Innovative Technology Experiences for Students & Teachers (ITEST) Program project presentations at ITEEA, CompleNet2015, NARST, Association for American Geographers, NSTA STEM Forum & Expo, CSCL 2015, ASEE, and ISTE (listed in order of occurrence).

Thursday, March 26

WaterBotics Exhibit ● ITEEA, Milwaukee, WI

Thursday, March 26 - Friday, March, 27, Exhibit Hall ● WaterBotics employs an innovative design challenge-building submersible robots from LEGO and other parts that can perform a series of increasingly complex and sophisticated underwater tasks. Middle and high school students learn and apply concepts of buoyancy and stability, gears and gear ratios, torque, 2D and 3D motion, and computer programming in the design of their robots. In the exhibit, sample underwater robots will be set up in a small pool and participants will have the opportunity to examine and control the robots. **Presenter:** Mercedes McKay, Center for Innovation in Engineering & Science Education (CIESE), Stevens Institute of Technology

Friday, March 27

Generating Interest in STEM Through Underwater Robotics ● ITEEA, Milwaukee, WI

Friday, March 27, 2015, 4:00-4:50pm, Wisconsin Center, Room 201D ● In this presentation, participants will learn about and experience the innovative WaterBotics curriculum designed to engage middle and high school students in a series of underwater design challenges using fully submersible LEGO robots. Participants will have an opportunity to manipulate sample robots and view curriculum materials, short video recordings, photos, and interactive simulations. **Presenter:** Adam Scribner, Center for Innovation in Engineering & Science Education (CIESE), Stevens Institute of Technology

NetSci High: Bringing Network Science Research to High Schools ● CompletNet2015, New York, NY

Friday, March 27, 2015, 4:55PM, in Technical Session 8 ● We present NetSci High, our NSF-funded educational outreach program that has been bringing network science research to regional US high schools since 2010. This program connects high school students and teachers in the Northeast US to regional university research labs and provides them with the opportunity to work on a year-long research project on network science, culminating in a formal presentation at a network science conference. This short paper reports the contents and materials we have developed to date, lessons learned from our experiences, and the future goals of this program. **Presenter:** Catherine Cramer (New York Hall of Science)

Saturday, April 11

Innovative Technology in Science Inquiry: Preparing Students for STEM ● NARST, Chicago, IL

Saturday, April 11, 2015, 2:45 PM–4:15 PM, Columbus GH ● This study investigates a comprehensive approach to inquiry-based science education by engaging students in inquiry-based science projects that use open source computational models and real-time data acquisition with probeware. We present four years of research findings from our research program with more than 4000 students from upper elementary to high school. In particular, we are interested in the following research questions: (1) did a comprehensive approach to inquiry-based science education increase students' understanding of standards-based content? (2) Did this approach increase students' interest and attitudes towards STEM careers? We investigated students' understanding of standards-based content using pre- and post-tests that were customized to the content in particular units. **Presenters:** Elham Beheshti

(Northwestern University); Josh Littenberg-Tobia; Carolyn Staudt, Nathan Kimball (The Concord Consortium); Jamie Broadhead

Sunday, April 12

From Beavers to Bigfoot: Design-based science learning in an informal culturally relevant STEM program ● NARST, Chicago, IL

Sunday, April 12, 2015 8:30-10:00am, Grand Suite 5 ● Design based science curricula can provide engaging alternatives to traditional science instruction while providing opportunities to learn complex systems by combining scientific inquiry with engineering practices(Hmelo et al. 2000). A culturally rich, place based informal STEM camp was offered to youth from two regional tribal communities during the summer of 2013. Students participated in STEM activities that informed them of geomorphological and ecological issues leading to a design challenge of creating a stream restoration plan. Students built a three dimensional model of a proposed stream restoration based on data collected in the field, tribal knowledge, and environmental engineering practices. The portrayal of STEM, cultural experiences, and camp themes on student representations of the stream restoration design will be discussed. **Presenters:** Melinda Howard, Anne Kern (U of Idaho)

Gender and Scientific Learning in a Design-Based Afterschool STEM Program ● NARST, Chicago, IL

Sunday, April 12, 2015 10:15-11:45am, Hyatt Regency - Roosevelt, Chicago IL ● This study investigates how students navigate gender and social norms while becoming acculturated into the world of scientific inquiry through engineering design. Critical, ethnographic discourse analysis was used to uncover several important findings. Collaborative, project based learning was created in response to research that indicated women

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learn best in collaborative, safe environments; however this study implies that creating those environments may require more than just setting up the structure to do so. Mentors and instructors may benefit from specific instruction in how to interact with groups in ways specific to their learning needs. Additional attention may also be needed for group formation, ensuring that each small group provides an environment ripe for learning. *Presenters:* Jessica E. Schnittka (University of Colorado Denver), Christine Schnittka (Auburn University)

Tuesday, April 14

Designing Programs that Engage, Motivate, and Interest Youth to Pursue STEM Careers across the NSF Funded ITEST program ● NARST, Chicago, IL

Tuesday, April 14, 2015 1:00-2:30pm, Hyatt Regency, Columbus IJ ● The work that is presented in this symposium is funded through the National Science Foundation's ITEST program. The three projects that are represented cut across both the cognitive and non-cognitive domains. The goal is to (1) provide a snapshot of the research that is being undertaken by ITEST programs, (2) examine how local contexts can be utilized to motivate and engage youth to pursue further study in a STEM field, (3) examination of how innovative and emerging technologies can be used to create learning experiences that engage youth who normally would not be interested in STEM fields, and (4) how to measure the increasingly recognized important non-cognitive attribute of resilience. *Presenters:* Mike Barnett (Boston College); Javed Khan (Tuskegee University); Fan Wu (Tuskegee University), Jacqueline DeLisi (Education Development Center, Inc.) *Presider:* Ami Patchen (Boston College) *Discussant:* Sarita Pillai (Education Development Center, Inc.)

