Satish Vedula

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Education

- **Florida State University** Tallahassee, FL 2024
  Ph.D. Electrical Engineering
  - **Thesis:** Degradation-Based Energy Management for Microgrids in the Presence of Energy Storage Elements
  - **Advisor:** Dr. Olugbenga Moses Anubi
- **The University of Alabama in Huntsville** Huntsville, AL 2019
  M.Sc. Electrical Engineering
- **Vellore Institute of Technology** Chennai, India 2017
  B.Tech. Electrical and Electronics Engineering

Research Interests

- Distributed Optimization, Control and Estimation
- Micro-grid and Hybrid Electric Vehicle Energy Management
- Battery Health Management and Hardware-in-Loop
- Model Predictive Control
- Inverter Based Resources Control and Stability

Employment

- **Center for Advanced Power Systems** Florida State University
  Research Assistant *Aug 2019 - Present*
- **Dept. of Electrical and Computer Engineering** FAMU-FSU College of Engineering
  Teaching Assistant *Aug 2021 - April 2022*
- **Dept. of Electrical and Computer Engineering** The University of Alabama in Huntsville
  Teaching Assistant *Jan 2019 - April 2019*

Publications

Journal Articles

1. **S. Vedula**, S. Alaviani and O. Anubi. "Distributed Model-Predictive Energy Management Strategy for Shipboard Power Systems Considering Battery Degradation." *ASME Journal of Dynamic Systems Measurements and Control* (**Under Review**), 2024.
2. **S. Vedula**, A. Olajube and O. Anubi. "Fault-Tolerant Decentralized Control for Large-Scale Inverter-Based Resources for Active Power Tracking." *ASME Letters in Dynamic Systems and Control* (**Under Review**), 2024.

3. Y. Zheng, **S. Vedula**, A. Olajube and O. Anubi, "Generative False Data Injection Attack Design for Networked Cyber-Physical Systems." *IEEE Transactions on Neural Networks and Learning Systems* (**Under Review**), 2024.
4. A. Olajube, K. Omiloli, **S. Vedula** and O. Anubi, "Decentralized Droop-based Finite Control Set Model Predictive Control of Inverter-based Resources in Islanded AC Microgrid." *ASME Letters in Dynamic Systems and Control* (**Under Review**), 2024.

Conference Proceedings

1. **S. Vedula**, M. Bijaieh, E. Boateng and O. Anubi "Degradation Aware Predictive Energy Management Strategy for Ship Power Systems." *IEEE Electric Ship Technologies Symposium, Arlington-VA*, 2021.
2. **S. Vedula** and O. Anubi "Distributed Model-Predictive Energy Management Strategy for Hybrid Electric Vehicles Considering Battery Health." *IEEE Conference on Control Technology and Applications*, [**Under Review**], 2024.
3. **S. Vedula**, A. Olajube, K. Omiloli and O. Anubi "Battery Degradation Heuristics for Model Predictive Energy Management in Shipboard Power Systems." *IEEE IECON, Chicago, IL [**Under Review**], 2024*.
4. M. Bijaieh, **S. Vedula**, and O. Anubi "Low-bandwidth Modular Mathematical Modeling of DC Microgrid Systems for Control Development with Application to Shipboard Power Systems." *IEEE Electric Ship Technologies Symposium, Arlington-VA*, 2021.
5. M. Bijaieh, **S. Vedula**, and O. Anubi "Model and Load Predictive Control for Design and Energy Management of Shipboard Power Systems." *IEEE Conference on Control Technology and Applications, San Diego, CA, 2021*.
6. M. Levi, **S. Vedula**, O. Anubi, H. Hoffman, and J. Sun "Health-Conscious Model Predictive Control for Integrated Shipboard Power Systems with Generator and Battery Under High Ramp Rate Loads." *IEEE European Control Conference, Stockholm, Sweden [**Accepted**], 2024*.
7. O. Anubi, C. Konstantinou, C. Wong and **S. Vedula** "Multi-Model Resilient Observer under False Data Injection Attacks" *IEEE Conference on Control Technology and Applications, Montreal, Canada, 2020*.

Under Preparation/Working Papers

1. **S. Vedula** and O. Anubi "Battery Health Conscious Adaptive Control for Islanded Microgrids." (**to be submitted**) *IEEE Transactions on Control System Technology, 2024*.
2. **S. Vedula** and O. Anubi "Admissibility-enforced Power Tracking for Inverter-based Resources: A Second-order Cone Programming Constraint." (**to be submitted**) *IEEE Control System Letters, 2024*.
3. K. Omiloli, A. Olajube, **S. Vedula** and O. Anubi "Nonlinear Control and Stability Analysis of a DC-grid-tied Converter with Efficient Chattering Pruning" (**to be submitted**) IEEE American Control Conference, Denver, CO, 2025.

