2025 Consortium of Hybrid Resilient Energy Systems (CHRES)

Technical Forum

July 30 & 31, 2025

https://netl.doe.gov/events/25CHRES

Welcome

Preparing a maximally talented workforce that can oversee and maintain the current energy infrastructure, manage the efficient use of energy, and discover new environmentally responsible ways to generate, store and distribute energy is critical to the future of our nation's security and economy.

The Consortium of Hybrid Resilient Energy Systems (CHRES) consortium's research and development is focused on the integration of energy systems, including hybridization of power systems, renewable energy sources, energy storage, energy conversion, and modeling & simulation of power grids. The CHRES consortium is dedicated to building and supporting a sustainable STEM career pipeline and preparing the fullest talent pool to meet the future energy needs of our society.

The CHRES program provides summer internship opportunities to undergraduates, doctoral students, and faculty to do research at four consortium universities and three national labs. During their internships, participants gain access to world class researchers and scientists, use one-of-a-kind equipment and facilities, collaborate with subject matter experts, author/co-author papers, and attend/present at conferences. They receive hands-on experience, opportunities for professional development, and personal growth for a well-rounded experience. CHRES Fellows strengthen the future technical and economic ability of our energy infrastructure to address present and future challenges.

At the end of each summer internship, NETL hosts a technical forum for all the CHRES summer interns at all consortium partners to show what they are learning and the important contributions they are making at the national labs and universities to solve the nation's energy challenges. In this event, students will give a 12-minute presentation with a 3-minute Q&A session.

How to join this Teams event:

Wednesday, July 30

[Join the meeting now](#)

Meeting ID: 275 508 688 289 6

Passcode: Gv7h88gm

Dial in by phone

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Phone conference ID: 551 701 158#

Thursday, July 31

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Presenters

Bryan Rodriguez Tirado,
Universidad Ana G. Méndez (UAGM)

Brianna Roman,
University of Puerto Rico Mayagüez (UPRM)

Benjamin Webster,
University of New Mexico (UNM)

Ryan Garcia, *UNM*

Micah Wolbrecht, *UNM*

Kevin Donnelly, *UNM*

John Santiago Melendez, *UPRM*

Jose Antonio Rosales Mata,
University of Texas at El Paso (UTEP)

Jorge E. Jimenez Ortiz, *UAGM*

Felix M. Cruz de Jesus, *UAGM*

Nahomy Hernandez, *UPRM*

Isabel Rivera Mojica, *UPRM*

Jahsyel Rojas Ortiz, *UPRM*

Sergio Rivera Cruz, *UPRM*

Emmanuel Ruscalleda, *UPRM*

Zeeshan Akhtar, *UPRM*

Cindy Zelada Quiroz, *UPRM*

Edward A. Figueroa Sanchez, *UPRM*

Aaron Michael Holzer, *UNM*

Dilcia Santos, *UAGM*

Brian L Reyes Santiago, *UPRM*

Abdiel Ordein, *UAGM*

Camila Morales, *UPRM*

Diego Merchan, *UAGM*

Rafael Baez Ramirez, *UTEP*

Ian Padin Aponte, *UPRM*

Matthew Winter, *UNM*

Charlene Palacio, *UNM*

Luis Rodriguez Rodriguez, *UPRM*

Enoch Padilla, *UNM*

Nico Galarza, *UNM*

Danial Anwaar-Maximo, *UNM*

Solomon Eagle Atcitty, *UNM*

Nikhet Chowdhury, *UNM*

Galilea De La O, *UTEP*

Ana Paulina Mata, *UTEP*

Ivana Neyra, *UTEP*

Sebastian Plaza, *UPRM*

Jorge Santos Lopez, *UAGM*

Emiliano Frayre, *UTEP*

Robinson Cruz Santana, *UAGM*

Johanna De Jesús Matos, *UAGM*

Dalysse Cruz Seda, *UAGM*

Mary Flores Tirado, *UAGM*

Sebasthian Sullivan Sanchez, *UAGM*

Abdiel Gomez Alverio, *UAGM*

Bili Perez Moyet, *UAGM*

Jose Laboy Steidel, *UAGM*

Daniel E. Mera Romo, *UAGM*

Rolando J. Tremont-Brito, *UAGM*

Santiago A. Goenaga Buelvas, *UAGM*

Nathalia N. Cotto Figueroa, *UAGM*

Delence Gabriel, *UAGM*

Jorge Lopez Leon, *UPRM*

Agenda

DAY 1 – AM

Wednesday, July 30, 2025
(All times shown are Eastern Daylight Time)

