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Thank you to our Program Committee

The Technical Program and Paper Reviews are administered by TISP’s Knowledge, Skills and Education Working Group. The working group raises awareness and promotes a common understanding among stakeholders of the importance of disaster resilience education and training.

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and support from Argonne National Laboratory
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<th><strong>Schedule at a Glance</strong></th>
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<td><strong>Sunday, April 3</strong></td>
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| 1:30 p.m.–3:00 p.m. | **Breakout Sessions I**  
| | • Technical Session 1A: Transportation Resilience *(Yellow Topaz)*  
| | • Technical Session 1B: Critical Infrastructure *(Opal 2)*  
| | • Technical Session 1C: Risk, Safety and Planning *(Emerald Ballroom 3)*  
| | • Technical Session 1D: Electric Grid Resilience *(Crystal Ballroom A)* |
| 3:00 p.m.–3:30 p.m. | **Networking Break** *(Sponsor and Exhibitor Epicenter)* |
| 3:30 p.m.–5:00 p.m. | **Breakout Sessions II**  
| | • Technical Session 2A: Wild Card! *(Yellow Topaz)*  
| | • Technical Session 2B: Infrastructure Protection and Resilience *(Opal 2)*  
| | • Technical Session 2C: Utilities Resilience *(Emerald Ballroom 3)*  
| | • Technical Session 2D: Security and Resilience of the Port of Charleston *(Crystal Ballroom A)* |
| 5:30 p.m.–7:00 p.m. | **Plenary Poster Discussion and Networking Reception** *(Sponsor and Exhibitor Epicenter)* |
| **Tuesday, April 5** |
| 7:00 a.m.–1:00 p.m. | **Registration** *(Pre-Function)* |
| 7:30 a.m.–8:30 a.m. | **Breakfast Presentation** *(Emerald Salon 1)* |
| 8:30 a.m.–9:00 a.m. | **Networking Break** *(Sponsor and Exhibitor Epicenter)* |
| 9:00 a.m.–10:30 a.m. | **Breakout Sessions III**  
| | • Technical Session 3A: Resilience *(Yellow Topaz)*  
| | • Technical Session 3B: Social and Economic Resilience *(Opal 2)*  
| | • Technical Session 3C: Collegiate Infrastructure Challenge Presentations *(Blue Topaz)*  
| | • Technical Session 3D: Critical Water Infrastructure: Asset Management Lessons and Challenges *(Crystal Ballroom A)* |
| 10:30 a.m.–11:00 a.m. | **Networking Break** *(Sponsor and Exhibitor Epicenter)* |
| 11:00 a.m.–12:30 p.m. | **Plenary Session** *(Crystal Ballroom C/D)* |
| 12:45 p.m.–2:15 p.m. | **Closing Lunch with Keynote Speaker** *(Crystal Ballroom C/D)* |
Welcome to the 2016 Critical Infrastructure Symposium, hosted by SAME’s TISP Council along with The Citadel. Now in its seventh year, the Symposium is a collaborative learning community comprised of students, educators, industry practitioners and government officials all engaged in developing strategies and solutions to meet our 21st century infrastructure demands.

This year’s Symposium is being held in Charleston, S.C., which is home to Joint Base Charleston, a key joint service military installation, to the Port of Charleston, a port critical to the economy and national security, and is the site of last fall’s devastating floods, which brought renewed focus to the importance of resilience and critical infrastructure.

For more information on SAME’s TISP Council, visit www.same.org/tisp.

Upcoming 2016 SAME National Events

David Nour Webinar Series: Relationship Economics®
April 12-July 12, 2016 • Virtual Webinar
www.same.org/continuinged

2016 Joint Engineer Training Conference & Expo
May 24-26 • Phoenix, Ariz.
www.same.org/jetc

SAME Post Leaders Workshop
Aug. 28-30 • St. Petersburg, Fla.
www.same.org/postleaders

SAME 2016 Small Business Conference
Nov. 16-18 • Atlanta, Ga.
www.same.org/sbc
Sunday, April 3

5:00 p.m.–7:00 p.m.
Welcome Reception
Emerald Ballroom Salons 1 & 2

Monday, April 4

7:00 a.m.–5:00 p.m.
Registration
Pre-Function

8:00 a.m.–11:00 a.m.
Symposium Workshop: Innovations in Resilience Education
Emerald Ballroom Salons 1 & 2
Facilitator: Christie Jones, George Mason University
This educational workshop will highlight the critical need for experiential learning in resilience education. The first half of the session will focus on the learning experiences of U.S. Air Force Academy cadets working on an engineering project in the Maroon Bells Wilderness in Colorado. During the second half, the audience will “brainstorm” on the 2026 infrastructure environment and what skills employers and students will need in 10 years.

