward, affordable and well supported way to teach Java coding, Processing could be for you. Processing runs on PC, Mac or Linux and openprocessing.org runs on most devices with a web browser. Projects range from pixel art to Arduino and beyond. Mr. Branson has extensive experience with Processing and will be joining us via video link. Mr. Belden has used Processing in his classroom for the past three years with great success. You do not need to be a "Coder" to attend or use this in your classroom. If you are a hardcore "Coder" Mr. Branson will have tips and examples that can help you. Attendees are requested to bring their own lap top computer or device in order to participate fully in this class.
Teaching Statistics: Let’s Stop Ignoring Nominal and Ordinal Scales of Measurement

The NOIR (nominal, ordinal, interval and ratio) scales of measurement are covered in most statistics books. The first two scales (categorical data) receive minimal attention. Continuous data (the latter two scales) offer many advantages: they contain more information than categorical data, resulting in smaller sample sizes; they provide more plotting options; they offer more analytical methods.

- Why bother teaching nominal and ordinal scales? Starting with nominal data permits hands-on experience with the scientific method as soon as students can sort and count. This hopefully stimulates interest in future STEM opportunities.

- After mastering the nominal realm, the next level is ordinal data. Classification still plays a key role, but now the categories have a natural ordering. Because the category names are often represented by numerals, errors are common when dealing with this type of data.

This session provides a comprehensive approach for properly collecting, plotting, and analyzing categorical data in the context of the scientific method. Common analytical errors will be highlighted.

Nerf Guns and More!

A ball is thrown into the air, a football player attempts to kick a football over the goal post, a toy rocket is launched straight upward… how many of these starting lines to “real-life” problems do you recognize? Consider actually modeling projectile motion in the classroom so that students can answer the question: when am I ever going to use this? Get ready to do some problem solving in this workshop! Leave with materials ready to use! Bring graphing calculator or laptop.

Attendees are requested to bring their own laptop computer or device in order to participate fully in this class.

Articulating Two Different Models of Engineering Design in STEM Classrooms

The Next Generation Science Standards (ngss) have identified engineering design as a significant and new component of national science standards. Technology and Engineering Education has over two decades of formally incorporating engineering design as a foundational component instruction. This presentation will examine real classroom activities to extract complimentary differences in philosophy and objectives of engineering design between science and technology education. Open dialogue will be encouraged.
**Session 6, Tuesday 9:15 - 10:15 AM**

6A Physical Health Sciences Building - PHS 216
Jennifer Buelin – ITEEA

Part 2 of 2 – This is a double session and continues from Session 5A

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6B Agriculture Science Building - AGRLAB 224
Mark Belden - NYS Master Teacher
Jeff Branson - Sparkfun Education

Part 2 of 2 – This is a double session and continues from Session 5B

**Java Coding with Processing**

If you are looking for a straight forward, affordable and well supported way to teach Java coding, Processing could be for you. Processing runs on PC, Mac or Linux and openprocessing.org runs on most devices with a web browser. Projects range from pixel art to Arduino and beyond. Mr. Branson has extensive experience with Processing and will be joining us via video link. Mr. Belden has used Processing in his classroom for the past three years with great success. You do not need to be a "Coder" to attend or use this in your classroom. If you are a hardcore "Coder" Mr. Branson will have tips and examples that can help you. **Attendees are requested to bring their own lap top computer or device in order to participate fully in this class.**

**Don’t forget** to fill out VENDOR CONTACT FORMs to be eligible for RAFFLE prizes. Raffle drawing is during the **July 30th** Keynote Address.
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Gathering STEAM in Liberia, the Bahamas and World: Developing Online STEAM Professional Development for Teachers Around the Globe

For the past 15 years the St. Bonaventure University (SBU) has actively developed and implemented a wide range of STEAM programming that has been successfully delivered to students in global schools. In Fall 2018 we were asked to build an online training program that could be delivered to a group of 20 teachers in Liberia. Working with a team of education, science and business students we created an online training program with both synchronous and asynchronous components. Notable features include a dedicated web page with lesson materials; live speakers; and prerecorded Youtube videos. One notable feature was the use of Whatsapp that served as a means of connecting teams of Liberian and American educators as they jointly built a simple tower. We followed this up three months later with an onsite training
for nearly 90 educators in the Bahamas. Both programs received high levels of praise for both the unique programming and learning materials.