Selected Talks/Seminars

- **Distributed Power Management for Battery Storage Systems: An ADMM Approach**
  FAMU-FSU College of Engineering - Tallahassee, FL, April 2024
- **Energy Management in Microgrids: Impending Risks and Resiliency Enhancement**
  FAMU-FSU College of Engineering - Tallahassee, FL, March 2024
- **Distributed Energy Management in Shipboard Power Systems**
  Southeast Control Conference - Panama City, FL, February 2024
- **Distributed Gradient Ascent: An Overview with an Application to the Energy Management in Microgrids**
  FAMU-FSU College of Engineering - Tallahassee, FL, December 2023

- **Energy Management in Shipboard Power Systems**
  FAMU-FSU College of Engineering - Tallahassee, FL, November 2021
- **Energy Management in Hybrid Electric Vehicles: An Overview**
  FAMU-FSU College of Engineering - Tallahassee, FL, October 2020

Research/Project Experience

- **Degradation-aware Energy Management for Shipboard Power System**
  - *Research Assistant*
  - PI: Dr. Olugbenga Moses Anubi
  - Developed Energy Management methods and optimization tools for Shipboard Power Systems considering Battery degradation.
- **Integrating Power Network Health Monitoring and prognosis into Shipboard Power Systems**
  - *Research Assistant*
  - PI: Dr. Olugbenga Moses Anubi
  - Developed model predictive and distributed numerical optimization methods for energy management.
- **Characterization, Monitoring, and Management of the State-of-Health of integrated Shipboard Power Systems with Energy Storage**
  - *Research Assistant*
  - PI: Dr. Olugbenga Moses Anubi
  - Developed a battery capacity fade model and implemented predictive control to manage battery degradation for energy management in a microgrid. The outcome of this method provides a viable solution for power system stability under high ramp loads in presence of energy storage elements.
- **Integrated Power System Cyber Simulator Modeling**
  - Research Assistant
  - PI: Dr. Olugbenga Moses Anubi (FSU) and Jude Pierre (GE Global Research)

Academic Contributions and Memberships

- **Reviewer for the following Journals and Conferences**
  - IEEE Conference on Control Technology and Applications (CCTA)
  - IEEE American Control Conference (ACC)
  - IFAC Modeling Estimation and Control Conference (MECC)
  - ASME Journal of Dynamic Systems Measurements and Control (JDSMC)
  - IEEE Industrial Electronic Society Conference (IECON)
  - IEEE Transactions on Transport Electrification (TTE)
- **Student Member: IEEE, ASME**

Teaching Experience

- **Senior Design Project (EEL4911)** — FAMU-FSU College of Engineering
  - *Teaching Assistant* — *Fall 2023*
  - Instructor: Dr. Jerris Hooker
- **Microprocessor System Design (EEL4746)** — FAMU-FSU College of Engineering
  - *Teaching Assistant* — *Spring 2022*
  - Instructor: Dr. Babak Noroozi

- **Engineering Design Concepts (EEL3927)** — FAMU-FSU College of Engineering
  - *Teaching Assistant* — *Spring 2022*
  - Instructor: Dr. Jerris Hooker
- **Statistical Topics in Electrical Engineering (EEL4021)** — FAMU-FSU College of Engineering
  - *Teaching Assistant* — *Fall 2021*
  - Instructor: Dr. Rodney Roberts
- **Advanced Circuits with Computer Lab (EEL3112L)** — FAMU-FSU College of Engineering
  - *Teaching Assistant* — *Fall 2021*
  - Instructor: Dr. Jinyeong Moon
- **Advanced Engineering Mathematics (EE630)** — The University of Alabama in Huntsville
  - *Teaching Assistant* — *Spring 2019*
  - Instructor: Dr. Sarma Rani

Technical Skills

- Mathematical Modeling
- Public Speaking
- Programming Languages
  - MATLAB, Python, Basic C
- Simulation Environments
  - Simulink, LabVIEW
- Real-time Simulators and Hardware-in-Loop
  - SPEEDGOAT, OPAL-RT, SYNDEM Inverter Kit
- Controls
  - PID, MPC, Convex optimization, Distributed Optimization, Fault Tolerant Control, Nonlinear Programming

Awards

- Recipient FSU Graduate Research Assistantship (2019-2021 and 2022-2024)
- Recipient FAMU-FSU College of Engineering Teaching Assistantship (2021 – 2022)

References

Dr. Olugbenga M. Anubi (PhD Advisor)
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