

## MONDAY, OCTOBER 18 (Pre-Symposium Workshops)

<b>10:45 – 11:00 ET</b>	Welcome – Ethan Huffman		
<b>11:00 – 12:30 ET</b>	<b>SESSION 1</b>		
<b>TRACK 1:</b> <i>Societal Benefits of Resilience/What does Resilience Mean to you</i> <u>Chair</u> Bobby Jeffers, SNL  <u>Presenters</u> Amanda Wachtel, SNL Susan Spierre-Clark, U Buffalo Pete Larsen, LBNL	<b>TRACK 2:</b> <i>Community &amp; Infrastructure Modeling Tools: Interdependent Networked Community Resilience Modeling Environment (IN-CORE)</i>  <u>Chairs</u> Stephanie Pilkington, UNCC; Craig Rieger, INL; Kevin Schultz, JHUAPL; Tim McJunkin INL; Char Sample, MTSI  <u>Presenter</u> Jong Sung Lee, U. Ill. UC	<b>TRACK 3:</b> <i>Power Grid Resilience: Needs and challenges</i>  <u>Chairs</u> Mohammed Ben-Idris, UNR Anurag Srivastava, WVU  <u>Presenters</u> Alireza Ghassemian, DOE Aranya Chakraborty, NSF	
<b>12:30-1:30 ET</b>	Lunch Break		
<b>1:30 – 3:00 ET</b>	<b>SESSION 2</b>		
<b>TRACK 1:</b> <i>The Heat is on – An Interactive Cyber Exercise</i>  <u>Presenters</u> Kimberly Denbow, AGA Jon Monken, Converge Strategies	<b>TRACK 2:</b> <i>Community &amp; Infrastructure Modeling Tools: All Hazards Analysis</i>  <u>Presenter</u> Ryan Hruska, INL	<b>TRACK 3:</b> <i>Power Grid Resilience: Definitions, metrics, and tools</i>  <u>Presenters</u> Aleksandar Stanković, Tufts Univ. Jay Liu, PJM Gary Huffman, Burns & MC & ComEd. Mohammed Ben-Idris, UNR Mathios Pantelli, Univ. of Cyprus Anurag Srivastava, WVU	
<b>3:00 – 4:30 ET</b>	<b>SESSION 3</b>		
<b>TRACK 1:</b> <i>DOE GMLC Resilient Distribution Systems (RDS) Projects – What we learned and what’s next</i>  <u>Moderators</u> Abraham Ellis, Sandia Emma Stewart, NRECA  <u>Panelists</u> Clay Koplín, CEC Kevin Schneider, PNNL David Lovelady, National Grid	<b>TRACK 2:</b> <i>Community &amp; Infrastructure Resilience Modeling and Simulation Needs/Challenges</i>  <u>Moderator</u> Stephanie Pilkington, UNCC  <u>Panelists</u> Ryan Hruska, INL Jamie Kruse, East Carolina U Thomas Overby, Texas A&M John Van de Lindt, CSU	<b>TRACK 3:</b> <i>Gaining Consensus on Power Grid Resilience Metrics (brainstorming)</i>  <u>Presenters</u> Anuradha Annaswamy, MIT Chris Dent, Univ. of Edinburgh Svetlana Ekisheva, NERC	
<b>4:30-6:00 ET</b>	<b>SESSION 4</b>		
<b>TRACK 1:</b> <i>Domain Components of the Impending Cyber-Physical Energy System Transformation</i>  <u>Chair</u> Paul Roege, Typhoon-HIL  <u>Presenters</u> Rob Hovsopian, NREL Charles Forsberg, MIT Sarah Davis, SRD Consulting	<b>TRACK 2:</b> <i>IN-CORE and AHA Interactive Session</i>  <u>Presenters</u> Ryan Hruska, INL Jong Su Lee, U. Ill. UC	<b>TRACK 3:</b> <i>Tools for Enabling Power Grid Resilience (Brainstorming)</i>  <u>Presenters</u> Marija lic, MIT Michael Legatt, ResilientGrid	

## TUESDAY, OCTOBER 19 (FED Day)

10:45-11:00 ET	Welcome – Ethan Huffman		
