Shammya Shananda Saha

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Education

2015–2021 April (Expected) **Ph. D.**, *Arizona State University*, Tempe, Arizona, *Electrical Engineering*.
CGPA: 3.90

2015–2018 **MSE**, *Arizona State University*, Tempe, Arizona, *Electrical Engineering*.
CGPA: 3.90

2009–2014 **B. Sc.**, *Bangladesh University of Engineering and Technology*, Dhaka, Bangladesh, *Electrical Engineering*.
CGPA: 3.83

Professional Experience

August,2015–Present **Graduate Research Assistant**, *Laboratory for Energy and Power Solutions* , Arizona State University.

- Synthethic distribution feeder development
- Application of blockchain in Transactive Energy
- Cyber-security of inverter dominated distribution networks
- Situational Awareness of Ad-hoc networks using Machine Learning Tools

Co-Instructor, for *Microgrid Design and Operation* course.

Teaching Assistant, for *Electric Grid Operator Training* course.

May,2020–July,2020 **Design Intern**, PXISE Energy Solutions, San Diego, USA.
Developed translators in Python and C# for transforming SQL based topology models to OpenDSS models and CIM models to OpenDSS model, custom methods to validate SCADA data measurement.

May,2018–Aug,2018 **Research Intern**, *Grid Integration Group*, Lawrence Berkeley National Lab, Berkeley, USA.
Developed a MATLAB and Python based OpenDSS simulation environment for simulating cyber-attack scenarios on smart inverters for power distribution systems.

June,2014–July,2015 **Research Assistant**, *Pi Labs Bangladesh*, Bangladesh.

- Designing PCB Boards for industrial projects
- R&D for new product development
- Quality Testing for Manufactured Products

June,2014–July,2015 **Lecturer**, *Sonargoan University*, Bangladesh.

- Preparing lecture materials for undergraduate students
- Conducting lectures, and exam preparation

Technical Skills

Programming	Python, MATLAB, NodeJS, C, Java, C#
Power System	OpenDSS, GridlabD, XENDEE, DSATools (PSAT, TSAT, SSAT), PSLF, PSSE, MATPower, PSCAD, XENDEE
Optimization	AMPL, Google OR Solver, DERCAM
Blockchain	Hyperledger Fabric, Hyperledger Caliper, Hyperledger Explorer
Engineering	Simulink, PSpice, Proteus, Cadence, PLECS
Embedded Systems	Arduino, Raspberry PI, M2M communication
Miscellaneous	Git, Bash, Linux, LATEX, MS Office, Docker

Projects

Design of an Universal Charge Controller, Funded by *IEEE Foundation*.

- Designed an universal charging circuit for 12-24V Battery Systems
- Designed the discharging circuit for the universal charge controller

Cyber-security by Automatic Grid Reconfiguration, Funded by *Department of Energy*.

- Developed feedback control model for Smart Inverters
- Developed simulation tool (OpenDSS and MATLAB/Python) for simulating cyber-attack scenarios on power distribution network

Distributed Security of Grid Edge Devices, Funded by *Office of Naval Research*.

- Developed a Transactive Energy framework using Hyperledger Fabric
- Integrated distributed market and verification algorithms with Blockchain
- Integrated the architecture with a physical inverter at LEAPS MIcrogrid Test Bed

Development of Synthetic Distribution Feeders, Funded by *Office of Naval Research & National Science Foundation*.

- Developed software framework for generating synthetic distribution feeder using OpenStreetMap
- Currently working on developing framework for generating unbalanced distribution networks

Development of Microgrid on a Desk, Funded by *Office of Naval Research* STEM.

- Developed power electronic design for *Microgrid on a Desk* for K3-K12 students
- Developing online course contents for Power Transmission and Distribution Systems

Power System Economic and Transient Simulator Development, Funded by *Incsys & PowerData*.

- Developed a JAVA based transient simulator using OpenPA library
- Developed open source SCED and SCUC using Google OR solver

GIS Translator Development for Off-grid Villages of Niger, Funded by *Powergen*.

- Developed a tool to convert ArcGIS power network models to OpenDSS models
- Developed a tool for visualizing voltage information over GIS Map

Situational Awareness and Smart Reconfiguration of Ad-hoc Military Grids using Digital Twin, Funded by *Office of Naval Research*.

