MONDAY, OCTOBER 19

10:00 – 2:00	INVITED SESSIONS OR TUTORIALS ON NEW TOPICS OR PROGRAMS	
TRACK 1: EMP/GMD Challenges and Research	TRACK 2: Enabling Safe Operation of Energy Storage Systems for Enhanced Resilience	TRACK 3: Resilient Artificial Intelligence
Chair: Jesse Reeves (INL) **Speakers** ▪ LtCol Stamper (USAF) ▪ John Ostrich (DOE) ▪ Tim Carty (EMP Shield)	**Chairs:** Yuliya Preger (SNL), Imre Gyuk (DOE) **Speakers** ▪ Imre Gyuk (DOE-OE) ▪ Loraine Torres-Castro (SNL) ▪ David Rosewater (SNL) ▪ Chris Searles (BAE Batteries) ▪ Richard Fioravanti (Quanta Tech.) ▪ Pete Jackson (City of Bakersfield) ▪ Michael Bobker (City U of NY) ▪ Paul Rogers (PGR Group)	**Chair:** Char Sample (INL) **Speakers** ▪ Diana Kelley (Microsoft) ▪ Robinson Pino (DOE) ▪ Andrew Lea (HelloDone.ai) ▪ Matt Bishop (UC Davis)

TUESDAY, OCTOBER 20

10:20 – 10:30	RESILIENCE WEEK WELCOME: Congressman Chris Stewart (UT-02) *Introduction by: Dan Elmore, Idaho National Laboratory*		
10:30 – 11:30	INDUSTRY PLENARY PANEL: Utility Resilience – Preparedness & Response to COVID-19 and Weather-related Seasonal Events MODERATOR: Sharla Artz, Sr VP. Gov't & External Affairs (Utilities Technology Council) PANELISTS: Jamey Sample, VP CSO (Xcel Energy) Kimberly Denbow, Managing Director, Security & Operations (American Gas Association) Laura Schepis, Sr Dir, National Security (Edison Electric Institute)		
11:30 – 12:30	SESSION 1		
TRACK 1: DOE-OE: Transmission Resilience Maturity Model (TRMM)	TRACK 2: DOE-CESER: Cyber Informed Engineering	TRACK 3: Infrastructure Student Competition TED Talks **11:30-1:00	TRACK 4: Workforce and Career Development in Cyber Security and Resilience of Critical Infrastructure
Chair: David Meyer (DOE-OE) **Presenters** ▪ Lynna Estep (NATF) ▪ Nick Koehler (AEP) ▪ Adrienne Lotto (NYPA) ▪ Cliff Glantz (PNNL)	**Chairs:** Kate Marks (DOE), Ginger Wright (INL) **Presenters** ▪ Ginger Wright (INL) ▪ Cheri Caddy (DOE)	**Chairs:** Cherrie Black (INL), John Hummel (ANL), Frederic Petit (ANL) **Presenters** ▪ *Committee on National Security Systems (CNSS) Overlay Use for Context-Sensitive Critical Infrastructure Dynamic Classes (CS-CIDC)*, Aleksandra Scalco (CSU) ▪ *Resilience on the Periphery: Understanding the Impacts of Population Displacement on Infrastructure Systems beyond the Disaster Zone*, Glenn Voelz (UofW)	**Moderator:** David Manz (PNNL) **Panelists** ▪ Victor Atkins (DOE) ▪ Mason Rice (ORNL)

		Overhead versus Underground: Designing Power Lines for Resilient, Cost-Effective Power Systems under Windstorms, Laiz Souto (UdeG) *Modeling Assertions for Expanding Complexity in Infrastructure Resilience Simulation*, Craig Poulin (NU) *Using Python's pywr package to Increase AHA's Resilience Modeling Capabilities*, Chase Christen (BSU) *RMDT: Resiliency Monitoring and Decision-Support Tool for Distribution During a Pandemic*, Gowtham Kandaperumal (WSU)

