

STEM Connects All

Never Too Early, Never Too Late



SUMMER INSTITUTE July 28-30, 2019

POSTERS



TOURS



PRESENTATIONS

2019 Summer Institute

Poster Exhibition

Sunday, July 28 • 5:00 - 6:00 PM (1 PD)

Central Dining Hall

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.

Marc Chiffert - NYSSPE

Architectural Engineering Problems

Poster Abstract: The poster will illustrate some math applications surrounding architectural engineering fields from the calculations of building settlements to air quality. Additionally illustrating deflections and failure.

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.

Joseph Zawick - SUNY Buffalo State College, WNY STEM Hub, STANYS

Sara Dannebrock - SUNY Buffalo State College

Sarah English - NYS Master Teachers, Sweet Home School District

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

Kathaleen Burke - STANYS

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

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 Mannequin Tour and Presentation (1 PD)

Tuesday, July 30, 2019

3:30 - 4:30 PM

Gather and meet Professor Jess Lipka at the lounge in the Physical and Health Sciences Bldg at 3:20 PM

Tour where nursing students participate in an innovative and interactive experience using a high-fidelity simulation mannequin 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, 1:00 - 2:00 PM

Session 8, 2:15 - 3:15 PM

Tour Session C, 3:30 - 4:30 PM

Image KEY

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



K-4

5-8

9-12

13-16

Science

Technology

Engineering

Mathematics

English
Language
Arts

Arts

July 28, 2019

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Cleanroom Tour and Presentation

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July 29, 2019
Session 1, Monday, 10:00 – 11:00 AM

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



1A Physical Health Sciences Building - PHS 107 (40)

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

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.

K-4 5-8 9-12



1B Agriculture Science Building – AS 223 (7)

Caitlin Bowen – NYSTEEA, Wellsville CDS

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.

5-8 9-12



1C Physical Health Sciences Building - PHS 216 (27)

Pam O'Brien – STEMscopes / Accelerated Learning

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.**

5-8 9-12 13-16



1D Agriculture Science Building – AS 225 (19)

Dana Morse – Texas Instruments

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.

K-4 5-8 9-12



1E Physical Health Sciences Building - PHS 313 (20)

Mary Ann Nickloy - 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.

9-12 13-16



1F Agriculture Science Building – AS 226 (39)

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

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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

5-8 9-12 13-16



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T

2A Agriculture Science Building – AS 226 (43)

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.

5-8 9-12



T



E

2B Agriculture Science Building – AS 224 (17)

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 lap top computer or device in order to participate fully in this class.**

9-12 13-16



2C Physical Health Sciences Building - PHS 107 (5)

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 lap top computer or device in order to participate fully in this class.**

5-8 9-12 13-16



2D Physical Health Sciences Building - PHS 313 (12)

Raymond Pitcher – Kindwind

Andy Leuth - Kindwind

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.

K-4

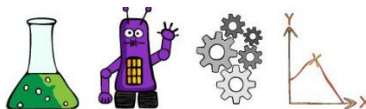


2E Agriculture Science Building – AS 223 (33)

Colleen Kelly – Orchard Park CSD

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.



Session 3, Monday, 3:15 – 4:15 PM

K-4

5-8

9-12

13-16



3A Agriculture Science Building – AS 225 (22)

Kenneth Huff - STANYS

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.

5-8

9-12



3B Agriculture Science Building – AS 224 (17)

Mark Belden – NYS Master Teacher

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.**

9-12

13-16



Arts

3C Physical Health Sciences Building - PHS 107 (5)

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5-8

9-12

13-16



S



T



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ELA

3D Physical Health Sciences Building - PHS 313 (12)

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5-8

9-12

13-16



E



M

3E Agriculture Science Building – AS 223 (34)

Susan Steere – Alfred State College

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.

K-4

5-8

9-12



S



T



E



M



ELA



Arts

3F Agriculture Science Building – AS 226 (2)

David Frongillo – Retired Educator

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.

Session 4, Monday 4:30 – 5:30 PM

9-12 13-16



4A Physical Health Sciences Building - PHS 216 (44)

Mary Mulcahy – Associate Professor, University of Pittsburgh at Bradford

Denise Piechnik - University of Pittsburgh at Bradford

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 CO₂ 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 CO₂ 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.

