

## Anika Tabassum

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### RESEARCH INTEREST

I develop explainable and robust frameworks to solve the challenges that emerge from Cyber-Physical Systems (CPS) and power-grid. My research interests broadly lie in utilizing Explainable Machine Learning (ML), uncertainty estimation, and optimization techniques to contribute to emerging scientific applications.

### EDUCATION

*Ph.D. Candidate, Computer Science* 2017 - Present  
Sanghani Center of AI & Data Analytics, Virginia Tech, Arlington, VA 22203  
Expected Graduation Date: September, 2021  
CGPA: 3.79/4.0 (All courseworks completed)  
Advisor: Prof. B. Aditya Prakash (recently moved to Georgia Tech)

*Urban Computing Certificate, Virginia Tech* Aug 2019 - Dec 2020

*Bachelor in Science, Computer Science and Engineering* 2011 - 2016  
Bangladesh University of Engineering and Technology  
Dhaka, Bangladesh

### PUBLICATIONS Under Submission

1. **Anika Tabassum**, Supriya Chinthavali, Sangkeun Lee, Bill Kay, Nils Stenvig, and B. Aditya Prakash. Efficient Contingency Analysis in Power Systems via Network Trigger Nodes.
2. **Anika Tabassum**, Supriya Chinthavali, Varisara Tansakul, and B. Aditya Prakash. Identifying Culprits in Multivariate Time-series for Urban Analytics.

### Referred Journals & Conferences

1. Alexander Rodriguez, **Anika Tabassum**, Jiaming Cui, Jiajia Xie, Javen Ho, Pulak Agarwal, Bijaya Adhikary, and B. Aditya Prakash. DeepCOVID: An Operational DL-driven Framework for Explainable Real-time COVID-19 Forecasting. Annual Conference on Innovative Applications of Artificial Intelligence (IAAI) 2021.
2. Alexander Rodriguez, Nikhil Muralidhar, Bijaya Adhikary, **Anika Tabassum**, Naren Ramakrishnan, B. Aditya Prakash. CALINET: Steering a Historical Disease Forecasting Model Under a Pandemic. AAAI 2021.
3. Nikhil Muralidhar, **Anika Tabassum**, Liangzhe Chen, Supriya Chinthavali, Naren Ramakrishnan, and B. Aditya Prakash. Cut-n-Reveal: Timeseries segmentations with explanations. ACM Transactions on Intelligent Systems and Technology (TIST) May 2020.
4. Sorour E. Amiri, **Anika Tabassum**, E. Thomas Ewing, and B. Aditya Prakash. Tracking and analyzing dynamics of news-cycles during global pandemics: a historical perspective. ACM SIGKDD Explorations Vol. 21 Issue 2 December 2019.

5. **Anika Tabassum**, Supriya Chinthavali, Sangkeun Lee, Liangzhe Chen, B. Aditya Prakash. Urban-Net: A System to Understand and Analyze Critical Infrastructure Networks for Emergency Management. ACM SIGKDD 2019.
6. **Anika Tabassum**, Sukarna Barua, Tanzima Hashem and Tasmin Chowdhury. Dynamic Group Trip Planning Queries in Spatial Database. SSDMB 2017.
7. **Anika Tabassum**, Mahmudul Hasan, Shibbir Ahmed, Rahnuma Tasmin, Deen Abdullah and Tasnim Musharrat. University Ranking Prediction System by Analyzing Influential Global Performance Indicators. KST 2017.
8. Shibbir Ahmed, A. S. M. L. Hoque, Mahmudul Hasan, Rahnuma Tasmin, Deen Abdullah and **Anika Tabassum**. Discovering knowledge regarding academic profile of students pursuing graduate studies in world's top universities. IWCI 2016.

#### Referred Workshops

1. Alexander Rodriguez, Nikhil Muralidhar, Bijaya Adhikary, **Anika Tabassum**, Naren Ramakrishnan, and B. Aditya Prakash. Steering a Historical Disease Forecasting Model Under a Pandemic: Case of Flu and COVID-19. NeuRIPS Workshop on Machine Learning in Public Health (MLPH). 2020.
2. Pravallika Devineni, Bill Kay, Hao Lu, **Anika Tabassum**, Supriya Chintavali, and Sangkeun Lee. Towards Quantifying Vulnerabilities in Critical Infrastructure Systems. IEEE BigData Workshop on Big Data Tools, Methods, and Use Cases for Innovative Scientific Discovery (BTSD), 2020.
3. Supriya Chinthavali, Varisara Tansakul, Sangkeun Lee, **Anika Tabassum**, JeffMunk, Jan Jakowski, Michael Starke, Teja Kuruganti, Heather Buckberry, JimLeverette. Quantification of Energy Cost Savings through Optimization and Control of Appliances within Smart Neighborhood Homes. ACM International Workshop on Urban Building Energy Sensing, (UrbSys), 2019