11:00 – 12:30 ET	<p><b>Resilience Week Welcome</b> – Senator Jim Risch</p> <p><b>Plenary Speaker 1</b> – Craig Rieger, INL/N&amp;HS Directorate Fellow, <i>Foundations of Resilience: Transformation of Cross-Disciplinary Collaboration in Dialogue</i></p> <p><b>Plenary Speaker 2</b> – Ron Fisher, Director Infrastructure Assurance and Analysis Division, INL; Director INL Resilience Optimization Center, <i>Building a Resilient Nation</i></p> <p><b>Plenary Speaker 3</b> – David Woods, Past-President Resilience Engineering Association and The Ohio State University, <i>A look back: Progress in Resilience Engineering; A look forward: Prospects for Outmaneuvering Complexity Penalties</i></p>		
12:30-12:45 ET	Break		
12:45 – 2:15 ET	<b>SESSION 1</b>		
	<p><b>TRACK 1: Energy Efficiency and Renewable Energy Resilience Thrusts</b> WETO/SETO/WPTO</p> <p><u>Chair</u> Tim McJunkin, INL</p> <p><u>Panelists</u> David Walter, Solar Energy Ben Ollis, ORNL Hill Balliet, Water Power Abhishek Somani, PNNL Bret Barker, Wind Energy Megan Culler, INL</p> <p><u>Moderator</u> Brian Seal, EPRI</p>	<p><b>TRACK 2: National Efforts to Establish a Secure &amp; Resilient Cybersecurity Supply Chain</b></p> <p><u>Chair</u> Wayne Austad, INL</p> <p><u>Presenters</u> Howard Grimes, CyManII Greg Shannon, CyManII Cheri Caddy, DOE-CESER Virginia Wright, INL Allan Friedman, DHS/CISA</p>	<p><b>TRACK 3: Cyber City: A Platform for Researching Critical Infrastructure Resilience</b></p> <p><u>Presenter</u> Candice Mitchell, US Army Corps of Engineers</p>
2:15 – 2:30 ET	Lunch Break		
2:45 – 3:45 ET	<b>SESSION 2</b>		
	<p><b>TRACK 1: Challenges and opportunities for resilient and sustainable energy transition in rural and island communities</b></p> <p><u>Moderator</u> Abraham Ellis, Sandia</p> <p><u>Panelists</u> Aaron Ng, DOE ETI Program Mark Glick, HNEI Erin Whitney, AECF Rob Cox, Coastal Studies Institute</p>	<p><b>TRACK 2: DOD Achieving Resilience for Control Systems Across Government-owned and Commercially-owned Assets</b></p> <p><u>Moderator</u> Aleksandra Scalco, US Navy</p> <p><u>Panelists</u> Michael Dransfield, NSA Daryl Haegley, OSD Policy Sandra Kline, ASN EIE Michael Kilcoyne, NAVFAC DCIO/CTWH Steve Simske, Colorado State University</p>	<p><b>TRACK 3: The National Cybersecurity Workforce Development Program: An Innovative and Scalable Framework to Expand the Critical Infrastructure Security Human Capital</b></p> <p><u>Moderator</u> Eman El-Sheikh, Univ. of West FL</p> <p><u>Panelists</u> Diane M. Janosek, NSA Eman El-Sheikh, Univ. of West FL Dipankar Dasgupta, Univ. of Memphis Art Conklin, Univ. of Houston</p>
3:45 – 4:00 ET	Break		
4:00 – 5:00 ET	<b>SESSION 3</b>		