12:30 – 1:00	BREAK
1:00 – 2:00	SESSION 2

TRACK 1: Energy Sector, Resilient Communications for Critical Infrastructure	TRACK 2: GMLC PANEL: The Role of Microgrids: Different Topologies in Different Environments	TRACK 3: Workforce Development for Grid Resilience
Chair: Brad Nelson (INL) Panelists - Alberto Lopez (CenterPoint Energy) - Chris Irwin (DOE-OE) - Chloe Applegate (LLNL)	**Chair:** Kevin Lynn (EERE-DOE) Panelists - Emma Stewart (LLNL) - Kevin Schneider (PNNL) - Rob Hovsapien (NREL)	**Chairs:** Masood Parvania (UU), David Manz (PNNL), Nate Evans (ANL) Speakers - Masood Parvania (UofU), *Cyber-Physical System Resilience Testbed for Resilience Education and Workforce Development* - Nathan Johnson (ASU), *Resilience with a Return on Investment* - Haibo He (UofRI), *Smart Grid Security and Resilience Through Workforce Development*

2:00 – 3:00	PLENARY PANEL: Cross-Cutting Initiatives at DOE <u>MODERATOR</u>: Kevin Lynn (EERE-DOE) <u>PANELISTS:</u> David Solan, Deputy Assistant Secretary for Renewable Power (EERE) Michael Pesin, Deputy Assistant Secretary for Advanced Grid Research and Development (OE)
3:30 – 5:30	MULTIPLE PARALLEL ACTIVITIES

Paper poster presentations	Exhibitor Hall

WEDNESDAY, OCTOBER 21

9:40 – 10:00	**BEST PAPERS AND STUDENT COMPETITION WINNERS** *Announced by Craig Rieger (INL) and Cherrie Black (INL)*
10:00 – 11:00	**OIL & NATURAL GAS CYBER R&D PLENARY PANEL** MODERATOR: Al Rivero, VP Global Energy (Rajant Corporation) PANELISTS: Qinghua Li, Associate Professor, Department of Computer Science and Computer Engineering (University of Arkansas) Mikhail Falkovich, Director, Information Security (Consolidated Edison Company of New York, Inc.) Niyo Little Thunder Pearson, Sr., CISSP, CCSP, Supervisor, Cybersecurity/Cyber Operations (ONE Gas) Edward Chiu, Cybersecurity Strategist (Chevron Corp.)
11:00 – 12:00	**SESSION 1**

TRACK 1: DOE Solar & Wind Energy Collaborative Resilience Research Projects	TRACK 2: Risk Informing Cybersecurity Defenses for Nuclear Energy	TRACK 3: Infrastructure Keynote Panel – Dominion Energy Pandemic Planning and Response
Chairs: David Walter (DOE), Bret Barker (DOE) **Speakers** ▪ Vahan Gevorgian (NREL), *Flexible PV-Wind-Storage Hybrid Generation* ▪ Jay Johnson (SNL), *Roadmap for Solar Cybersecurity* ▪ Jake Gentle (INL), *Roadmap for Wind Cybersecurity*	**Chairs:** Tim McJunkin (INL), Katya Le Blanc (INL), Lon Dawson (SNL) **Moderators** ▪ Richard Mogavero (NEI) ▪ Bill Gross (NEI) **Panelists** ▪ Mike Rowland (SNL) ▪ Chris Lamb (SNL) ▪ Shannon Eggers (INL) ▪ Katya Le Blanc (INL) ▪ Arup Bhuyan (INL)	**Chairs:** Cherrie Black (INL), John Hummel (ANL), Frederic Petit (ANL) **Panelists** ▪ Simon Hodges, Chief Risk Officer/VP Strategic Planning ▪ Jonathan Bransky, Director Threat Intelligence (External Teams) ▪ Lauren Shrader, Strategic Risk Management Coordinator (Operations) ▪ John Larson, Director Public Policy (HR/Personnel) ▪ Scott Hansen, Director of Strategic Risk Management