#### INVITED ARTICLE

Anika Tabassum, Supriya Chinthavali, Liangzhe Chen, and B. Aditya Prakash. Data Mining Critical Infrastructure Systems: Models and Tools. IEEE Intelligent Informatics Bulletin, 2018

#### HONORS & AWARDS

- Facebook COVID-19 Symptom Data Challenge, 1st prize (Team *DEEP OUT-BREAK*), 2020
- NSF Urban Computing Fellowship Award, 2019-21
- Travel award SIGKDD, 2019 & 2020
- Best Undergraduate Poster Award, 2016
- Best Database Project Award, 2014
- Travel grant award in Grace Hopper Celebration, Houston, Texas, 2015
- Travel grant award in Grace Hopper Celebration India, 2014
- Bangladesh University of Engineering & Technology Dean Scholarship, 2013, 2016

**RESEARCH  
EXPERIENCE**

**Projects**

Scalable Computing Group, ORNL

September 2020- Present

Collaborator: Supriya Chinthavali, Dr. Sangkeun Lee

- *Power Flow Model Through Network-based Approaches*  
Develop a learning model to identify the critical components in heterogeneous networks like power grids, by incorporating different uncertainties and domain rules.
- *HydroPower Prediction for Extreme Weather Conditions*  
Leverage deep learning model to predict power generation of a hydro-power plant during extreme weather conditions, such as drought, heat wave, etc. by incorporating weather physics.  
Experience: PyTorch, Python Pandas, Numpy, Scikit-learn
- *Smart Neighborhood with Microgrid Technology*  
Develop an explainability module for understanding energy usage of a neighborhood for HVAC and multiple electrical devices to improve energy optimization for homes.

CDC Covid-19 Forecasting Challenge

March 2020-Present

Collaborator: Georgia Tech, Virginia Tech, University of Iowa,

- *Team: DEEP-COVID (Placed 1st in Facebook COVID-19 Symptom Data Challenge)*  
Predict hospitalizations and mortality for Covid-19 with a data driven deep-learning model. My contribution is constructing and maintaining the data module pipeline for handling data uncertainty and fast-changing scenarios.

Graduate Assistant

- *Explainable Time-Series Segmentations* February 2018- December 2019  
Collaborator: Dr. Naren Ramakrishnan, Virginia Tech  
Identify significant and consequential events (segments) in multivariate time-series and explain each event in terms of culprit the time-series to analyze and improve grid resiliency for future disaster
- *Failure Propagation in Critical Infrastructure System* July 2018- May 2019  
Collaborator: Oak Ridge National Lab, Department of CS, Virginia Tech  
Improve the interactive geographic information system EAGLE-I of US department of Energy that allows user to view nations energy infrastructure in map, obtain near real-time informational updates, and quantify vulnerabilities of critical infrastructure components within one platform  
Experience: Neo4J, PostgreSQL, Python Networkx, Graph Analysis
- *Dynamics of news cycle during global epidemics* May 2018-Feb 2019  
Collaborator: Department of CS, Department of history Virginia Tech  
Develop a framework to analyze and understand information flow of a global epidemic in newspapers and journals based on historical perspective

**PROFESSIONAL EXPERIENCE** **Research Internship**, Oak Ridge National Lab

June 2019 - August 2019

*Smart Neighborhood*

Build an analytic module to understand and leverage optimization algorithms for modeling energy usage in smart neighborhood.

Experience: Python Data Analysis(Numpy, Scipy, Pandas, Matplotlib, Scikit-learn), Multithreading, and Visualization libraries, PyMongo, PostgreSQL

**Teaching**, Virginia Tech  
GTA: CS 2114, Software Design & Data Structure  
GTA: CS 1114, Introduction to Software Design

August 2017 - May 2019

## TALKS

**Machine Learning Models for Critical Infrastructures**, Women in Data Science (wIDS), Blacksburg, 2021

**Connecting Critical Infrastructures through Explainable and Network-based Models**, UrbComp Seminar, Virginia Tech, 2020

**Urban-Net: A System to Understand and Analyze Critical Infrastructure Networks for Emergency Management**, KDD 2019

## TECHNICAL SKILLS

Programming Languages: Python, Matlab, Java, J2EE, J2SE, C++, HTML, Prolog  
Database: MySQL, Neo4j, MongoDB, RDF Triplestore (Apache Jena, Fuseki).  
Deep Learning Library: PyTorch  
Multithread: Multiprocessing, PyPy, GPU  
Operating Systems: Linux, MAC-OS, Windows

## SERVICES

External Reviewer: ICDM, KDD, WWW, SDM, TKDD, IEEE BigData

Reviewer: ECML PKDD

## RELEVANT GRADUATE COURSES:

- CS 6604: Advanced Deep learning
- CS 5614: Big Data Management Systems
- STAT 6474: Advanced Bayesian Statistics
- CS 5525: Data Analytics
- CS 5485: Urban Computing
- CS 5984: Deep Learning (Audit)
- CS 5604: Information Storage & Retrieval
- CS 5764: Information Visualization
- NSEG 5134: Monte Carlo Simulation Methods