9:50 am	Log on opens at this time.
10:00 am	**Start**
10:05 am	**Introduction** – *Jerry Carr, NETL*
10:10 am	**Opening Remark** – *Betsy Snell, Program Manager, MSIPP/NNSA/DOE*
10:15 am	**Keynote Address/Welcome** – *Kirk Gerdes, Associate Director of the NETL Research and Innovation Center, NETL*
10:20 am	Hybrid Energy Systems for Remote Wireless Sensors – *Bryan Rodriguez Tirado, UNM*
10:35 am	Impacts of the Mechanics of Materials on the Dynamics of Vibration Energy Harvesters – *Brianna Roman, UNM*
10:50 am	Implementation of a Control System for a Three-Phase Inverter – *Benjamin Webster and Ryan Garcia, UNM*
11:05 am	Development of a Testing Facility for Gas Engine Materials Research – *Micah Wolbrecht, UNM*
11:20 am	Characterization Techniques of Neutron Generators Using Foil Activation – *Kevin Donnelly, LLNL*
11:35 am	Weather at a Glance: An Interactive Meteorological *Dashboard* – *John Santiago Melendez, LLNL*
11:50 am	The Chemistry of Organic Radio-Chromic (ORC) Dosimeters – *Jose Antonio Rosales Mata, LLNL*
12:05 pm	Structural Analysis of Steel Plate Composite Construction – *Jorge E. Jimenez Ortiz and Felix M. Cruz de Jesus, LLNL*
12:20 pm	Selective Extraction of Rare Earth Elements Using PVA:PEI Nanofibers in Continuous Flow Process – *Nahomy Hernandez, LLNL*
12:35 pm	Off-Design Performance Analysis of a Solid Oxide Electrolysis Cell (SOEC) - Gas Turbine Hybrid System – *Isabel Rivera Mojica, NETL*
12:50 pm	A Novel Concept of a Flexible Nuclear-Based Integrated Energy Systems for SOFC/GT Hybrid Cycle – *Jahsyel Rojas Ortiz, NETL*

DAY 1 – PM

1:05 pm	**Lunch Break**

2:00 pm	0D vs. 1D: How the Fidelity of Solid Oxide Fuel Cell (SOFC) Models Impacts Hybrid Energy System Analysis – *Sergio Rivera Cruz, NETL*
2:15 pm	Wave Energy – *Emmanuel Ruscalleda, SNL*
2:30 pm	Grid Following Inverter Using Taraz – *Zeeshan Akhtar, UPRM*
2:45 pm	Angle Optimization of Multilevel System – *Cindy Zelada Quiroz, UPRM*
3:00 pm	Modeling and Analysis of DC/DC Converters – *Edward A. Figueroa Sanchez, UPRM*
3:15 pm	Designing of Boost Converter – *Aaron Michael Holzer, UPRM*
3:30 pm	Analysis and Simulations of DC Microgrids – *Dilcia Santos, UPRM*
3:45 pm	Swarm-Enabled UAV Networks for Electrical Infrastructure Monitoring – *Brian L Reyes Santiago, UPRM*
4:00 pm	Implementing a Grid following Inverter Control on the NI Board – *Abdiel Ordein, UNM*
4:15 pm	Earth Abundant Single Atom Catalysts for Selective Acetylene Hydrogenation – *Camila Morales, UNM*
4:30 pm	**Adjourn**

Agenda

Thursday, July 31, 2025
(All times shown are Eastern Daylight Time)