11:00 a.m.–11:30 a.m.
Networking Break
Sponsor and Exhibitor Epicenter

11:30 a.m.–1:00 p.m.
Opening Lunch
Emerald Ballroom Salons 1 & 2

Welcome to the 2016 Critical Infrastructure Symposium
• Brig. Gen. Joe Schroedel, P.E., F.SAME, USA (Ret.), SAME Executive Director
• State of the Infrastructure – 2016
  • Ernie Edgar, P.E., Atkins, and Chair, TISP Council

Growing a Secure Infrastructure – Port of Charleston
• Capt. Gary Tomasulo, USCG, Sector Commander, Coast Guard Sector Charleston
• Lt. Col. Matthew Luzzatto, P.E., PMP, USA, Commander, USACE Charleston District
1:00 p.m.–1:30 p.m.

Networking Break
Sponsor and Exhibitor Epicenter

1:30 p.m.–3:00 p.m.

**TECHNICAL SESSION 1A:**
Transportation Resilience
Yellow Topaz

*Moderator:* Ernie Edgar, P.E., Atkins

*Speakers:*
  *Integrating Transportation Operations Centers, Traffic Management Centers and Intelligent Transportation Systems in Multi-Modal Resilience Analysis and Planning*
  *Redundancy and Resilience: Moving Hazmat by Rail in the 21st Century*
- **Alex Brent Rollins**, The University of Tennessee at Chattanooga
  *Designing Resilient Bridges: Lifecycle Corrosion Modeling Applied to Current Practice*
- **Marc Fialkoff**, Virginia Tech; **Olufemi Omitaomu**, University of Tennessee; and **Steven Peterson** and **Mark Tuttle**, Oak Ridge National Laboratory
  *Impacts of Legal Restrictions on Freight Transportation Routing During Extreme Weather Events*

**TECHNICAL SESSION 1B:**
Critical Infrastructure
Opal 2

*Moderator:* Col. Joe Manous Jr., Ph.D., P.E., FSAME, USA (Ret.), USACE Institute for Water Resources

*Speakers:*
- **John Thomas**, Ph.D. student, and **Thomas Seager**, Ph.D., Arizona State University
  *A Holistic Approach to Critical Infrastructure: Human Resilience and Development in Coupled Social, Ecological, and Technological Systems*
- **David Flanagan**, Ph.D., and **Steven Taylor**, Johns Hopkins University, Applied Physics Laboratory
  *Cyber-Physical Critical Infrastructure Resiliency Analysis*
- **Frédéric Petit**, Ph.D., ABCP, and **Lawrence Paul Lewis**, Argonne National Laboratory
  *Incorporating Logical Dependencies and Interdependencies*
TECHNICAL SESSION 1C:  
Risk, Safety and Planning  
Emerald Ballroom Salon 3  
Moderator: Capt. Len Dillinger, P.E., F.SAME, USN (Ret.), South Carolina State Guard  
Speakers:  
• JD Solomon, P.E., CH2M  
  Why Don’t They Understand?  
  Communicating Risk and Resiliency to  
  Decision-Makers and the Public  
• Lt. Col. Jakob Bruhl, Ph.D., P.E., USA, U.S. Military Academy, and Amit Varma, Ph.D., Purdue University  
  Multi-Hazard Analysis of Steel-Plate Structures  
• David Savarese, Jacobs  
  Leveraging Public and Private Expertise for  
  Pre-Design Resilience Planning  
• Rick White, Ph.D., University of Colorado, Colorado Springs  
  Apples to Apples: Re-Evaluating RAMCAP

TECHNICAL SESSION 1D:  
Electric Grid Resilience  
Crystal Ballroom A  
Moderator: George Baker, James Madison University  
Speakers:  
• Chris Beck, Ph.D., Avi Schnurr and Paul Stockton, Electric Infrastructure Security Council  
  Electric Infrastructure Protection (E-PRO Handbook)  
• Ambassador Henry “Hank” Cooper, High Frontier and Applied Research Associates  
  Strategy to Address Electric Grid Vulnerabilities  
• Thomas Popik, Foundation for Resilient Societies  
• George Baker, Ph.D., James Madison University  
  Wide-Area Effects on the National Electric Grid: Protection and Recovery Issues

* Schedule as of March 23; speakers subject to change.
3:00 p.m.–3:30 p.m.

Networking Break
Sponsor and Exhibitor Epicenter

3:30 p.m.–5:00 p.m.

