



## CONVERGENCE OF PHYSICS, AI, COMPUTING AND CONTROL FOR ENABLING AND SECURING POWER AND ENERGY SYSTEM TRANSFORMATION

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Colorado School of Mines

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### OVERVIEW

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The on-going power and energy system transformations are essential for achieving the carbon-neutral goals while modernizing the power system. Such unprecedent transformations also bring many grand challenges in terms of modeling, simulating, controlling and securing power systems and a large number of energy systems interacted with the grid at the edge. To develop new solutions to addressing these grand challenges, convergence of key technical fields including physics (i.e., power and energy systems), AI, computing and control is critical and practical. In this talk, I will talk about some recent researches and progresses along this convergence direction including: 1) development of scalable, physics-informed AI methods for controlling power systems; 2) T&D multi-scale co-simulation and co-optimization for supporting coordinated system restoration with DERs. Finally, I will also present some on-going activities at the Power, Intelligence and Computing (PIC) lab at Mines.

### BIO

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Dr. Qiuhua Huang is an Associate Professor in the Electrical Engineering Department of Colorado School of Mines. Prior to this, he was a Principal Power System Engineer at Utilidata Inc and a Staff Power System Research Engineer at Pacific Northwest National Laboratory. He received his Ph.D. degree in electrical engineering from Arizona State University, Tempe, AZ, USA, in 2016, B.Eng. and M.Eng. degrees in electrical engineering from South China University of Technology, Guangzhou, China, in 2009 and 2012, respectively. He is the recipient of the 2019 IEEE Power and Energy Society (PES) Prize Paper Award, 2018 R&D 100 Award and best conference paper awards in IEEE PES General Meeting in 2020 and 2018. He serves as an Associate Editor of IEEE Transactions on Power Systems. His research interests include power system modeling, simulation and control, fusion and application of AI/machine learning and advanced computing technologies for digitizing and transforming power and energy systems.