<p><b>TRACK 1:</b> <i>Prognostic sensing and modeling for resilient management of extreme events</i></p> <p><u>Chairs</u>          Kris Villez, ORNL          Abraham Ellis, Sandia          Tim McJunkin, INL</p> <p><u>Presenters</u>          Suzanne Groneman, City of Reno NV          Ben Jenkins, Idaho Falls Power          Mohammed Ben-Idris, Univ. of NV</p>	<p><b>TRACK 2:</b> <i>DoD -All Hazards Analysis (AHA) presented with the Army Cyber Institute (ACI)</i></p> <p><u>Chair</u>          Tim Klett, INL</p> <p><u>Presenter</u>          MAJ Steven Whitham, ACI</p>	<p><b>TRACK 3:</b> <i>Cybersecurity Workforce Development for Rural Distribution Utilities: Challenges and Solutions</i></p> <p><u>Moderators</u>          Abraham Ellis, Sandia          Emma Stewart, NRECA</p> <p><u>Panelists</u>          Olga Lavrova, NNMSU          Delaine Orendorff, NRECA</p>
<p><b>5:00 – 5:15 ET</b></p>	<p>Break</p>	
<p><b>5:15 – 6:15 ET</b></p>	<p><b>Research Poster Presentations</b>  <i>*Note: The authors will formally present their posters at the times listed, however they will be available to chat for the entire hour.</i></p> <p><u>Posters</u></p> <ul style="list-style-type: none"> <li>• 5:15 - <i>Extensive resilience analysis of function models of complex systems</i>, Yann Guillouet, German Aerospace</li> <li>• 5:20 - <i>Cyber-Physical Security Assessment and Resilience of a Microgrid Testbed</i>, Theron Beam, BSU</li> <li>• 5:25 - <i>COVID Response: A Blended Approach to Studying Sanitizer Station Deployment at Clemson University</i>, Tyler O'Brien, Clemson University</li> <li>• 5:30 - <i>A Co-Simulation Approach to Modeling Electric Vehicle Impacts on Distribution Feeders During Resilience Events</i>, Thad Haines, Sandia</li> <li>• 5:35 - <i>Enhancing the Operational Resilience of Advanced Reactors with Digital Twins by Recurrent Neural Networks</i>, Linyu Lin, INL</li> <li>• 5:40 - <i>Design of Resilient Electric Distribution Systems for Remote Communities: Surgical Load Management using Smart Meters</i>, Mayank Panwar, NREL</li> <li>• 5:45 - <i>Applying Utility's Advanced Grid Technologies to Improve Resiliency of a Critical Load</i>, Charlie Vartanian, PNNL</li> <li>• 5:50 - <i>A Deep-Defense Approach for Next-Gen Cyber-Resilient Inter-Dependent Critical Infrastructure Systems</i>, Eman Hammad, Texas AM U - Commerce</li> </ul>	
<p><b>WEDNESDAY, OCTOBER 20 (Research Day)</b></p>		
<p><b>10:45-11:00 ET</b></p>	<p>Welcome – Ethan Huffman          Best Papers Announcement</p>	
<p><b>11:00 – 12:30 ET</b></p>	<p><b>Plenary Speaker:</b> <i>Energy Equity and Economic Development Opportunities on the Path to Zero Carbon</i>  <u>Interviewer</u>          Andrew McIlroy, ALD for Energy and Homeland Security, Sandia National Laboratories</p> <p><u>Speaker</u>          Kate Gordon, Senior Advisor to Secretary of Energy</p> <p><b>Plenary Panel:</b> <i>How do we maintain or even improve resilience in the drive towards Net-zero carbon</i>  <u>Moderator</u>          Amy Myers Jaffe, Managing Director of the Climate Policy Lab at The Fletcher School at Tufts University</p> <p><u>Panelists</u>          Michael Pesin Deputy Assistant Secretary for the Advanced Grid Research and Development Division, OE          Alice Caponiti, Deputy Assistant Secretary for Reactor Fleet and Advanced Reactor Deployment, NE          Alejandro Moreno, Deputy Assistant Secretary for Renewable Power, EERE</p>	