**Session 7, Tuesday 10:45 – 11:45 AM**

*K-4  S  T  E  M*  

**7A** Physical Health Sciences Building - PHS 107  
Kate Elder - Cobleskill-Richmondville School District

**Time to Tinker: A Model for Introducing Engineering & Design Standards in Elementary Schools**

Does your district struggle to give their students hands-on opportunities in science? Are you wondering how to introduce engineering and design principals building-wide in your elementary setting? Do your kids have time to "Tinker"??? In this session I will share the roll-out of "Tinkertime" at Radez Elementary. Originating as a need for students to have meaningful activities to do while teachers met for professional development, "Tinkerbins" were created to travel from class to class, with simple STEM activities for kids that could be facilitated in a non-instructional way by teaching assistants and aides. They introduce concepts that can later be built on by teachers in instructional settings. Come see our kits, find out how the schedule works, find out where the money came from, and brainstorm ideas for implementing in your own school.

**5-8  T  M**  

**7B** Agriculture Science Building - AGRLAB 223  
Julie Bensley – HS Math Teacher, Alfred Almond CSD

**Part 1 of 2 – This is a double session and continues in Session 8B**

**Engaging Students Through Desmos Activity Builder**

This session will examine the power and possibility of using Desmos Activity Builder in the mathematics classroom. Desmos Activity Builder is a free online interactive classroom tool meant to create student engagement with mathematics. Come learn how this tool can be utilized to build and check understanding of mathematical concepts. Teachers will be able to experience Desmos Activity Builder as a student as well as view ready to use activities available on the website. This program also allows instructors to create their own unique activities geared directly to the needs of their individual students. We will look at basic techniques teachers can use to build their own activities. Attendees should bring a Smartphone or other device in order to participate in activities.

**5-12  T  M**

**7C** Agriculture Science Building - AGRLAB 226  
Stephanie Schaefer - University at Buffalo, Seton Catholic Central

**Basics of Google Sheets: Tricks for Analyzing Assessment Data**

Have you ever wondered how you could figure out trends in student achievement? Google Sheets can help you with analyzing your student data. Learn tricks and tips to using Google Sheets for data driven instruction. You will leave this session with practical tips on using Google Sheets, and you will even learn ways to teach your students how to monitor their own progress!
7D Agriculture Science Building - ABRLAB 224
Thomas Fisher

**WeBWorK and FishMath**
The goal of this presentation is to answer two questions: How do I do spiral review without having to worry about cheating or piles of papers to grade? And what do I do when students are finished early or just need more practice? The presentation will cover two digital tools that can be used to do spiral reviews without cheating or having to grade papers by hand and to provide additional skill practice. The first is the online homework system, WeBWorK, which allows for randomized problems, immediate feedback, and automatic grading. The second is the website FishMath.com/extra which contains problem generators by unit so that students have an endless supply of problems (and answers) to practice with.

7E Agriculture Science Building - AGRLAB 225
Winston Martey – 9-12 Math Instructor

**History-Infused Mathematics Instruction**
The purpose of this research was to develop and implement a history-infused mathematics curriculum through teacher-researcher collaboration. History is used as the main context to introduce mathematics concepts because history has the natural tendency to provide us with meaningful learning. Our knowledge of history of mathematics facilitates learners’ thoughts, dove-tailed into conceptual units. History-infused mathematics instruction is meant to provide an engaging hook to give students a deep conceptual understanding of current algorithms in a natural progression (Katz, 1997; Kelley, 2000). We posit that employing the history of mathematics in school curricular can (1) increase students’ motivation and develop a positive attitude towards mathematics and (2) help explain difficulties and confusion that students encounter via an analysis of the development of mathematics.

