



U.S. DEPARTMENT OF
ENERGY



Crosscutting Research and Advanced Energy Systems Project Review Meeting Sensors and Controls Virtual Session Agenda

All times designated in Eastern Daylight Time

Tuesday, May 18, 2021

Advanced Sensors and Controls for FE Power Generation

Moderator: Robie Lewis

- 9:00 AM Advanced Sensors and Controls Overview (FWP-NETL)**
Ben Chorpening & Yuhua Duan , National Energy Technology Laboratory
- 9:30 AM Agent-Based Controls and Cyberphysical Systems (FWP-NETL)**
Dave Tucker, National Energy Technology Laboratory
- 9:50 AM LIBS Development and Testing (FWP-NETL)**
Dustin McIntyre, National Energy Technology Laboratory
- 10:10 AM Optical Fiber Sensor Development for Harsh Fossil Energy Applications (FWP-NETL)**
Michael Buric, National Energy Technology Laboratory

Cyber-Physical Systems

Moderator: Robie Lewis

- 10:30 AM Advanced Tool for Cyber Physical Systems and Digital Twins (FWP-AL-20-450-023)**
Mark Bryden, Ames National Laboratory
- 11:00 AM Expedited Real Time Processing for the NETL Hyper Cyber-Physical System (FE0030600)**
Comas Haynes, Georgia Tech Research Corporation

Artificial Intelligence for Improved Plant Operation and Performance

Moderator: Robie Lewis

- 11:30 AM Deep Analysis Net with Causal Embedding for Coal Fired Power Plant Fault Detection and Diagnosis (FE0031763)**
Feng Xue, General Electric (GE) Company

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12:00 PM Boiler Health Monitoring using a Hybrid First Principles-Artificial Intelligence Model (FE0031768)

Debansu Bhattacharyya, West Virginia University Research Corporation

12:30 PM BREAK

Robotics for Non-Destructive Evaluation and Repair

Moderator: Maria Reidpath

1:00 PM A Lizard-Inspired Tube Inspector (LTI) Robot (FE0031649)

Ehsan Dehghan-Niri, New Mexico State University

1:30 PM A Robotics Enabled Eddy Current Testing System for Autonomous Inspection of Heat Exchanger Tubes (FE0031645)

Jian Lin, University of Missouri

2:00 PM Development of a Pipe Crawler Inspection Tool for Fossil Energy Power Plants (FE0031651)

Dwayne McDaniel, Florida International University

2:30 PM Autonomous Aerial Power Plant Inspection in GPS-Denied Environments (FE0031655)

Angel Flores Abad, University of Texas at El Paso

Quantum for Energy Systems and Technologies

Moderator: Maria Reidpath

3:00 PM Ultra-Low Disorder Graphene Quantum Dot-Based Spin Qubits for Cyber Secure Fossil Energy Infrastructure (FE0031908)

S. Sreenivasan, University of Texas at El Paso

3:30 PM Harnessing Quantum Information Science For Enhancing Sensors In Harsh Fossil Energy Environment (FE0031896)

Bryan Wong, University of California - Riverside

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Magnetohydrodynamic (MHD) Concepts for Future Power Generation

Moderator: Maria Reidpath

4:00 PM **Direct Power Extraction (DPE) (FWP-NETL)**
Rigel Woodside, National Energy Technology Laboratory



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Wednesday, May 19, 2021

Advanced Manufacturing and Embedded Sensor Technologies

Moderator: Adam Payne

- 8:30 AM** **Passive Wireless Sensors Fabricated by Direct-Writing for Temperature and Health Monitoring of Energy Systems in Harsh-Environments (FE0026171)**
Ed Sabolsky, West Virginia University
- 9:00 AM** **Advanced Manufacturing of Ceramic Anchors with Embedded Sensors for Process and Health Monitoring of Coal Boilers (FE0031825)**
Ed Sabolsky, West Virginia University
- 9:30 AM** **Additive Manufacturing of Circumferentially Embedded Optical Sensor Modules for In Situ Monitoring of Coal-Fueled Steam Turbines (FE0031826)**
Hai Xiao, Clemson University
- 10:00 AM** **Embedded Sensors Integrated into Critical Components for In Situ Health Monitoring of Steam Turbines (FE0031832)**
Anand Kulkarni, Siemens Corporation

Monitoring & Diagnostics for Gas Turbine Application

Moderator: Adam Payne

- 10:30 AM** **Novel Temperature Sensors and Wireless Telemetry for Active Condition Monitoring of Advanced Gas Turbines (FE0026348)**
Anand Kulkarni, Siemens Corporation
- 11:00 AM** **In-Situ Optical Monitoring of Operating Gas Turbine Blade Coatings Under Extreme Environments (FE0031282)**
Quentin Fouliard, University of Central Florida
- 11:30 AM** **Wireless Temperature Sensor for Rotating Turbine Blades (SC0020908)**
Daniel Micka, Creare, LLC

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**12:00 PM Resonant Frequency based Ultra-High Temperature Sensors for Harsh Environments
(SC0020800)**

Reamonn Soto, Sensatek Propulsion Technology, Inc.

12:30 PM BREAK

Blockchain and Distributed Ledger Technologies for Enhanced Cybersecurity

Moderator: Robie Lewis

1:00 PM Blockchain for Optimized Security and Energy Management (BLOSEM) (FWP-NETL)
David Tucker, National Energy Technology Laboratory

**1:30 PM A Novel Access Control Blockchain Paradigm to Realize a Cybersecure Sensor Infrastructure
in Fossil Power Generation Systems (FE0031770)**
Rahul Panat and Vipul Goyal, Carnegie Mellon University (CMU)

**2:00 PM Incorporating Blockchain/P2p Technology into an Sdn-Enabled Cybersecurity System to
Safeguard Fossil Fuel Power Generation Systems (FE0031742)**
Jun Liu, University of North Dakota Energy and Environmental Research Center (UNDEERC)

2:30 PM Secure Data Logging and Processing with Blockchain and Machine Learning (FE0031745)
Leonel Lagos, Florida International University

**3:00 PM Blockchain Empowered Provenance Framework for Sensor Identity Management and Data
Flow Security in Fossil-Based Power Plants (FE0031744)**
Abel Gomez Rivera - Student Researcher, Old Dominion University



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These Projects did not participate in the virtual meeting but are part of the program portfolio.

Robust Heat-Flux Sensors for Coal-Fired Boiler Extreme Environments (FE0031902)

Oded Rabin, University of Maryland

Ceramic-Based Ultra-High Temperature Thermocouples in Harsh Environments (FE0031906)

Yucheng Lan, Morgan State University

Passive Wireless Sensors for Realtime Temperature and Corrosion Monitoring of Coal Boiler Components Under Flexible Operation (FE0031912)

Ed Sabolsky, West Virginia University Research Corporation

High-Accuracy and High-Stability Fiber-Optic Temperature Sensors for Coal Fired Advanced Energy Systems (FE0031899)

Ming Han, Michigan State University