12:00 – 12:30	**BREAK**
12:30 – 1:30	**SESSION 2**

TRACK 1: DOE Solar & Wind Energy Resilience Research Projects	TRACK 2: Averting a Disaster Within the Disaster: Effective Resilience Planning for Energy Emergency Management	TRACK 3: COVID-19 – Infrastructure Owners and Operators Perspective
Chairs: David Walter (DOE), Bret Barker (DOE) **Speakers** ▪ Ulrich Muenz (Siemens), *AURORA ASSIST Project* ▪ Jairo Giraldo (UofU), *SolarSTARTS ASSIST Project* ▪ Brian Naughton (SNL), *Defense and Disaster Deployable Turbine (D3T) Project* ▪ Anne Kimber (ISU), *Optimal Operation and Impact Assessment of Distributed Wind for Improving Efficiency and Resilience of Rural Electricity Systems WIRED Project*	**Chairs:** Jonathon Monken (Converge Strategies), Abraham Ellis (SNL) **Panelists** ▪ Virginia Castro (DOE State Program Office) ▪ Eliza Hotchkiss (NREL)	**Chairs:** Cherrie Black (INL), John Hummel (ANL), Frederic Petit (ANL) **Panelists** ▪ MODERATOR: Matt Beaudry, Utah Public-Private Partnership (Utah Division of Emergency Management) ▪ Simon Hodges, Chief Risk Officer (Dominion Energy) ▪ Jeff King, Security and Emergency Response Coordinator (Jordan Valley Water Conservancy District) ▪ Phil Solomon, VP and Chief Engineer (Deseret Power) ▪ Ben Hart, Deputy Director (Utah Governor's Office of Economic Development)

1:30 – 2:30	SESSION 3	
TRACK 1: Cyber Resilience Papers		**TRACK 2: Defense Community**
Chairs: David Manz (PNNL), Char Sample (INL), Nate Evans (ANL) Presenters *A Novel Architecture for Attack-Resilient Wide-Area Protection and Control System in Smart Grid,* Vivek-Kumar Singh (ISU) ** *Resilient Data: An Interdisciplinary Approach*, Char Sample (INL) *Cyber Threat Dictionary Using MITRE ATT&CK Matrix and NIST Cybersecurity Framework Mapping*, Roger Kwon (PNNL) *Is Blockchain a suitable technology for ensuring the integrity of data shared by lighting and other building systems?*, Michael Poplawski (PNNL)		Chairs: Abraham Ellis (SNL), Emma Stewart (LLNL) Panelists - Stephanie Kline (DoD Army Corps of Engineers) - Arthur Lord (DoD, Office of the Secretary of Defense) - Michael Wu (Converge Strategies) - Dan Ton (DOE-OE)

2:30 – 3:30	SESSION 4	
TRACK 1: Cyber Resilience Papers	**TRACK 2: Modeling the Disaster Timeline**	**TRACK 3: Infrastructure TED Talks**
Chairs: David Manz (PNNL), Char Sample (INL), Nate Evans (ANL) Presenters *A Cyber Resilient Design for Control Systems*, Craig Rieger (INL) *Cyber-Physical Architecture for Automated Responses (CyPhAAR) Using SDN in Adversarial OT Environments*, Javier Grandio (VCU) *Next-Generation CPS Testbed-based Grid Exercise - Synthetic Grid, Attack, and Defense Modeling*, Gelli Ravikumar (ISU) *D-IDS for Cyber-Physical DER Modbus System -- Architecture, Modeling, Testbed-based Evaluation*, Gelli Ravikumar (ISU)	Chairs: Ray Byrne (SNL), Elaina Sutley (KU) Speakers - Andrea Staid (SNL), *Threat modeling for multi-sector resilience analysis* - Brian Pierre (SNL), *Optimizing for Grid Resilience while Considering Initial Transient Impacts and Long-term Restoration* - Sara Hamideh (SBU), *Interdisciplinary Housing Recovery Modeling Considering Households*	Chairs: Cherrie Black (INL), John Hummel (ANL), Frederic Petit (ANL) Presenters *CYBER-CHAMP - A Model for Informing and Building a Cybersecurity Resilient Workforce*, Shane Stailey (INL) *Developing an Explainable Deep Learning Model for Enhanced Critical Infrastructure Analysis*, Shiloh Elliott (INL) *ICS Dependence and Cyber Risk of National Critical Functions*, Jackie First (LLNL) *Python Simulator for Cyber Event Scenarios (PySCES)*, Mike Nygaard (LLNL) *Intelligence-Led Protection of the Infrastructure Environment,* Frederick Ferrer (INL)

4:00 – 5:00	"AFTER HOURS" SPEAKER
Improving Power System Resilience with Interoperable Communication Scott Manson, Schweitzer Engineering Laboratories, Inc.	