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Session 8, Tuesday 1:30 – 2:30 PM

8A Central Dining Hall- Allegany Room
Joseph Zawicki - NYS STEM Education Collaborative, STANYS, WNY STEM Hub
Kathaleen Burke - STANYS

**Developing New and Evaluating Extant NGSS Resources**
This session will focus on tools for creating (or evaluating) NGSS lessons that are being created or that currently exist. The New York State adaption of the NGSS incorporates the use of phenomena, disciplinary core ideas, science and engineering practices and cross-cutting concepts. Students use silent sustained writing and mathematical analysis to formulate questions and to explore phenomena related to relevant scientific concepts and processes. Participants will review several evaluation tools and will receive a lesson from the SEPUP collection.
**Engaging Students Through Desmos Activity Builder**

This session will examine the power and possibility of using Desmos Activity Builder in the mathematics classroom. Desmos Activity Builder is a free online interactive classroom tool meant to create student engagement with mathematics. Come learn how this tool can be utilized to build and check understanding of mathematical concepts. Teachers will be able to experience Desmos Activity Builder as a student as well as view ready to use activities available on the website. This program also allows instructors to create their own unique activities geared directly to the needs of their individual students. We will look at basic techniques teachers can use to build their own activities. Attendees should bring a Smartphone or other device in order to participate in activities.

**Maps, Math, Media: Transdisciplinary STEM Projects**

This session explores the role of mobile technologies such as Global Positioning System (GPS) and educational apps in teacher education; offers creative strategies and possibilities for integrating GPS and Social Interaction Software (SIS) into K16 curriculum with limited resources; and demonstrate examples such as Hi5 (Hiking for Health, Happiness, Head, Hand and Heart) to Nature project that integrates Maps, Math and Media Education using mobile devices (e.g. GPS devices); and showcases participants’ projects and digital stories as a virtual gallery walk. The research study explored wide range of meanings participants associated with experiential STEM project based learning activities; the impact of mobile technologies in developing multicultural and multilingual curriculum that promotes transdisciplinary approach to curriculum design; the ways in which participants integrated math, maps and media into their lesson plans; and how they gained alternative points of view on environment and renewed interest and commitment to community service and global education.

**Professional Engineering Skills: Preparing Your High School Student to Enter a College Program & Beyond**

This presentation will cover skills that are required of engineering professionals and college students wanting to enter the field. In addition to skills needed to be successful in the field this presentation will also cover skills graduating high school students need to be successful in engineering science, engineering technology, and other technical science programs. As an example Alfred State College’s mechanical engineering science and engineering technology, and civil technology and construction management programs will be examined.
8E Physical Health Sciences Building - PHS 107
Clark Greene - Buffalo State College, NYSTEEA, ITEEA

**Differentiated Knowledge within STEM Education**

Multiple intelligence is a theory proposed by Howard Gardner more than 30 years ago. Subsequent evolution of multiple intelligences has identified differentiated cognitive function/knowledge closely aligned to varied intelligence. This presentation will examine differentiated, yet complimentary knowledge as it relates to practices, content, and objectives of and among individual STEM disciplines.

**Tour Session C, Tuesday, 2:45 – 3:45 PM**

Please register for the tours at the time of check in.

Gather and meet Professor Jess Lippa at the lounge in the Physical and Health Sciences Bldg at 2:35 PM

**Nursing Simulation Manikin Tour and Presentation**

Tour where nursing students participate in an innovative and interactive experience using a high-fidelity simulation manikin in a safe, non-threatening learning environment. Changes in the acute medical condition allow the student to react and provide the appropriate interventions.