

# IEEE PES Distinguished Lecture Distributed Artificial Intelligence for Modern Power Systems

The number of power electronics converters connected to electrical networks has been growing. The modern power system, also referred to as smart grid, is the transformation of the traditional power system to one that is conscious, intelligent, distributed, and flexible. Such an electric power grid architecture can facilitate the distributed and secure flow of power from renewable energy sources including solar and wind. Smart grid operations and control is complex, now dealing with variable power and energy sources, bidirectional power flows, and uncertainty in forecasting and real-time availability of generation, loads, energy storage and other operational resources. Furthermore, modern power system operations will involve flexible loads and energy storage including electric vehicles. This talk will address the potentials and promises of Distributed Artificial Intelligence (AI) for modern power system operations and control. AI has evolved over the last 50 years to impact complex systems operations and control in a meaningful way. Examples of distributed AI technologies for stable, secure, reliable, and efficient operations and control in for the evolving electric power grid will be presented.

**June 26, 2025** h 11.30

Council Room

EN:lab Building

3<sup>rd</sup> floor

Via Lambruschini, 6

Milan



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Duke Energy Distinguished Professor of Power Engineering and Professor of Electrical and Computer Engineering

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G. Kumar Venayagamoorthy is the Duke Energy Distinguished Professor of Power Engineering and Professor of Electrical and Computer Engineering at Clemson University since January 2012. Prior to that, he was a Professor of Electrical and Computer Engineering at the Missouri University of Science and Technology (Missouri S&T), Rolla, USA where he was from 2002 to 2011.

Dr. Venayagamoorthy is the Founder and Director of the Real-Time Power and Intelligent Systems Laboratory at Clemson University. Dr.

Venayagamoorthy holds the position of an Extraordinary Professor at the University of Pretoria, South Africa.

Dr. Venayagamoorthy received his PhD and MScEng degrees in Electrical Engineering from the University of Natal, Durban, South Africa. He received his BEng degree with a First-Class Honors in Electrical and Electronics Engineering from Abubakar Tafawa Balewa University, Bauchi, Nigeria. He holds an MBA degree in Entrepreneurship and Innovation from Clemson University, USA.

Dr. Venayagamoorthy is a recipient of 2004 U.S. NSF CAREER award and 2007 U.S. Office of the Naval Research Young Investigator Award. His research interests are in the development and innovation of power systems, smart grids and artificial intelligence technologies. He is an inventor of technologies for scalable computational intelligence for complex systems and dynamic stochastic optimal power flow. Dr. Venayagamoorthy has published ~ 600 refereed technical articles which are cited > 25,000 times with a h-index of 73 and i10-index of > 300.

Professor Venayagamoorthy has given over 500 technical presentations (including over 30 keynotes and plenaries) in 50 countries to date.

Dr. Venayagamoorthy is the Chair and Founder of the IEEE PES Working Group on Intelligent Control Systems and IEEE Computational Intelligence Society (CIS) Task Force on Smart Grid. He has

served/serves as Editor/Associate Editor/Guest Editor of several IEEE Transactions and Elsevier Journals. He is the Editor for the IEEE Press Series on Power and Energy Systems. Dr. Venayagamoorthy is a Fellow of the IEEE, IET (UK), the South African Institute of Electrical Engineers (SAIEE) and Asia-Pacific Artificial Intelligence Association (AAIA), and a Senior Member of the International Neural Network Society (INNS). He is a Distinguished Lecturer of the IEEE CIS, IAS, IES and PES.

Dr. Venayagamoorthy is the INNS Vice-President for Industry Relations and a Member of its Board of Governors. He was a 2024 U.S. Fulbright Scholar to South Africa.



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