Friday, April 24

Paper Building a Community for Advancing and Broadening Participation in Geospatial Careers ● Association for American Geographers, Chicago, IL

Friday, April 24, 5:20pm ● In session: *Preparing the Geospatial Technology Workforce* ● Aiming to advance and broaden participation in geospatial careers, our project includes several strategies to build a community of a diverse set of stakeholders for support and outreach. The primary participants are students in grades 9-12 at Scott High School, a United Way Schools as Community Hubs center in Toledo, Ohio, where 94% of the students are black and 87% are considered economically disadvantaged. This collaboration includes all stages of the project: planning, implementation, and future impact. In addition, a teacher advisory committee, including social studies and physical science teachers in private and public school settings, is essential in the development and piloting of curricular materials throughout the study. This presentation addresses the methods, challenges, and successes of engaging with a broad group of stakeholders for this multi-year NSF-funded project. *Presenters:* Beth Schlemper, Sujata Shetty, Kevin Czajkowski, & Victoria Stewart (University of Toledo)

Friday, May 22

Connecting Physical Science, Design, and Engineering Through Underwater Robotics ● NSTA STEM Forum & Expo, Minneapolis, MN

Friday, May 22 10:30-11:30am, Minneapolis Convention Center, 101 D/E ● WaterBotics is an innovative STEM curriculum that provides motivation for students to engage in and learn physical science and engineering concepts through a scaffolded series of hands-on, team-based challenges. Middle and high school teachers and out-of-school educators will be introduced to WaterBotics

and learn how it can be implemented – from high school physics classes to middle school summer camps. This presentation will include details about the WaterBotics curriculum and implementation considerations, demonstrations of sample robots, and information and hand-outs about how to get involved with the project. *Presenter:* Adam Scribner, Center for Innovation in Engineering & Science Education (CIESE), Stevens Institute of Technology

June 7-11

Pioneer Valley Citizen Science Collaboratory: A CSCL Approach to Designing Citizen Science Projects ● CSCL 2015, Gothenburg, Sweden

TBA; Poster ● The recent explosion of citizen scientist (CitSci) projects has led researchers to call for their broad use as a tool for improving science learning (Bonney, et al., 2014; Wals, et al., 2014). We highlight the CSCL design features of our PVCS Collaboratory and outline a research program for measuring CitSci's understanding of the nature of science, content knowledge changes and shifts in Science 2.0 practices as participants move from novice data collectors to competent practitioners. *Presenters:* Timothy Zimmerman (Hampshire College), Hedieh Najafi, Alisa Acosta, James D. Slotta, Meagan O'Hara, Armin Krauss

June 15-17

Student Learning of STEM Concepts Using a Challenge-based Robotics Curriculum ● ASEE Annual Conference, Seattle, WA

TBA ● The paper examines pre- and post-student learning of science, programming, and engineering concepts using a tightly integrated robotics curriculum. Data from over 750 middle school and high school youth from both in-school and out-of-school environments indicate that student post-test scores for the science and

programming concept areas increased, but only to just above 50 percent of the total possible scores. Although students felt they had learned, and teachers agreed, the degree of learning was not reflected in the assessment scores. Recommendations for the design of future curricula based on project evidence and results will be presented. **Presenter:** Mercedes McKay, Center for Innovation in Engineering & Science Education (CIESE), Stevens Institute of Technology

Curriculum Exchange: LEGO-Based Underwater Robotics as a Vehicle for Science and Engineering Learning ● ASEE Annual Conference, Seattle, WA

TBA ● Learn more about the innovative, underwater robotics curriculum known as WaterBotics® that can be used in classrooms, camps, or out-of-school programs. Designed to appeal to girls and boys, teams of middle or high school youth design, build, program, test, and redesign underwater robots made of LEGO® and other components. Program details, equipment needs, and purchasing information will be shared. **Presenter:** Mercedes McKay, Center for Innovation in Engineering & Science Education (CIESE), Stevens Institute of Technology

Monday, June 29

Learning Science, Web Design and Eyetracking Technology in a Summer Enrichment Program ● ISTE, Philadelphia, PA

Monday, June 29, 2:00–4:00 pm; Poster ● Teams of high school students in a summer enrichment program researched, designed and created their own website using a product design cycle methodology and evaluated their websites with eyetracking technology. Students improved their knowledge of the science content on the website and learned about teamwork, eyetracking and other STEM content. **Presenters:** M. Javed Khan (Tuskegee University), Marcia Ross (Alabama State University),

Christine Schnittka (Auburn University), Fan Wu (Tuskegee University)

Tuesday, June 30

Innovative Technology in Science Inquiry ● ISTE, Philadelphia, PA

Tuesday, June 30, 4:00–5:00 pm ● Using a simple web-based authoring portal, teachers customize middle and secondary classroom activities using open source models. The use of Innovative Technology in Science Inquiry (ITSI) promotes higher-order thinking skills through the 5E's model of learning (engage, explore, explain, evaluate, and elaborate). Every activity showcases a STEM career and relates the learning to the global job market. The ITSI portal is online and retains all student inquiry-based work with models and probes. Teachers observe all student work in the form of online reports that can be sorted by individual or classroom responses. Teachers participate in an online Professional Learning Community to share and peer review all teacher-created activities. **Presenters:** Carolyn Staudt, Scott Cytacki, Chad Dorsey (Concord Consortium)

For more information about these and other sessions, click on the conference name to be directed to the website for each event.