THURSDAY, OCTOBER 22

10:00 – 11:00	PLENARY SPEAKER: Epidemiological Modeling on Speed Dial Chick Macal (Argonne National Laboratory) *Introduced by John Hummel, Argonne National Laboratory*
11:00 – 12:00	SESSION 1

TRACK 1: Moderated Discussion: Contrasting Artificial intelligence with Human Intelligence: Where are we, and where are we going?	TRACK 2: Community Resilience Papers	TRACK 3: Complex Environments Special Session: Progression of State Energy Security Planning
Chairs: Katya Le Blanc (INL), David Manz (PNNL), Char Sample (INL)	**Chairs:** Ray Byrne (SNL), Abraham Ellis (SNL) **Presenters** ▪ *Indicator-based Safety and Security Assessment of Offshore Wind Farms*, Frank Sill Torres (German Aerospace Center) (DLR) ** ▪ *Merging Microgrids for Optimal Distribution Grid Restoration under Explicit Communication Constraints*, Martin Pietsch (Technische Universität Darmstadt) ▪ *Overhead versus Underground: Designing Power Lines for Resilient, Cost-Effective Power Systems under Windstorms*, Laiz Souto (Universitat de Girona) ▪ *Power Grid Contingency Analysis with Machine Learning: A Review and Prospects*, Bjorn Vaagensmith (INL)	**Chairs:** Brandi Martin (DOE), Kyle Pfeiffer (ANL) **Presenters** ▪ Jason Pazirandeh (DOE) ▪ Brandi Martin (DOE) ▪ Kyle Pfeiffer (ANL)

12:00 – 12:30	BREAK
12:30 – 1:30	SESSION 2

TRACK 1: Artificial Intelligence for Resilient Control Systems	TRACK 2: Community Resilience Papers	TRACK 3: Infrastructure TED Talks
Chairs: Kevin Schultz (JHUAPL), Quanyan Zhu (NYU), Kris Villez (ORNL) **Speakers** ▪ Carol Smidts (OSU), *Detection and response for Cyberattacks in Nuclear Power Plants* ▪ Juntao Chen (Fordham University), *Real-Time Security and Resilience for Multi-Layer Mobile Autonomous Systems*	**Chairs:** Sara Hamideh (SBU), Elaina Sutley (KU) **Presenters** ▪ *Resilience to the COVID-19 Pandemic: A Distributed Situation Awareness Perspective*, Abdul Alhaider (VT) ▪ *The use of emerging conductive materials for outreach activities in the K-12 community*, Eduardo Ortiz-Rivera (U of PR-Mayaguez)	**Chairs:** Cherrie Black (INL), John Hummel (ANL), Frederic Petit (ANL) **Presenters** ▪ *Risk as the Yardstick of Resilience*, Doug Elliott (PNNL) ▪ *Gas-Electric Model for Interdependent National Infrastructure (GEMINI)*, Mike Nygaard (LLNL) ▪ *Using GIS to Integrate Community Profile Analysis, Critical Infrastructure Information, and Inundation Mapping to Support Consequence Analysis and Dam-Related Planning Activities*, Molly E. Finster (ANL)

		▪ *NGTransient: A Hydraulic Pipeline and Optimal Control Model for Simulating Pipeline Disruptions and Impacts on Electric Power Generation*, Eric Tatara (ANL) ▪ *Commercial Routing Assistance Tool: Enhancing Resilience through Route Restrictions Visualization*, Ollie Gagnon (INL)

1:30 – 2:30	SESSION 3	
TRACK 1: Control Papers: Resilient Controls in the Field		TRACK 2: Sustainable Energy Resilience in Rural and Island Communities
Chairs: Kevin Schultz (JHUAPL), Quanyan Zhu (NYU), Kris Villez (ORNL) **Presenters** ▪ *A Metric Framework for Evaluating the Resilience Contribution of Hydropower to the Grid*, Timothy McJunkin (INL) ** ▪ *Graph Signal Processing for Infrastructure Resilience: Suitability and Future Directions*, Kevin Schultz (JHUAPL) ▪ *Formal Online Resiliency Monitoring in Microgrids*, Omar Ali Beg (UT- Permian Basin) ▪ *A Framework for Evaluating the Resilience Contribution of Solar PV and Battery Storage on the Grid*, Tyler Phillips (INL)		**Chairs:** Abraham Ellis (SNL), Stephen Walls (DOE-OE) **Panelists** ▪ Suzanne MacDonald (Maine Island Institute) ▪ Chris Rose (Renewable Energy Alaska Project, REAP) ▪ Jennifer DeCesaro (DOE-OE)