- Currently working developing methods for state estimation in the under-sampled regime for distribution networks

Publications

Published

- **Shammya Saha**, E. Schweitzer, A. Scaglione and N. G. Johnson, "A Framework for Generating Synthetic Distribution Feeders using OpenStreetMap", in *51st North American Power Symposium*, 13-15 Oct 2019, Wichita, Kansas, USA.
- **Shammya Saha** and N. G. Johnson, "Point-on-Wave Analysis of Three-Phase Induction Motor Drive Under Fault External to the Power Plant", in *IEEE Power & Energy Society General Meeting (PESGM)*, 5-10 Aug. 2018, Portland, OR, USA.
- **Shammya Saha**, S. Janko, N. G. Johnson, R. Podmore, A. Riaud and R. Larsen, "A universal charge controller for integrating distributed energy resources", in *IEEE Global Humanitarian Technology Conference (GHTC)*, 13-16 Oct. 2016, Seattle, WA, USA.
- **Shammya Saha**, M. N. B. Shaheed, M. H. Sajeeb, T. Hamid and S. I. Khan, "Optimal planning of off-grid solar-wind-tidal hybrid energy system for sandwip island of Bangladesh", in *8th International Conference on Electrical and Computer Engineering*, 20-22 Dec. 2014, Dhaka, Bangladesh.
- E. Schweitzer, **Shammya Saha**, A. Scaglione, N. G. Johnson and D. Arnold, "Lossy DistFlow Formulation for Single and Multiphase Radial Feeders", in *IEEE Transactions on Power Systems*, Nov. 2019.
- Md. Z. R. Khan, Md. Z. Khan, M. N. I. Khan, **Shammya Saha**, D. F. Noor, and Md. R. K. Rachi, "Maximum Power Point Tracking for Photovoltaic Array Using Parabolic Interpolation", in *International Journal of Information and Electronics Engineering*, vol. 4, no. 3, pp. 249-255, May 2014.
- A. Anderson, P. Loomba, I. Orajaka, J. Numfor, **Shammya Saha**, S. Janko, N. Johnson, R. Podmore and R. Larsen, "Empowering Smart Communities: Electrification, Education, and Sustainable Entrepreneurship in IEEE Smart Village Initiatives", in *IEEE Electrification Magazine*, vol. 5, no. 2, pp. 6-16, June 2017.
- R. Podmore, R. Larsen, H. Louie, N. Johnson, **Shammya Saha**, "Fueling Sustainability: The Exponential Impact of Empowering Off-Grid Communities", in *IEEE Electrification Magazine*, vol. 4, no. 1, pp. 11-17, Feb. 2016.
- N. A. Khan, A.K. Sikder and **Shammya Saha**, "Optimal planning of off-grid solar-wind-tidal hybrid energy system for sandwip island of Bangladesh", in *2nd International Conference on Green Energy and Technology*, 5-6 Sep. 2014, Dhaka, Bangladesh.
- M. N. I. Khan ; Z. Khan ; D. F. Noor ; A. Nahiyan, E. Haque, **Shammya Saha**, R. K. Rachi and Z, R. Khan, "Modelling and simulation of an efficient Charge Controller for Photovoltaic System with Maximum Power Point Tracking ", in *3rd International Conference on the Developments in Renewable Energy Technology (ICDRET)*, 29-31 May 2014, Dhaka, Bangladesh.
- P. Ahmmed , **Shammya Saha** , S. M. N. Al Sunny , I. Hossain and I. J. Rafee, "Modeling and simulation of a Microcontroller based power factor correction converter", in *International Conference on Informatics, Electronics and Vision (ICIEV)*, 01 August 2013, Dhaka, Bangladesh.

Accepted

- **Shammya Saha**, D. Arnold, A. Scaglione, E. Schweitzer , N. G. Johnson , C. Roberts and S. Peisert, "Lyapunov Stability of Smart Inverters Policies based on Linearized DistFlow Approximation".
- **Shammya Saha**, C. Gorog, A. Moser, A. Scaglione and N. G. Johnson , "Integrating Hardware Security into a Blockchain-Based Transactive Energy Platform".
- C. Roberts, S. Ngo, A. Milesi, S. Peisert, D. Arnold, **Shammya Saha**, A. Scaglione, N. G. Johnson, A. Kocheturov and D. Fradkin , "Deep Reinforcement Learning for DER Cyber-Attack Mitigation".

