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Tanvir Ferdousi

Charlottesville, VA 22901, USA

EDUCATION

Ph.D.** in **Electrical and Computer Engineering [May 2021]

Department of Electrical and Computer Engineering (ECE)

Kansas State University (K-State), Manhattan, KS

- Thesis: "Computational models and tools for analysis, prediction, and control of infectious diseases"
- Supervisor: Dr. Caterina Scoglio, ECE, K-State

B.Sc.** in **Electrical and Electronic Engineering [Feb 2013]

Department of Electrical and Electronic Engineering (EEE)

Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh

- Thesis: "Design of a honeycomb all solid photonic bandgap fiber for a wide visible region"
- Supervisor: Dr. Md. Shah Alam, EEE, BUET

RESEARCH INTERESTS

- Machine Learning / AI
- Networked contagions
- Software Systems

PUBLICATIONS

Google Scholar Profile: https://scholar.google.com/citations?user=tEofsW0AAAAJ

- Yi, Chunlin, Aram Vajdi, **Tanvir Ferdousi**, Lee W. Cohnstaedt, and Caterina Scoglio. 2023. "PICTUREE—Aedes: A Web Application for Dengue Data Visualization and Case Prediction." *Pathogens* 12, no. 6: 771. [Paper]
- **Ferdousi, Tanvir,** Aparna Kishore, Lucas Machi, Dustin Machi, Chris J. Kuhlman, and S. S. Ravi. "A Web-Based System for Contagion Simulations on Networked Populations." In *2022 IEEE 18th International Conference on e-Science (e-Science)*, pp. 306-315. IEEE, 2022.
- **Ferdousi, Tanvir**, Lee W. Cohnstaedt, and Caterina M. Scoglio. "A windowed correlation-based feature selection method to improve time series prediction of dengue fever cases." *IEEE Access* 9 (2021): 141210-141222. [Paper]
- **Ferdousi, Tanvir**. "Computational models and tools for analysis, prediction, and control of infectious diseases." *PhD Dissertation* (2021), Kansas State University. [Dissertation]
- **Ferdousi, Tanvir**, Don Gruenbacher, and Caterina M. Scoglio. "A Permissioned Distributed Ledger for the US Beef Cattle Supply Chain." *IEEE Access* 8 (2020): 154833-154847. [Paper]
- **Ferdousi, Tanvir**, Sifat Afroj Moon, Adrian Self, and Caterina M. Scoglio. "Generation of swine movement network and analysis of efficient mitigation strategies for African swine fever virus." *PLOS ONE* 14, no. 12 (2019): e0225785. [Paper, Code]
- **Ferdousi, Tanvir**, Lee W. Cohnstaedt, D. Scott McVey, and Caterina M. Scoglio. "Understanding the survival of Zika virus in a vector interconnected sexual contact network." *Scientific Reports* 9, no. 1 (2019): 7253. [Paper, Code]
- Moon, Sifat A., **Tanvir Ferdousi**, Adrian Self, and Caterina M. Scoglio. "Estimation of swine movement network at farm level in the US from the Census of Agriculture data." *Scientific Reports* 9, no. 1 (2019): 6237.
- Shahtori, Narges Montazeri, **Tanvir Ferdousi**, Caterina M. Scoglio, and Faryad Darabi Sahneh. "Quantifying the impact of early-stage contact tracing on controlling Ebola diffusion." *Mathematical Biosciences & Engineering* 15, no. 5 (2018): 1165-1180.

WORK EXPERIENCE

Postdoctoral Research Associate at *University of Virginia (UVA)*   *[Aug 2021 – Current]*
- Developed and optimized graph analytics tools capable of large-scale computations in a software as a service (SaaS) architecture using high performance computing (HPC).
- Deployed an Agro-hydrological simulation system (VIC-CropSyst) with automated HPC parallelization, data pre- and post-processing to provide user-friendly access to the tool.
- Developed a framework for large-scale spatial model explainability using supervised and unsupervised machine learning techniques.