**TECHNICAL SESSION 2A:**
Wild Card!

*Yellow Topaz*

**Moderator:** Stanley Rader, D.E., P.E., U.S. Air Force Academy

**Speakers:**
- **Steve Coe**, Rosenblum Coe Architects,
  **Dave Crutchfield**, P.E., RMF Engineering, and
  **Paul Wood**, Charleston County, S.C.
  *Enhancing Safety & Security – A Case Study on Charleston County’s Consolidated 911 Call Center and Emergency Operations Center*
- **Kevin Clement**, CEM, TEM, MCP, State of Texas Office of Homeland Security
  *SLTTGCC/RC3 Regional Landscape Study*
  *Evaluation of Terrorist Improvised Nuclear Device Detonation in U.S. Urban Areas*

**TECHNICAL SESSION 2B:**
Infrastructure Protection and Resilience

*Opal 2*

**Moderator:** Christine Jones, George Mason University

**Speakers:**
- **The Honorable William Anderson**
  *The Changing Role of the Military Civil Engineer in the Shadow of the Evolution of the 21st Century Terrorist Threat*
- **Suzanne DiGeronimo**, FAIA, F.SAME, DiGeronimo Architects
  *Retrofit of Existing Homes to be Flood Resilient in New York City and New Jersey*
- **Benga Erinle**, Ultra Electronics, 3eTI
  *Intelligent Monitoring and Control: Essential Guidance for Critical Infrastructure Security*
- **Waheed Uddin**, Ph.D., University of Mississippi
  *Managing Disaster Resilience of City Public Infrastructure Assets*
TECHNICAL SESSION 2C: Utilities Resilience
Emerald Ballroom 3

**Moderator:** Col. Joe Manous Jr., Ph.D., F.SAME, USA (Ret.), USACE Institute for Water Resources

**Speakers:**
- Olufemi Omitaomu, University of Tennessee, Knoxville, and Supriya Chinthavali, Sangkeun Lee, and Sreenivas Sukumar, Oak Ridge National Laboratory
  - Vulnerability Analysis of Linked Electricity Generation and River Basin Systems Using an Integrated Graph Model
- Chad Renshaw, P.E., Stantec
  - Electrical Resiliency – Reliability for Storm Events
- Brian Zapata, Ph.D., P.E.; Zapata Incorporated
  - The Challenges of Implementing NERC CIP14
- Jonathan Raymer, P.E., Underground Solutions Inc.
  - Innovations in Resilient Underground Utility Design and Construction Methods and Materials

TECHNICAL SESSION 2D: Security and Resilience of the Port of Charleston
Crystal Ballroom A

**Moderator:** Col. Ronald Welch, Ph.D., P.E., F.SAME, USA (Ret.), The Citadel

**Panelists:**
- Steve Kemp, South Carolina Ports Authority
- Joanne Fogg, U.S. Customs & Border Protection
- Cdr. Brian Falk, USCG, Coast Guard Sector Charleston
- Tim Fudge, USACE Charleston District
- Maj. Gen. Michael Walsh, USA (Ret.), Dewberry

5:30 p.m.–7:00 p.m.

Plenary Poster Discussion and Networking Reception
Sponsor and Exhibitor Epicenter

**Presenters:**
- Matthew Redington, P.E., HDR Inc.
  - A Hospital Rebuilds After Superstorm Sandy
- Michael Geer, P.E., PMP, U.S. Air Force
  - Determination of Endurance Period for a Large Command and Control Facility
- Todd Gardner, Signals Defense LLC
  - Why Building Shielding?
- R. Brec Wilshusen, P.E., and Jeffrey Alvich, P.E., SAME
  - Omaha Post Practical Physical Protection Measures Applied to Lincoln Public Schools
- David Brannegan, Frédéric Petit, Ph.D., ABCP, and Megan Clifford, Argonne National Laboratory
  - Resilient Infrastructure Initiative
- JD Solomon, P.E., CH2M
  - A New Method for Determining Infrastructure Criticality
Tuesday, April 5

7:00 a.m.–1:00 p.m.

Registration
Pre-Function

7:30 a.m.–8:30 a.m.

Breakfast Presentation:
Reconstruction in Post-Conflict Environments
Emerald Ballroom 1
Speaker:
• Col. Craig Collier, USA (Ret.)
  – Professional Staff Member (Readiness), House Armed Services Committee

Examine what we learned from the reconstruction experience in Iraq. Col. Craig Collier, USA (Ret.), will offer insights from his deployment experiences as well as from his work with the Special Inspector General for Iraq Reconstruction.

8:30 a.m.–9:00 a.m.