<p><b>12:30-12:45 ET</b></p>	<p>Break</p>	
<p><b>12:45 – 2:15 ET</b></p>	<p><b>SESSION 1</b></p>	

<b>TRACK 1: Autonomous Intelligence for Cyber-Defense Agents</b> <u>Moderator</u> Nate Evans, ANL  <u>Presenters</u> Nate Evans, ANL Ben Blakely, Dwolla Paul Theorn, Thales S. Jay Lang, RIT Venkatramanan Subrahmanian, Northwestern Martin Drasar, Masaryk University		<b>TRACK 2: Future Challenges in Human-Technology Integration: A Sponsor's Perspective</b> <u>Chairs</u> Katya Le Blanc, INL; Corey Fallon, PNNL  <u>Presenters</u> Alexandra Medina-borja, NSF Sandra Jenkins, DOE OE Leslie Blaha, AFOSR		<b>TRACK 3: Convergence of Resilience and Equity</b> <u>Moderator</u> Bobby Jeffers, Sandia  <u>Panelists</u> Rosanne Ratkiewich, CPUC Shay Bahramirad, Quanta Technology Adaora Ifebigh, NRECA Kyle Spencer, City of Norfolk	
2:15-2:45 ET	Lunch Break				
2:45-3:45 ET	<b>SESSION 2</b>				
<b>TRACK 1: Cognitive Systems Papers</b> <u>Chairs</u> Nathan Lau, VT; Katya Le Blanc, INL; Corey Fallon, PNNL  <ul style="list-style-type: none"> <li>• <i>A Methodology for Assessing Risk to Inform Technology Integration</i>, Corey Fallon, PNNL</li> <li>• <i>Exploration of Time-Based Resilience Measurements for Next Generation Combat Vehicle Teams</i>, Hudson Graham, ASU</li> </ul>		<b>TRACK 2: Cyber System Papers</b> <u>Chairs</u> Nate Evans, ANL; David Manz, PNNL; Char Sample, MTSI  <ul style="list-style-type: none"> <li>• <i>Continuous Infrastructure Assessment for Key Business Functions in Changing Environments</i>, Gabriel Weaver, UIUC</li> <li>• <i>A Cyber-Resilience Risk Management Architecture for Distributed Wind</i>, Megan Culler, INL</li> <li>• <i>Digital data provenance for the power grid based on a Keyless Infrastructure Security Solution</i>, Sri Nikhil Gupta Gourisetti, PNNL</li> <li>• <i>Leveraging STIX for Actionable Intelligence and Automated Response</i>, Christian Hunt, CSSRT</li> </ul>		<b>TRACK 3: Community/Infrastructure Papers</b> <u>Chairs</u> Raymond Byrne, Abraham Ellis, SNL; Stephanie Pilkington, UNCC  <ul style="list-style-type: none"> <li>• <i>Refueling Delay Models in Heterogenous Road Networks for Wireless Communications Base Station Gensets Operating in Extreme Conditions</i>, Vaidyanathan Krishnamurthy, UTA</li> <li>• <i>Statistical Evaluation of Flooding Impact on Power System Restoration Following a Hurricane</i>, Grant Cruse, UPitt</li> <li>• <i>Quantifying Resilience Value of Solar plus Storage in City of Reno</i>, Mohammed Ben Idris, UNR</li> <li>• <i>Resilient Recovery Features of Offshore Wind Farm with Maintenance Service</i>, Bartosz Skobie, GAC</li> </ul>	
3:45-4:00 ET	Break				
4:00-5:00 ET	<b>SESSION 3</b>				
