Our group is active in electrical power and energy education and research. Our primary research thrusts are in power system dynamics and control; operational decision-making; “smart-grid” applications; system reliability; voltage security; economics of systems and markets; electric machines and power electronic systems, and renewable energy.

**Dr. Venkataramana Ajjarapu:** Nicholas Professor of Electrical and Computer Engineering; IEEE Fellow: (vajjarap@iastate.edu); <http://www.engineering.iastate.edu/directory/?user_page=vajjarap>

Dr. Ajjarapu studies ways to improve voltage stability- a critical factor in reliable power networks: he develops new methods for faster responses to correct potential instability, and he studies impacts of factors, such as large amounts of renewable energy projects connected to transmission, distributed generation connected to distribution, and demand response actions, that affect voltage stability. He and his research group has developed transmission-distribution co-simulation techniques. His research includes mathematical simulation and development of a cyber-physical power system test bed. Dr. Ajjarapu is the author of: “*Computational Techniques for Voltage Stability Assessment and Control (Power Electronics and Power Systems*”.

**Dr. Robert Brown**, Anson Marston Distinguished Professor of Mechanical Engineering, Director, Bioeconomy Institute, rcbrown3@iastate.edu; <https://www.me.iastate.edu/directory/faculty/robert-c-brown/> biofuels development for use in power generation

**Dr. Kristen Cetin**, Assistant Professor in Civil, Construction and Environmental Engineering, kcetin@iastate.edu; <http://www.ccee.iastate.edu/kcetin/> , building energy efficiency research, building benchmarking

**Dr. Ian Dobson**, Sandbulte Professor of Electrical and Computer Engineering; IEEE Fellow (dobson@iastate.edu); <http://www.engineering.iastate.edu/directory/?user_page=dobson>

Dr. Dobson studies power system reliability and resilience, including the risk of cascading failure blackouts, with an emphasis on data processing, monitoring and mitigation. Cascading failure is a serious problem for the power grid, but difficult to predict, as events are rare, but can be catastrophic when they do occur. Dr. Dobson is developing new, data-driven methods to study and mitigate blackouts, and has analyzed power system dynamics that lead to voltage collapse and oscillations.

**Dr. Manimaran Govindarasu**, Mehl Professor of Electrical and Computer Engineering; IEEE Fellow (gmani@iastate.edu); <http://www.engineering.iastate.edu/directory/?user_page=gmani>

Dr. Govindarasu’s research focuses on ways to improve best practices for the cyber security of power systems, including developing new tools to detect hacking and create an attack-resilient smart grid. He works with industry on CIP compliance, and in 2017 led, with NARUC and USAID, a cyber security study tour for Black Sea utility regulators.

**Dr. Chao Hu**, Assistant Professor of Mechanical Engineering with a Courtesy Appointment in Electrical and Computer Engineering (chaohu@iastate.edu); <https://www.me.iastate.edu/chaohu>

Dr. Chao Hu’s research expertise and emphasis is in the areas of performance/degradation modeling and failure prognostics of lithium-ion (Li-ion) battery energy storage systems. Specifically, the research work of his group at ISU has been focused on developing new methods and tools for predictive analysis of short-term performance and long-term degradation of Li-ion battery systems in grid applications. The ultimate goal of his research is to ensure safe and reliable operation of the battery systems in these applications.

**Dr. Doug Jacobson**, University Professor, Information Assurance Center and Electrical and Computer Engineering, dougj@iastate.edu; <http://www.iac.iastate.edu/> - Cyber Security research and education

**Dr. Anne Kimber**, Director, Electric Power Research Center (EPRC), ISU College of Engineering (akimber@iastate.edu);

<http://powerweb.ece.iastate.edu/welcome-to-the-electric-power-research-center/>

Dr. Kimber works with ISU faculty and industry to find opportunities for collaboration in order to advance research and improve training. EPRC industry members fund graduate student research on applied power systems problems. Current and new projects include: Assessing the impacts of geomagnetic disturbances on Midwest transmission system reliability; Opportunities and benefits for deploying VSC-Based HVDC; Real-time monitoring and control of long-term voltage stability with high wind penetration via local linear regression; Impacts of power transformer overload ratings on transformer reliability and life; Functional assessment of DFIG and PSMG-based wind turbines for grid support applications; Power grid resilience: assessment, enhancement and outage management; Coordinating conventional voltage control devices with smart inverters in rural distribution networks with DER penetration; High-Fidelity Performance/Degradation Modelling and Deployment Testing of Utility-Scale Battery Energy Storage Systems.

