Shammya Shananda **Saha**

Cyber Security, Stability Analysis, Power Transmission and Distribution Systems

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Education

Arizona State University — *Tempe, Arizona, USA*

Ph. D. in Electrical Engineering (*Security & Stability of Power Distribution Systems with High Penetration of Renewables*) — *2015 - April 2021 (Expected)*

Arizona State University — *Tempe, Arizona, USA*

MIP in Electrical Engineering (CGPA: 3.90) — *2015 - 2018*

- Courses: Power Systems Analysis, Linear System Theory, Advanced Power Electronics, Power Plant Control and Monitoring, Power System Stability, Power System Dynamics, Renewable Electric Energy Systems, Power Transmission and Distribution Systems, Optimal Control, Power System Operation and Planning, Operation Research Applied to Electric Power Systems

Bangladesh University of Engineering and Technology — *Dhaka, Bangladesh*

B.Sc. in Electrical Engineering (CGPA: 3.83) — *2009 - 2014*

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

Experience

Laboratory for Energy and Power Solutions, Arizona State University — *Tempe, USA*

Graduate Research Assistant — *August,2015 - Present*

- Synthetic 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 and Grid Graph Signal Processing

PXISE Energy Solutions — *San Diego, USA*

Design Intern — *May, 2020 - July, 2020*

- Developed translators in Python and C# for transforming SQL based topology models to OpenDSS model
- Developed converter to convert CIM model to OpenDSS model
- Developed methods to validate SCADA data measurement

Grid Integration Group, Lawrence Berkeley National Lab — *Berkeley, USA*

Research Intern — *May, 2018 - Aug, 2018*

- Developed a MATLAB and Python based OpenDSS simulation environment for simulating cyber-attack scenarios on smart inverters for power distribution systems.

Pi Labs Bangladesh — *Dhaka, Bangladesh*

Junior Research Engineer — *June, 2014 - July, 2015*

- Designed PCB Boards for industrial projects.
- Conducted R&D for new product development.
- Performed quality testing for manufactured products.

Sonargoan University — *Dhaka, Bangladesh*

Lecturer — *June, 2014 - July, 2015*

- Prepared lecture materials for undergraduate students.
- Conducted lectures for *AC and DC Circuits*

Research Projects

Design of an Universal Charge Controller

IEEE Foundation

Project Lead

- 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

Department of Energy

Team Member

- 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

Office of Naval Research

Project Lead

- 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

Office of Naval Research

Project Lead

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

Power System Economic and Transient Simulator Development

Incsys & PowerData

Project Lead

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

Development of Microgrid on a Desk

Office of Naval Research

Team Member

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

GIS Translator Development for Off-grid Villages of Niger

Powergen

Team Member

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

Situational Awareness and Smart Reconfiguration of Ad-hoc Military Grids using Digital Twin

Office of Naval Research

Project Lead

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

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

Selected Publications

- A Secure Distributed Ledger for Transactive Energy: The Electron Volt Exchange (EVE) Blockchain
- A Framework for Generating Synthetic Distribution Feeders using OpenStreetMap
- Lyapunov Stability of Smart Inverters Policies based on Linearized DistFlow Approximation
- Point-on-Wave Analysis of Three-Phase Induction Motor Drive Under Fault External to the Power Plant
- Integrating Hardware Security into a Blockchain-Based Transactive Energy Platform
- Deep Reinforcement Learning for DER Cyber-Attack Mitigation
- A universal charge controller for integrating distributed energy resources
- Study and analysis of existing solar PV system in urban area of Bangladesh
- Modelling and simulation of an efficient Charge Controller for Photovoltaic System with Maximum Power Point Tracking