<b>TRACK 1: Control Systems Papers</b> <u>Chairs</u> Kris Villez, ORNL; Quanyan Zhu, NYU; Kevin Schultz, JHUAPL  <ul style="list-style-type: none"> <li>• <i>Novel Data Driven Noise Emulation Framework using Deep Neural Network for Generating Synthetic PMU Measurements</i>, Sri Nikhil Gupta, Gourisetti, PNNL</li> <li>• <i>Automatic Drift Correction through Nonlinear Sensing</i>, Kris Villez, ORNL</li> </ul>		<b>TRACK 2: Cyber Systems Papers</b> <u>Chairs</u> Nate Evans, ANL; David Manz, PNNL; Char Sample, DoD  <ul style="list-style-type: none"> <li>• <i>Chaos Engineering for Enhanced Resilience of Cyber-Physical Systems</i>, Charalambos Konstantinou, KAUST</li> <li>• <i>Data-Driven Suitability Analysis to Enable Machine Learning Explainability and Security</i>, Shaya Wolf, INL</li> </ul>		<b>TRACK 3: Communications Crossover Papers</b> <u>Chairs</u> Eyuphan Bulut, VCU; Kemal Akkaya, FIU; Brad Nelson, INL  <ul style="list-style-type: none"> <li>• <i>Modular Network Stacks in the Real-Time Executive for Multiprocessor Systems</i>, Vijay Banerjee, UC, Colorado Springs</li> <li>• <i>Analyzing Implicit Interactions to Identify Weak Points in Cyber-Physical System Designs</i>, Jason Jaskolka, CU</li> </ul>	

# Resilience Week 2021

<ul style="list-style-type: none"> <li>• <i>Adaptive, Cyber-Physical Special Protection Schemes to Defend the Electric Grid Against Predictable and Unpredictable Disturbances</i>, Shamina Hossain-McKenzie, SNL</li> <li>• <i>Hierarchical Operation of Flexible Building Microgrids for Distributed Critical Loads Resiliency</i>, Manohar Chamana, TT</li> </ul>	<ul style="list-style-type: none"> <li>• <i>On the Limits of EM Based Detection of Control Logic Injection Attacks In Noisy Environments</i>, Konstantinos Kolia, UI</li> <li>• <i>Infrastructure eXpression for Codified Cyber Attack Surfaces and Automated Applicability</i>, Rita Foster, INL</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Cyber Senses: Modeling Network Situational Awareness after Biology</i>, Benjamin Blakely, ANL</li> </ul>
5:00 – 5:15 ET	Break	
5:15-6:15 ET	<b>SESSION 4</b>	
<p><b>TRACK 1:</b> <i>Supply Chain Security for Industrial Control Systems</i></p> <p><u>Moderator</u> Quanyan Zhu, NYU</p> <p><u>Presenters</u> Jennifer Pederson, CISA Charmaine Sample, MTSI Sachin Schetty, Old Dominion University Junaid Farooq, University of Michigan</p>	<p><b>TRACK 2:</b> <i>Secure and Resilient Wireless Communications for Distributed Electric Grid Operations, 5G Capabilities</i></p> <p><u>Presenters</u> Brad Nelson, INL Daniel Bennett, NREL MD Touhiduzzaman, NREL James Ogle, PNNL</p>	<p><b>TRACK 3:</b> <i>"Homeland" Critical Infrastructure Resiliency Tabletop Exercise</i></p> <p><u>Moderator</u> Kendall Bean, Univ of Idaho</p> <p><u>Presenters</u> Chandler Bean, BYU-I Michael Haney, U of Idaho David Oliver, INL</p>
<b>THURSDAY, OCTOBER 21 (Hot Topic Day)</b>		
10:45-11:00 ET	Welcome – Ethan Huffman	
11:00 – 12:30 ET	<p><b>Plenary Panel – Policies and Priorities to Advance Cyber Resilience in Critical Facilities and Infrastructures</b></p> <p><u>Moderator</u> Zach Tudor, INL N&amp;HS Associate Laboratory Director</p> <p><u>Panelists</u> Sudha Vyas, DOD CIO Chief Architect Puesh Kumar, DOE CESER Acting Principal Deputy Assistant Secretary David Mussington, Executive AD Infrastructure Security Division (ISD) within CISA</p>	
