

Sowmya Acharya

Ph. D.
Department of ECE, UW-Madison

+91 8433 500 299
sacharya2@wisc.edu
acharya-sowmya.github.io

Research Interests

- Compression of phasor measurement data
- Grid data analytics
- Power system operations

Education

- Dec 2019 **Ph.D. in Electrical Engineering**, *University of Wisconsin - Madison, WI*
Advisor: Dr. C. L. DeMarco
GPA: 3.93/4.00
- Aug 2014 **M.S. in Electrical Engineering**, *University of Wisconsin - Madison, WI*
GPA: 3.90/4.00
- May 2012 **B.Tech. in Electrical Engineering**, *Veermata Jijabai Technological Institute, India*
GPA: 9.00/10.00

Experience

Research

- 2019–2020 **Research Associate** *University of Wisconsin-Madison*
Data analytics for power grid measurement data. Collaborate on EPIGRIDS project for developing metrics to validate synthetic power grids.
- 2014–2019 **Research Assistant** *University of Wisconsin-Madison*
PMUs and other measurement devices in power systems generate a large volume of data. The storage and transfer of this data can be made more efficient by employing data compression. We developed low-loss compression algorithms for PMU data by adapting image and video compression techniques and exploiting the spatial and temporal correlations in the measurements.
- 2012–2014 **Master's Research** *University of Wisconsin-Madison*
An accurate topology of the power system is an essential input to many applications like state estimation and contingency analysis. This research proposed methods for near real-time identification of changes in network topology through dynamic control and observer design. The topology estimation is performed using a limited set of PMU measurements.

Professional Experience

- Aug–Dec 2018 **Fellow Intern** *GE Global Research*
Evaluated and refined a cyberattack detection algorithm to detect and characterize replay attacks on wide area measurement system (WAMS) data. Contributed to parameter tuning and validation of composite load models for simulating fault-induced delayed voltage recovery.

Teaching

2012–2013 **Teaching Assistant** *University of Wisconsin-Madison*
Math 114: Algebra and Trigonometry (Fall '12, Fall '13)
Math 320: Linear Algebra and Differential Equations (Spring '13)

Publications

- Journal *Sowmya Acharya and C. L. DeMarco*, "Data Compression for Power Distribution System Waveform Measurements", IEEE Transactions on Smart Grid [**Under Review**].
- Journal *Sowmya Acharya and C. L. DeMarco*, "Low-loss Image-based Compression for Synchrophasor Measurements", IET Generation, Transmission & Distribution, 2020.
- Conference *Sowmya Acharya and C. L. DeMarco*, "Enhancing Lossy Compression of PMU Measurements by Data Conditioning", ISGT North America 2020.
- Conference *Philip Hart, Sowmya Acharya and Honggang Wang*, "Coherency-Based Detection Algorithm for Synchrophasor Cyberattacks", North American Power Symposium (NAPS 2019).
- Conference *Sowmya Acharya and C. L. DeMarco*, "Exploiting Network-induced Correlation for Efficient Compression of PMU Data", North American Power Symposium (NAPS 2018).
- Report *Sankar, Lalitha, Christopher DeMarco, Reetam Sen Biswas, Zhigang Chu, Andrea Pinceti, Sowmya Acharya, and Jong Min Lim*, "Synchrophasor Data-Analytics for a More Resilient Electric Power System," Power Systems Engineering Research Center, Final Project Report S-74, September 2019.
- Poster *Sowmya Acharya and C. L. DeMarco*, "Topology Error Estimation in Power System Dynamic Models", IEEE PES T&D Conference and Exposition 2018.

Relevant Coursework

Advanced Power Systems Analysis, Linear Programming Techniques, Nonlinear Optimization, Optimal Control and Variational Methods, Online Control of Power Systems

Professional Development

- Jun 2014 *Short Course: Power System Operation in the Age of Smart Grid*
- Jun 2013 *Short Course: Smart Grid Applications of WAMS*

Professional Skills

MATLAB/Simulink, PowerWorld, L^AT_EX

Leadership Positions

- Member Graduate student representative to the *Committee on Women in the University* at the UW-Madison (2016 – 2019)
- Member Appointed member of Shared Governance Committee in the Associated Students of Madison (2016 – 2019)
- Mentor Mentoring undergraduate students in the ECE department of UW-Madison who are recipients of the *Reynolds Scholarship* (2016 – 2017)
- Volunteer Actively helping with various events organized by the Carbone Cancer Center at the UW-Hospital