ZEAL SHAH

147F Brittany Manor Drive, Amherst, MA 01002
zpshah95@gmail.com · +1(412) 251-6226 · www.linkedin.com/in/zealpshah

RESEARCH INTERESTS

Data science and AI for social good, technology for development, sustainability

EDUCATION

University of Massachusetts Amherst — Amherst, MA
Ph.D. in Electrical & Computer Engineering — Aug 2018 - Present
Advisor: Prof. Jay Taneja

Carnegie Mellon University — Pittsburgh, PA
M.S. in Energy Science, Technology & Policy (*concentration: ECE*) — Aug 2016 - Dec 2017

Pandit Deendayal Petroleum University — Gandhinagar, India
B.Tech. in Electrical Engineering — Jun 2012 - Jun 2016

PUBLICATIONS

- **Zeal Shah**, Alex Yen, Ajey Pandey, and Jay Taneja. "GridInSight: Monitoring Electricity Using Visible Lights." In the 6th ACM International Conference on Systems for Energy-Efficient Built Environments, Cities, and Transportation (BuildSys'19), **November 2019**. **Best Paper Nominee**. *1

POSTERS & PRESENTATIONS

- **Zeal Shah**, Jay Taneja. "Monitoring Electric Grid Reliability Using Satellite Data." In the 6th ACM International Conference on Systems for Energy-Efficient Built Environments, Cities, and Transportation, November 2019. **Best Poster Award**. *2
- **Zeal Shah**, Alex Yen, Ajey Pandey, Jay Taneja. "GridInSight: Monitoring Electricity Using Visible Lights." In the 2nd Annual ACM SIGCAS Conference on Computing and Sustainable Societies (COMPASS'19), July 2019. *1
- Jon Thacker, **Zeal Shah**. "Smart Metering Data For Tracking Access to Electricity." In the 7th Microgrid Global Innovation Forum, September 2018. *3
- **Zeal Shah**, Yoolhee Kim, Anand Prakash, Vasu Nambeesan. "Occupancy Prediction Based on the Power Consumption Patterns" In the Carnegie Mellon University Symposium on Machine Learning in Science and Engineering, May 2017. *4
- **Zeal Shah**, Siddhartha Joshi. "Operation and Analysis of a Bi-directional DC-DC Converter for Efficient Charge Control of Battery in a Microgrid." In the 50th IEEE Industry Applications Society Annual Meeting, October 2015.

EXPERIENCE

STIMA Lab, University of Massachusetts Amherst — Amherst, MA
Graduate Research Assistant — Aug 2018 - Present

- Develop electric grid reliability measurement indices using nighttime-lights satellite data to enable grid reliability monitoring at a global scale; create an API to make indices publicly accessible. *2
- Develop mechanisms to track, quantify, and map energy infrastructure recovery in conflict affected regions using satellite data, to help humanitarian efforts.
- Process massive satellite imagery datasets on GPU clusters and apply deep learning techniques to map buildings in these images, to support infrastructure planning efforts in emerging economies.
- Created a low-cost solution to non-intrusively monitor grid power quality and phase using smartphone cameras to facilitate better management of grids in developing countries. *1

SparkMeter — Washington, DC
Data Science Intern — Feb 2018 - Sep 2018

- Developed a monitoring tool using Grafana and SQL for real-time monitoring of deployed smart meters, base stations and cloud services to facilitate efficient troubleshooting.

- Analyzed smart meter data to track the evolution of electricity quality and reliability across 68 sites spread over Sub-Saharan Africa and South-Asia with 10 to 500+ customers per site. *3
- Provided need based data and analysis support to different teams.

Nikola Power Washington, DC
Engineering Intern (Remote) Jun 2018 - Aug 2018

- Developed an optimal battery dispatching algorithm to minimize the operating cost of residential solar grid+storage system by controlling charging & discharging of the battery.
- Assisted in development of short-term load forecasting algorithm for company's residential energy management system product.

Carnegie Mellon University Pittsburgh, PA
ECE Graduate Teaching Assistant Jan 2017 - Dec 2017

- Head TA for two senior level courses: *Fundamentals of Power Systems* and *Embedded Systems.*

SparkMeter Washington, DC
Data Science Intern May 2017 - Aug 2017

- Developed a suite of interactive analytical reports that provide actionable commercial, financial and technical insights into grid operations to company's utility customers.
- Created an outlier detection and removal program to filter noise recorded by smart meters.

SELECTED COURSE PROJECTS

- **Multi-tier Online Book Store:** Developed a multi-tier web application using Flask in Python and added features like caching, replication, load-balancing, fault tolerance and recovery.
- **Where, When and Watt?:** Created a program to predict occupancy of different rooms based on appliance power consumption data and achieved 93% model prediction accuracy. *4
- **New York State Energy Brief:** Analyzed multiple open-source datasets to study and predict NY's energy consumption in residential, commercial, industrial and transportation sectors.
- **Solving Unit Commitment:** Implemented mixed-integer linear programming to solve a 24-hour unit commitment problem using data from multiple generators and demand data.

SELECTED COURSEWORK

Neural Networks, Machine Learning, Algorithms, Optimization, Distributed & Operating Systems, Computer Architecture, Applied Stochastic Processes, Linear Systems

HONORS & AWARDS

- Dean's Fellowship, UMass Amherst College of Engineering 2018
- Travel Grant Award, IEEE Industrial Applications Society 2015
- Travel Grant Award, IEEE Energy Conversion Congress and Exposition 2015

COMPUTING SKILLS

Programming: Python, SQL, Matlab
Python Libraries: Flask, GeoPandas, Numpy, OpenCV, Pandas, PyTorch, Rasterio, Scipy, Scikit-learn, SQLAlchemy
Visualization Tools: Plotly, Grafana