12:30-12:45 ET	Break	
12:45 – 2:15 ET	<b>SESSION 1</b>	
<p><b>TRACK 1:</b> <i>Is Mission Decomposition the Key to Unlocking Energy Resilience?</i></p> <p><u>Presenter</u> Jonathon Monken, Converge Strategies</p>	<p><b>TRACK 2:</b> <i>Artificial intelligence and Machine Learning</i></p> <p><u>Presenters</u> Char Sample, MTSI James LaRue, Mantech / USMC</p>	<p><b>TRACK 3:</b> <i>Applying Advanced Grid Technologies for Improving Resiliency of Critical Loads</i></p> <p><u>Moderator</u> Charlie Vartanian, PNNL</p> <p><u>Presenters</u> Clay Koplin, Cordova Electric Cooperative Dan Borneo and Waylon Clark, Sandia Lauren Khair, NRECA Frank Tuffner and Jeremy Twitchell, PNNL</p>
2:15 – 2:45 ET	Lunch Break	
2:45-3:45 ET	<b>SESSION 2</b>	

# Resilience Week 2021

<b>TRACK 1: <i>Protecting Energy Infrastructures from Climate Physical Risks, Sorted by Consequence</i></b>  <u>Presenters</u> Andy Bochman, INL Gavin Hawkley, INL Ryan Cobey, INL Emma Banks, INL			<b>TRACK 3: <i>Commercial Routing Assistance (CRA) capability with the CISA Integrated Operations Division (IOD) and All Hazards Consortium (AHC)</i></b>  <u>Chair</u> Tim Klett, INL  <u>Presenter</u> Gregory McShane, IOD, CISA
<b>3:45 – 4:00 ET</b>	Break		
<b>4:00 – 5:00 ET</b>	<b>SESSION 3</b>		
<b>TRACK 1: <i>Water and the Built Environment</i></b>  <u>Chairs</u> Irene Susini, Frontiers Media Auroop Ganguly, Northeastern  <u>Presenters</u> Auroop Ganguly, Northeastern Poulomi Ganguli, Indian I-Tech. Kharagpur Kalyan Piratla, Clemson University Murty Bhallamudi, Indian I-Tech. Madras Julia Hopkins, Northeastern Samrat Chatterjee, PNNL (DOE)	<b>TRACK 2: <i>Structured Threat Intelligence Graph Case Studies and Use</i></b>  <u>Chair</u> Nate Evans, ANL  <u>Presenters</u> Rita Foster, INL Robert Timpany, INL Maurice Martin, NREL Steve Granda, NREL Andrew Hahn, SNL Daniel Harkness, ANL Clarisse Kim, ANL	<b>TRACK 3: <i>Electric Vehicle and Grid Integration: Tools for a Resilient Electrified Transportation Future</i></b>  <u>Presenters</u> Tim Pennington, INL Lee Slezak, Vehicle Grid Integration Brendan Casey, DoN NAVFAC	
<b>5:00 – 5:15 ET</b>	Break		
<b>5:15 – 6:15 ET</b>	<b>SESSION 4</b>		
<b>TRACK 1: <i>American Water Works Association and West Yost: How Consequence-driven Cyber-informed Engineering (CCE) helped us to be more Resilient</i></b>  <u>Moderator</u> Tim Klett, INL  <u>Presenter</u> Andy Ohrt – West Yost Associates	<b>TRACK 2: <i>Digital Twins a New Frontier in Critical Infrastructure Protection</i></b>  <u>Presenters</u> Nii Attoh-Okine, Univ of Delaware John Sobanjo, Florida State University Hubo Cai, Purdue University	<b>TRACK 3: <i>Learning Large-Scale Real-World Data for Characterizing and Improving Energy System Resilience</i></b>  <u>Presenters</u> Feng Qiu, ANL Alinson Xavier, ANL Rui Yao, ANL	