

Workshop (W4): AI for Energy Innovation **held in conjunction with 37th AAAI Conference on Artificial Intelligence (AAAI-23)**

February 13, 2023 Washington, D.C.
Walter E. Washington Convention Center Room 140B

<https://AIenergyworkshop2023.inl.gov> aienergyworkshop2023@inl.gov

8:50am – 9:00am Introduction: workshop overview & logistics

9:00am – 11:30am Session I

9:00am – 9:25am **Modeling energy consumption in smart buildings with digital twins (I)**
Edward Y. Hua, The MITRE Corporation

9:25am – 9:35am **AI to the grid edge to accelerate clean energy (I)**
Yingchen "YC" Zhang, Utilidata Inc.

9:35am – 9:45am **Physics-constrained interval bound propagation for robustness verifiable neural networks in power grids**
Wenting Li¹, Krishnamurthy Dj Dvijotham², Deepjyoti Deka¹
¹Los Alamos National Laboratory ²Google Research

9:45am – 9:55am **AI-based energy services for reinforcing the AI-on-demand platform**
Francisco Barrientos¹, Spiros Mouzakitis², Leandro Lombardo³, Andrej Campa⁴,
Gema Hernández-Moral¹, Antonio E. Corral-Vicente¹, Carla Rodríguez-Alonso¹
¹CARTIF Centro Tecnológico ²National Technical University of Athens
³Engineering Ingegneria Informatica ⁴COMSENSUS

9:55am – 10:05am **Smart measurement units in smart grids: an AI-in-the-loop solution for distributed intelligence and high-fidelity measurements**
Maeshal Hijazi¹, Payman Dehghanian¹, Shiyuan Wang²
¹George Washington University ²Quanta Technology

10:05am – 10:30am **Reinforcement Learning for selective key applications in power systems: A review of recent advances and future challenges (I)**
Prof. Lina Li
Gordon McKay Professor of Electrical Engineering and Applied Mathematics, Harvard University

10:30am – 11:00am Coffee break (on site)

11:00am – 11:10am **Differentiable programming for modeling and control of energy systems**
Jan Drgona, Pacific Northwest National Laboratory

11:10am – 11:20am **Energy efficiency considerations for popular AI benchmarks**
Raphael Fischer, Matthias Jakobs, Katharina Morik, TU Dortmund

11:20am – 11:30am **Intelligent energy generation systems that operate, think, do their finances, and maintain themselves**
Dimitrios Pylorof, Humberto E. Garcia, Idaho National Laboratory

11:30am – 12:40pm Session II

11:30am – 11:55am **The growing and evolving role of AI in building system operations (I)**
Dr. Amir Roth Technology Manager (Building Energy Modeling & Control Platforms Technology)
DOE/EERE Building Technologies Office

- 11:55am – 12:20pm **Connecting physics-informed ML to data-centric AI for energy systems (I)**
Dr. Soumalya Sarkar Senior Principal Research Scientist, Raytheon Technologies
- 12:20pm – 12:30pm **Multifidelity active learning for failure estimation of TRISO nuclear fuel**
Som L. Dhulipala¹, Promit Chakraborty², Michael Shields², Wen Jiang¹, Benjamin W. Spencer¹, Jason D. Hales¹ ¹Idaho National Laboratory ²Johns Hopkins University
- 12:30pm – 12:40pm **Reactor dynamics surrogate models for digital twin - A case for ARIMAX models and a case against LSTMs**
Jasmin Lim, Karthik Duraisamy, University of Michigan
- 12:40pm – 2:00pm Lunch (on your own; no sponsored lunch provided)**
- 2:00pm – 4:55pm Session III**
- 2:00pm – 2:20pm **Overview of ARPA-E program GEMINA (Generating Electricity by Managing Intelligent Nuclear Assets) (I)**
Prof. Jenifer Shafer, Program Director, DOE Advanced Research Projects Agency – Energy
- 2:20pm – 2:40pm **Overview of AI work at DOE EERE Solar Energy Technologies Office (I)**
Dr. Guohui Yuan, DOE/EERE Solar Energy Technologies Office
- 2:40pm – 3:00pm **[TBD] (I)**
Prasad Gupte, U.S. Department of Transportation
- 3:00pm – 3:15pm **AI for Energy – Exploring activities and opportunities in the Netherlands (I)**
Prof. Jochen Cremer, Delft University of Technology
- 3:15pm – 3:40am **The intersection of AI and control: The key to addressing energy systems challenges (I)**
Dr. Sonja Glavaski
Principal Technology Strategy Advisor, Pacific Northwest National Laboratory
- 3:40pm – 4:00pm **Overview of NSF programs CPS (Cyber-Physical Systems) and EPCN (Energy, Power, Control, and Networks) (I)** (video presentation - pending)
Prof. Aranya Chakraborty, Program Director, National Science Foundation
- 3:40pm – 4:00pm Coffee break (on site)**
- 4:00pm – 4:15pm **AI activities and opportunities at Pacific Northwest National Laboratory**
Dr. Draguna Vrabie, Pacific Northwest National Laboratory
- 4:15pm – 4:30pm **AI activities and opportunities at Oak Ridge National Laboratory**
Dr. Hong Wang, Oak Ridge National Laboratory
- 4:30pm – 4:45pm **AI activities and opportunities at Idaho National Laboratory**
Dr. Humberto E. Garcia, Idaho National Laboratory
- 4:45pm – 4:55pm **A generative adversarial network approach for identification and mitigation of cyber-Attacks in wide-area control of power systems** (video presentation - pending)
Jishnudeep Kar¹, Aranya Chakraborty, North Carolina State University
- 5:00pm – 6:00pm Panel session with invited speakers and all participants**
(audience questions collected during the day through aienergyworkshop2023@inl.gov)

(I): invited speaker