Under Review

- **Shammya Saha**, N. Ravi, K. Hreinsson, J. Baek, A. Scaglione and N. G. Johnson , "A Secure Distributed Ledger for Transactive Energy: The Electron Volt Exchange (EVE) Blockchain".

Academic Projects

- Development of SCED and SCUC encompassing transmission line, generator contingency and renewable generation using Bender's Decomposition and Progressive Hedging
- Analyzing the behavior of power plant auxiliary in response to external fault in PSCAD
- Development of a MATLAB based CAD tool for Power Electronics Application
- Design of a programmable DC Load Bank using Arduino UNO, real time clock & memory card
- Dynamic Model Development of an Inverter in PSLF
- Sizing of Series Capacitor for improving the stability of a steel mil
- Dynamic Model Development of a 150 kVA Induction Motor Drive using Simulink and PSLF

Activities

Talks

- **Shammya Saha**, DER Integration in Patrol Base and Forward Operating Base Design, Training Session for Army Reserve Managers, November 6, 2017
- Nathan Johnson, **Shammya Saha**, Samantha Janko, Nathan Webster, From Energy Access to Grid Resiliency: A Story of Anthropology, Engineering, and Business, University of Alaska, September 14, 2018

Media Coverage

- ASU Microgrid Engineering with XENDEE, url: `https://www.youtube.com/watch?v=XJK06BDyRYg`
- ASU Microgrid Boot Camp Training, url : `https://www.youtube.com/watch?v=LeRRq0o8SP8&t=13s`

Volunteering Activities

- Student Lead for IEEE PES voluntary project on developing an open source design for 10 Watt and 100 Watt Solar Charge Controller for Rural Areas of Bangladesh, 2013-2014
- Participated in volunteering for Project C.U.R.E. with my research lab
- Student Volunteer for 2019 ACE e-Energy conference
- Co Vice Chair, ASU IEEE PES Student Chapter (May 2016-June 2017)

Posters & Presentations

- **Shammya Saha** and Nathan Johnson, Point-on-Wave Analysis of Three-Phase Induction Motor Drive Under Fault External to the Power Plant, 2018 IEEE PES General Meeting, Portland, OR.
- **Shammya Saha**, Eran Schweitzer, Anna Scaglione and Nathan Johnson, A Framework for Generating Synthetic Distribution Feeder using OpenStreetMap, 2019 North American Power Symposium (NAPS), October 14, 2019, Wichita, Kansas.
- **Shammya Saha**, Raksha Ramakrishna, Anna Scaglione, Nathan Johnson and Gary Morris, Resilience of Critical Infrastructure to Cyber Attacks, Naval Enterprise Partnership Teaming with Universities for National Excellence (NEPTUNE) Project Review, October 8, 2019
- **Shammya Saha**, Raksha Ramakrishna, Teklemariam Tesfay, Gary Morris Anna Scaglione and Nathan Johnson, Cybersecurity of Operational Technology in Electric Grids, Cyber-Physical Systems Security Workshop, October 18-19, University of Rhode Island, Kingston, RI; url: `https://web.uri.edu/dura/files/Nathan_Johnson.pdf`
- **Shammya Saha**, Shahidul Islam Khan, Development of 10W and 100W Solar Charge Controller for Rural Areas of Bangaldesh, 2014 IEEE PES General Meeting, Washinton DC, MD.

Training

- Instructor, ASU Microgrid Boot Camp for US Veterans: XENDEE Session, (March 2016- Present)
- Co-Instructor, Hands on Training Session for Army Reserve Base Managers, November 6, 2017
- Co-Instructor, ASU Microgrid Mini Boot-Camp, 86th Military Operations Research Society (MORS) Symposium, Naval Postgraduate School, 19th June, 2018; url:`https://www.mors.org/Symposium/86th-Symposium`

References

Dr. Nathan Johnson — **Associate Professor**, *The Polytechnic School*, Arizona State University.
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Dr. Anna Scaglione — **Professor**, *Electrical and Computer Engineering*, Arizona State University.
ascaglio@asu.edu

Dr. Daniel Arnold — **Research Scientist**, *Grid Integration Group*, Lawrence Berkeley National Laboratory.
dbarnold@lbl.gov

Dr. Raymond A. de Callafon — **Professor**, *Department of Mechanical and Aerospace Engineering*, University of California, San Diego.
callafon@gmail.com