Networking Break
Sponsor and Exhibitor Epicenter

9:00 a.m.–10:30 a.m.

TECHNICAL SESSION 3A:
Resilience
Yellow Topaz
Moderator: Frédéric Petit, Ph.D., ABCP, Argonne National Laboratory
Speakers:
• Timothy Brewer and Peter Vonk, Karagozian & Case Inc.
  Integration of Open Source Data Streams, 3-D Modeling, and Analytical Tools to Enhance Infrastructure Resilience and Security
• Jahn Dussich, ITB Inc.
  Enhancing Resiliency Through Sustainability in Remote, Mission-Critical Locations
• Susan Spierre Clark and Thomas Seager, Arizona State University
  A Capabilities Approach to Resilience
• Aerik Carlton, Hinman Consulting Engineers, and Col. Nicholas Goddard, ARNG, Colorado Army National Guard
TECHNICAL SESSION 3B:  
Social and Economic Resilience  
Opal 2  
Moderator: Christy Magee, Department of Homeland Security  
Speakers:  
- Paul Roege, P.E., Creative Erg LLC, James Mancillas, Ph.D., U.S. Army Environmental Command, and Igor Linkov, Ph.D., U.S. Army Engineer Research and Development Center  
  Governance for Resilience  
- Samuel Merrill, Ph.D., GEI Consultants  
  Minimizing the Odds of Overbuilding or Underbuilding in the Face of Extreme Weather Events: A Cumulative Benefit-Cost Framework for Transportation Organizations  
  Bridging the Gap: Social and Economic Resilience between Government Agencies  
- George Huff, The Continuity Project  
  Business Investment: Using Standards to Evaluate the Economics of Community Resilience

TECHNICAL SESSION 3C:  
Collegiate Infrastructure Challenge Presentations  
Blue Topaz  
Moderators:  
- Lt. Col. Steve Hart, Ph.D., P.E., USA (Ret.), Virginia Military Institute  
- Col. Ronald Welch, Ph.D., P.E., F.SAME, USA (Ret.), The Citadel  
Teams:  
- Virginia Military Institute  
- The Citadel  
- U.S. Military Academy  
- U.S. Air Force Academy  
[See pages 12 & 13 for more on the Challenge.]

TECHNICAL SESSION 3D:  
Critical Water Infrastructure: Asset Management Lessons and Challenges  
Crystal Ballroom A  
Moderator: David Wegner, Jacobs Engineering  
Panelists:  
- Bill Brown, Association of State Floodplain Managers  
- Ed Hecker, P.E., USACE Institute for Water Resources  
- Steve Martinko, K&L Gates
10:30 a.m.–11:00 a.m.

Networking Break  
*Sponsor and Exhibitor Epicenter*

11:00 a.m.–12:30 p.m.

**Plenary Session: Practical Community Resilience Program**  
*Crystal Ballroom C/D*  

**Speakers:**
- **David Vaughn**, Integrated Resilience LLC and Clemson University  
- **Ed Hecker**, P.E., USACE Institute for Water Resources

TISP is seeking to improve the disaster resilience of economically disadvantaged communities through the use of current best practice methodologies to inventory, assess, manage, and reduce long-term risk. The primary objectives of the pilot is development of a low-cost execution model that will determine the current resilience of a community, identification of mitigation actions for the study community, establishment of an institutional framework, and delivery of a methodology to Land/Sea Grant Universities for implementation across the nation.

12:45 p.m.–2:15 p.m.

**Closing Lunch with Keynote Speaker: A Risk-Informed View of Critical Infrastructure**  
*Crystal Ballroom C/D*  

**Speaker:**  
- **James Dalton**, P.E., SES, Chief, Engineering & Construction, HQ USACE

Resilience continues to gain momentum as an organizing principle for communities, businesses and governments to identify critical risks and find ways to reduce the chance of loss of life and resources. In the closing Keynote Address, James Dalton, P.E., SES, Chief, Engineering & Construction, HQ USACE, will discuss how the Corps is using a risk-informed view to address changing conditions in order to increase project, system, and community resilience at the national, regional, state and local levels.

3:00 p.m.–6:00 p.m.

**Technical Tour:**  
**Wando Welch Terminal, Port of Charleston**

Wando Welch Terminal has received worldwide acclaim for its innovative design and overall terminal productivity. Opened in 1982, the final stage of terminal construction was completed in the form of a fourth container berth and nearly 90-acres of additional container storage space. At present, it is the Port of Charleston’s largest terminal in terms of volume and physical size.
2016 Collegiate Infrastructure Challenge

The 2nd Annual Collegiate Infrastructure Challenge is a 24-hour student competition that tasks college students from participating universities to work critically, creatively and collaboratively within their teams to conceive a solution to a national infrastructure-related problem.