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



4B Agriculture Science Building – AS 224 (10)

Lisa Blank - Watertown CDS, North Country STEM Learning Network, STEM Ecosystems, LEAD STEM

Mary Margaret Small - Clarkson University, North Country STEM Learning Network, STEM Ecosystems

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.

K-4 5-8 9-12



4C Agriculture Science Building – AS 223 (11)

Theresa McSweeney – NYSUT

Timothy Fowler - New York State Network for Youth Success

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.

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K-4 5-8 9-12



4D Agriculture Science Building – AS 226 (23)

Ellen Harp - ISTE, EPT, NYSTEEA

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.

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K-4 5-8 9-12



4E Agriculture Science Building – AS 225 (15)

Lynne Blum – Dansville CSD

Kim Derrenbacher – Dansville CSD

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.



K-4



4F Agriculture Science Building – AG 225 (13)

Austin Levinson – Colegio Neuva Granada

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 (42)

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.



5-8 9-12 13-16



5B Agriculture Science Building - AS 226 (16)

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 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.**

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



5C Agriculture Science Building - AS 224 (18)

James Alloway - EMSQ Associates

Part 1 of 2 – This is a double session and continues in Session 6C

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.

9-12



5D Central Dining Hall- Allegany Room (32)

Ellen Falk - AMTNYS , North Salem HS MS Math Teacher

Nerf Guns and More!

Part 1 of 2 – This is a double session and continues in Session 6D

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 lap top computer or device in order to participate fully in this class.**

9-12 13-16



5E Agriculture Science Building - AS 223 (37)

Marc Chiffert - New York State Society of Professional Engineers (NYSSPE)

Part 1 of 2 – This is a double session and continues in Session 6E

Application of Math Equations in Architectural Engineering

To illustrate real life scenarios and applications surrounding the Architectural Engineering Field.

K-4

5-8

9-12

13-16



5F Physical Sciences Building - PHS 107 (24)

Clark Green - Clark Buffalo State College, NYSTEEA, ITEEA

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

K-4

5-8

9-12

13-16



6A Physical Health Sciences Building - PHS 216 (42)

Jennifer Buelin – ITEEA

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

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.

5-8 9-12 13-16



6B Agriculture Science Building - AS 226 (16)

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.**

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



6C Agriculture Science Building - AS 224 (18)

James Alloway - EMSQ Associates

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

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.

9-12



6D Central Dining Hall- Allegany Room (32)

Ellen Falk - AMTNYS , North Salem HS MS Math Teacher

Nerf Guns and More!

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

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 lap top computer or device in order to participate fully in this class.**

9-12 13-16



6E Agriculture Science Building - AS 223 (37)

Marc Chiffert - New York State Society of Professional Engineers (NYSSPE)

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

Application of Math Equations in Architectural Engineering

To illustrate real life scenarios and applications surrounding the Architectural Engineering Field.

K-4

5-8



6F Physical Health Sciences Building - PHS 107 (29)

Todd Palmer - St. Bonaventure University

Elizabeth Austin

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 1:00 - 2:00 PM

K-4

5-8



7A Physical Health Sciences Building - PHS 107 (8)

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 9-12



7B Agriculture Science Building - AS 223 (31)

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.

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



7C Agriculture Science Building - AS 226 (21)

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!

5-8 9-12



7D Agriculture Science Building - AS 224 (30)

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.

9-12



7E Agriculture Science Building - AS 225 (35)

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.

Session 8, Tuesday 2:15 - 3:15 PM

K-4

5-8

9-12

13-16



8A Physical Health Sciences Building - PHS 107 (41)

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.

5-8

9-12



8B Agriculture Science Building - AS 223 (31)

Julie Bensley – HS Math Teacher, Alfred Almond CSD

Part 2 of 2 – This is a double session and continues from Session 7B

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.

5-8 9-12 13-16



T



M



ELA

8C Agriculture Science Building - AS 224 (36)

Melda Yildiz - New York Institute of Technology

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.

9-12 13-16



S



T



E

8D Agriculture Science Building - AS 226 (38)

Aric Bryant – Alfred State College

Kera Mariotti - Alfred State College, ABET

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.

K-4 5-8 9-12



S



T



E



M

8E Physical Health Sciences Building - PHS 107 (25)

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, 3:30 – 4:30 PM

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

Gather and meet Professor Jess Lipka at the lounge in the Physical and Health Sciences Bldg at 3:20 PM

Nursing Simulation Mannequin Tour and Presentation

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