Moderators: AM - Nicole Kirby, NETL
                PM - Danylo Oryshchyn, NETL

9:50 am	Log on opens at this time.
10:00 am	**Start**
10:05 am	**Welcome & Housekeeping** – *Nicole Kirby, NETL*
10:10 am	Leveraging LlamA 3.1:8B to Reason Over Conditional Mission Statements – *Diego Merchan, LLNL*
10:25 am	Capturing Non-Linear Hydrodynamic Forces using Machine Learning – *Rafael Baez Ramirez, SNL*
10:40 am	Air Receiver Thermal Testing and Mixing Capacities – *Ian Padin Aponte, SNL*
10:55 am	An Introduction to Sphinx Documentation for Python Packages – *Matthew Winter, SNL*
11:10 am	HELPR Software Quality: Leveraging AI – *Charlene Palacio, SNL*
11:25 am	Microgrid Design Toolkit (MDT) Based Modeling of Sargassum Intrusions as Design-Based Threats for Coastal Power Plants – *Luis Rodriguez Rodriguez, SNL*
11:40 am	HyRAM+ Updates – *Enoch Padilla, SNL*
11:55 am	Case Study of Incorporating Airborne Wind Energy Systems in a Microgrid in Rural Puerto Rico – *Nico Galarza, SNL*
12:10 pm	Exploring the Role of Higher Fidelity Inflows for Wind Turbine Simulations – *Danial Anwaar-Maximo, SNL*
12:25 pm	Experimental Corrosion Testing for Electrochemical Property Prediction Plea – *Solomon Eagle Atcitty, SNL*
12:40 pm	Preliminary Machine Learning Model for Estimating Pitzer Parameters – *Nikhet Chowdhury, SNL*
12:55 pm	**Lunch Break**

2:00 pm   Harnessing Synthetic Urine as a Sustainable Energy Source: Urea-to-Ammonia Oxidation on Antibody-Modified Pt/Ni - Electrode Utilizing the Proteus Mirabilis System – *Galilea De La O, UTEP*

2:15 pm   X-ray Scattering Analysis of Polypropylene–Palygorskite Nanocomposites for Improved Creep Response – *Ana Paulina Mata, UTEP*

2:30 pm   From Print to Performance: Engineering SLA/DLP Resins for Nuclear Waste Applications – *Ivana Neyra, UTEP*

2:45 pm   Ag–TM Alloy Nanoparticles as Cost-Effective Catalysts for Oxygen Reduction in Alkaline Medium for Potential Fuel Cells Application – *Sebastian Plaza, UTEP*

3:00 pm   Platinum and Copper as catalysts for Ammonia Oxidation Reaction with Boron Doped Electrodes – *Jorge Santos Lopez, UTEP*

3:15 pm   In situ X-ray Investigations of Hydroxylated Mineral Phase Growth Under Microfluidic Control – *Emiliano Frayre, UTEP*

3:30 pm   Design and 3D Printing of Intertwined Lithium-Ion Battery Components for Resilient Energy Storage Systems – *Robinson Cruz Santana, UTEP*

3:45 pm   Pole Foundation/Soil Interaction, Lateral Support and Breakaway Connectors to Mitigate Electrical Blackouts Because of a High Category Hurricane – *Johanna De Jesús Matos, Dalysse Cruz Seda, and Mary Flores Tirado, UAGM*

4:00 pm   Exploring the Power Generation of Vertical Axis Wind Turbines in Puerto Rico – *Sebasthian Sullivan Sanchez, Abdiel Gomez Alverio, Bili Perez Moyet, Jose Laboy Steidel, and Daniel E. Mera Romo, UAGM*

4:15 pm   Low-Cost Micro Wind Turbine Control System with Monitoring and Braking Capabilities – *Rolando J. Tremont-Brito, Santiago A. Goenaga Buelvas, and Nathalia N. Cotto Figueroa, UAGM*

4:30 pm   Technical Assessment and Design of a PV-BESS Distributed Energy System for Grid Modernization in Caguas, Puerto Rico – *Delence Gabriel, UAGM*

4:45 pm   The Photovoltaic Exponential Model – *Jorge Lopez Leon, SNL*

5:00 pm   **Closing Remarks** – *Danylo Oryshchyn, NETL*