**Dr. Song Charng Kong**, Professor, Mechanical Engineering, kong@iastate.edu; <https://www.me.iastate.edu/directory/faculty/song-charng-kong/> , use of biorenewable fuels in combustion engines, Co-PI on Camp Dodge Energy and Water plan and CHP potential study.

**Dr. Wenzhen Li**, Richard Seagrave Professor of Chemical and Biological Engineering, wzli@iastate.edu; <http://djchadde.public.iastate.edu/index.html>, collaboration on flow battery performance with solar arrays in distribution networks.

**Dr. James McCalley**, London Chair, and Anson Marston Professor of Electrical and Computer Engineering, IEEE Fellow (jdm@iastate.edu); <http://www.engineering.iastate.edu/directory/?user_page=jdm>

Dr. McCalley’s main research thrust is on optimization of generation and transmission system planning. Recently this work has been applied to the development of comprehensive plans for transmission investment, across seams, for the United States. These methods are also being applied to the development of power infrastructure “visions” for Puerto Rico post Hurricane Maria. Dr. McCalley has research strengths in wind energy development, energy storage modeling, and the economics of energy markets. He directs the Wind Energy Science, Engineering, and Policy training program at ISU.

**Dr. Alan Russell**, Professor of Materials Science and Engineering and Ames Laboratory, russell@iastate.edu, Al-Ca transmission conductor development. Ames Laboratory <https://www.ameslab.gov/> and Critical Materials Institute <https://cmi.ameslab.gov/>

**Dr. Sarah Ryan**, Joseph Walkup Professor of Industrial and Manufacturing Engineering, smryan@iastate.edu; <https://www.imse.iastate.edu/files/2018/02/Ryan_CV_2017.pdf> , methods for improving power system planning under uncertainty.

**Dr. Sri Sriritharan**, Wilkinson Professor of Interdisciplinary Engineering, Civil, Construction and Environmental Engineering, sri@iastate.edu; <http://sri.cce.iastate.edu/> Development of tall Hex-Crete concrete towers for greater electricity production from wind

**Dr. Gene Takle**, CF Curtiss Distinguished Professor of Agriculture and Life Sciences (gstakle@iastate.edu); <https://www.agron.iastate.edu/people/gene-takle>

Dr. Takle’s research emphasizes the use of climate science, both modeling and analysis, for investigating the causes and future impacts of climate change. He also leads a team that conducts meteorological measurements and analysis of data taken at the surface and from tall towers within and near utility scale wind farms. The objectives of this research are to improve the predictive skill of wind forecast models, understand wind-farm power reduction due to turbine wakes and evaluate the impact of wind farms on crops.

**Dr. Leigh Tesfatsion**, Research Professor, and Professor Emerita of Economics, Mathematics, and Electrical & Computer Engineering (tesfatsi@iastate.edu); <http://www2.econ.iastate.edu/tesfatsi/bio.htm>

Dr. Tesfatsion’s current research focuses on three topics: (1) the study of new contract designs for electric power markets to facilitate the increased penetration of renewable energy resources and the management of systemic risks; (2) the study of water and climate change issues with the ultimate goal of facilitating watershed sustainability through community engagement; and (3) the development of *Agent-Based Computational Economics (ACE)* software platforms to facilitate the study of coupled physical, natural, and human systems, such as electric power systems and watersheds.

**Dr. Zhaoyu Wang**, Harpole-Pentair Assistant Professor of Electrical and Computer Engineering (wzy@iastate.edu); <http://wzy.ece.iastate.edu>

Dr. Wang specializes in the study of power distribution systems and microgrids. His research includes the design and control of microgrids, resilience enhancement of distribution grids using advanced outage management and distributed energy resources (DERs), voltage-var control, the optimization of DERs, energy storage, and demand response, and the development of better dynamic load-modeling tools.