2:30 – 3:30	PLENARY PANEL: 5G Resilience and Security MODERATOR: Arup Bhuyan (Idaho National Laboratory) PANELISTS: Serena Reynolds, National Risk Management Center (NRMC), Cybersecurity and Infrastructure Security Agency (CISA) Amanda Toman, Director of 5G Initiatives (Office of the Under Secretary of Defense) *Introduction by Daniel Elmore, Idaho National Laboratory*

FRIDAY, OCTOBER 23

10:00 – 11:00	PLENARY SPEAKER: Expanding Perspectives of Disaster Science and Community Resilience Maria Dillard, Acting Director of Disaster and Failure Studies (Engineering Laboratory) (National Institute of Standards and Technology) *Introduction By: Sara Hamideh, Stony Brook University*
11:00 – 12:00	SESSION 1

TRACK 1: Communications Resilience Papers	TRACK 2: Interdisciplinary Resilience Science
Chairs: Brad Nelson (INL), Eyuphan Bulut (VCU), Kemal Akkaya (FIU) Presenters ▪ *Implementation of IEEE Standard 1547-2018 for DER Communication Interface using Data Distribution Service*, Mohamad El Hariri (UofU) ** ▪ *Secure, Resilient and Stable Resource Allocation for D2D-based V2X Communication*, Fatih Yucel (VCU)	Chairs: Elaina Sutley (KU), Sara Hamideh (SBU) Speakers ▪ Diana Mitsova (FAU) ▪ Ali Mostafavi (TAMU) ▪ Elaina Sutley (KU)

12:00 – 12:30	BREAK
12:30 – 1:30	SESSION 2

TRACK 1: Unmanned Aerial Vehicles for Resilient Communication	TRACK 2: Resilience Metrics & Social Factors including Fairness and Equity
Chairs: Kemal Akkaya (FIU), Eyuphan Bulut (VCU) Speakers ▪ Ismail Guvenc (NCSU) ▪ Arupjyoti Bhuyan (INL) ▪ Travis Potter (FEMA)	Chairs: Sara Hamideh (SBU), Elaina Sutley (KU) Speakers ▪ Jamie Kruse (East Carolina University) ▪ Daniel Kushner (Commonwealth Edison) ▪ Marla Perez Lugo (University of Puerto Rico)

1:30 – 2:30	SESSION 3

TRACK 1: Advanced Mathematical and Computational Methods for Solvability, Operability, and Security Challenges in Cyber-Physical Systems	TRACK 2: Can We Make Systems More Resilient Using an Operator's Perspective?
Chairs: Craig Bakker and Samrat Chatterjee (PNNL) Presenters ▪ *Power system resilience through defender-attacker-defender models with uncertainty: an overview*, Matthew Oster (PNNL) ▪ *Attack-Resilient Path Planning using Dynamic Games with Stopping States*, Shaunak D. Bopardikar (MSU) ▪ *Cyber Challenges in Industrial Control Systems,* Drew Batten (DHS)	Chairs: Kimberly Lewis and Megan Kendle (DoD) Panelists ▪ Susan Adams (SNL) ▪ Scottie-Beth Fleming (SNL) ▪ Thomas Ulrich (INL) ▪ Ron Boring (INL)

2:30 – 3:30	SESSION 4

TRACK 1: Advanced Mathematical and Computational Methods for Solvability, Operability, and Security Challenges in Cyber-Physical Systems	TRACK 2: Not Getting Lost in Translation – Resilience Across Disciplines
Chairs: Craig Bakker and Samrat Chatterjee (PNNL) Speakers ▪ *The Koopman Operator: Capabilities and Recent Advances*, Craig Bakker (PNNL) ▪ *Stochastic Input-Output Analysis: Comparison of Methods to Evaluate IT Infrastructure Disruptions,* Joost Santos (GWU) ▪ *Sensors & Controls R&D for Grid-integrated Efficient Buildings*, Erika Gupta (BTO-DOE)	Chairs: Veronika Vazhnik, Katya LeBlanc, Tim McJunkin (INL) Panelists ▪ Gerald Matthews (UCF) ▪ Erica Smithwick (Penn State) ▪ Ann Masten (UM)

**Best Paper