Last year, five teams were asked to devise the national transportation system of 2025, 2055 and 2115 that effectively and efficiently integrates all transportation modes (Aviation, Highway, Maritime, Pipeline and Railroad) to safely and securely transport people and commerce. The inaugural Collegiate Infrastructure Challenge was won by the team from The Citadel (see page 13 for more information).

2016 Challenge Teams:
  - Virginia Military Institute
  - The Citadel
  - U.S. Military Academy
  - U.S. Air Force Academy

CHALLENGE SCHEDULE

Monday, April 4
8:00 a.m.–Completion
The Challenge (Blue Topaz)

Tuesday, April 5
9:00 a.m.–10:30 a.m.
Challenge Presentations (Blue Topaz) in Technical Session 3C
12:45 p.m.–2:15 p.m.
Winners Announced (Crystal Ballroom C/D) during Closing Lunch

The 2016 Challenge

Building on the great momentum from the inaugural Collegiate Infrastructure Challenge, this year the competition will ask students first to make a choice. For 2016, there will be three exciting challenges presented. Each team will choose one of the challenge options— which will be provided onsite—and then work within their teams to develop a solution they will then present to attendees on day three of the Symposium.

Presentations

On Tuesday morning in Technical Session 3C, each team will present their proposals for the Challenge. Each team is asked to submit and present:
1. An eight-minute presentation with time for Q&A during the session;
2. 2,000-3,000 word article that explains and justifies their answer (what it is and why it is right); and
3. Either a one-minute information video that advocates the concept or a one-slide “advertisement” that advocates for the concept.

Evaluation

Each submission will be evaluated by subject matter experts using the following judging criteria:
1. Innovation: Is the solution a game changer?
2. Suitable: Does the solution solve the problem?
3. Feasible: Can the solution actually be reasonably implemented?
4. Acceptable: Can society live with the costs associated with the solution?
5. Complete: Have all aspects of the solution been addressed: (political, social, economic, information, and infrastructure)?
In the 2015 Challenge, The Citadel team looked at how existing infrastructure can be enhanced while new technology, and human acceptance of such technology, evolves over the next century.

Initially, the team examined our highway system and envisioned a median raised tram system with cargo transport lanes by 2055. By 2115, the ideal system would consist of outer commuter lanes and raised restricted freight lanes with suspended electric commuter trams. For railroad, the integrated solution by 2055 would employ a series of high speed (upwards of 300-mph) electric freight train lines connecting distant regions of the country under non-stop service. A non-stop approach will provide sufficient distance to slowly and efficiently accelerate to high speeds while hauling large loads. Slowing down over a long distance using regenerative electric braking would greatly increase the efficiency of the train. Using high speed electric passenger trains to ride these same prefabricated freight lines to efficiently transport American’s to and from distant cities will relieve some of the strain being felt by the interstate highways and airports. Shipping private vehicles with the passenger train, a practice already being performed, would further increase the allure of this nostalgic mode of transport. For maritime transportation, by 2055, to eliminate the need for extreme dredging, reduce the required size of bridges, and allow for more efficient use of security forces, large, modulated blue Water cargo ships should be built. Acting more as a collection of barge modules linked together being propelled by one or more engine craft this would be the train (albeit a wide one) of the ocean. As this mother ship of container barges sets anchor just outside of a harbor, Small tug-like boats attach to the barge segments ready for transport. By 2115, the propelling vessels may even take advantage of nuclear power through the use of reactors to provide the heat necessary to power steam propulsion plants.

Regarding aviation, as the public becomes more familiar and comfortable around automated vehicles, planes will follow efficient, dynamic flight plans coordinated electronically. To ease concerns over the automation a pilot will still be present to take manual control in the event of a malfunction. After automated flight has proven to be reliable, in 2115, planes will be flown exclusively by a computer. Ground control will maintain the ability to override the computer and take control of the plane in the event of abnormal flight behavior. Ultimately, UAVs have the potential to turn inner-city transportation from a congested, inefficient 2D structure to a fast, short distance, complex, 3D System. After public familiarity has grown and drones are seen as reliable and safe, and once models capable of hauling payloads around 200-lb are economical and small enough, short-range personal travel can begin.

Adapted from The Citadel team’s Integrated Transportation Solution (CIS, 2015)—by Chris Eastwood, Jason Shea, Daniel Hess, Daniel McCullough, and Zachary Peters.
SAVE THE DATE
SAME 2016
Small Business Conference
November 16-18, 2016 | Atlanta, Ga.