Graduate Research Assistant at *Kansas State University (K-State)*   *[Aug 2016 – May 2021]*
- Developed network-based epidemic spreading models for Zika and African swine fever viruses to study the impacts of pathogen behavior, host movements, and disease control measures.
- Developed a correlation-based feature selection method to improve the performance of recurrent neural networks (LSTM and GRU) in predicting time series case data of dengue fever.
- Designed and developed an Epidemic forecasting dashboard to visualize and analyze spatial and temporal data.
- Conceptualized a blockchain-based decentralized data management framework for the US beef cattle industry.
- Designed and developed models for graph generation from aggregate and incomplete data. The graphs were used to simulate virus spreading processes.

Senior Software Engineer at *Samsung R&D Institute Bangladesh (SRBD)*   *[Apr 2013 - Jul 2016]*
- Managed the Connectivity, Security, and Protocol team of the OCF IoTivity QA project as a team lead in 2016.
- Developed tools for unit, integration, and compliance test of the OCF IoTivity framework.
- Extended a Java-based constrained application protocol (CoAP) library with IoTivity framework features.
- Implemented and maintained a TURN-based NAT traversal solution to establish TCP connections via relay servers.

Research Engineer at *Institute of Information and Communication Technology (IICT)*   *[Feb 2013 - Mar 2013]*
- Conducted workshops on embedded systems as a teaching assistant. Prepared teaching materials on FPGA, Verilog, and Microcontrollers.

ACADEMIC EXPERIENCE

Relevant Courses	Machine Learning and Pattern Recognition, Network Theory, Mathematics of Data and Networks, Analysis of Algorithms, Agent-Based Game Theory, Multivariate Statistical Methods
Teaching Responsibilities (TA)	Introduction to Blockchain (Co-Taught), Applied Scientific Computing, Introduction to Computer Engineering, Linear Systems

TECHNICAL SKILLS

Areas of Expertise	Network Science, Machine Learning, Blockchains, Computational Models
Languages	C/C++, Python, R, Java, MATLAB, SQL, JavaScript, Solidity
Environments	AWS, Azure, Linux, Mac OS, Windows
Frameworks	TensorFlow, scikit-learn, Pandas, Numpy, PostGIS, Leaflet.js, Ethereum
Tools	Jupyter, Visual Studio, Eclipse, GNU Make, Bash Shell, Jira, Git

PEER REVIEW CONTRIBUTIONS
Reviewed multiple articles for the following journals / conferences,
- IEEE Access
- IEEE Networking Letters
- IEEE Transactions on Network Science and Engineering
- Elsevier Preventive Veterinary Medicine
- PeerJ
- ASONAM 2022
- Winter Simulation Conference 2023

SELECTED PRESENTATIONS

- Using Net.Science to perform on-demand contagion simulations – June 2023
- NetSimS (Network Simulation as a Service) within the CINES ecosystem (Biocomplexity Institute Fall Research Meeting) – December 2022.
- A web-based system for contagion simulations on networked populations (IEEE eScience 2022, Salt Lake City, Utah) – October 2022
- A permissioned distributed ledger for farm animal supply chains (Beef Cattle Institute, K-State) – June 2019
- Understanding the role of sexual transmission in the spread of Zika virus (AMCA Annual Meeting, Kansas City, MO) – Feb 2018
- Developing applications using RFC 7252 - Constrained Application Protocol (CoAP) (Samsung, Dhaka, Bangladesh) – Jul 2015
- From schematics to PCB layouts in Proteus Design Suite (Eastern University, Dhaka, Bangladesh) – Dec 2014

AWARDS & HONORS

- Achieved "Grade 1" in annual performance evaluation at Samsung (2014).
- Achieved the "Advanced Level" in the Software Certification Test at Samsung (2016).
- Earned the 1st place in the Solution Lab of Samsung R&D Institute Bangladesh in the Software Capability Test (2013).
- Dean's List Award from Bangladesh University of Engineering and Technology (2010).
- Earned scholarships for being ranked 1st out of 84 enrolled students in the Cisco Networking Academy Program (CNAP) at BUET (2010-2011) in the CCNA Exploration 4.0 course.

ACTIVITIES & LEADERSHIP

- An alumnus of the Leadership Development Program at the Staley School of Leadership Studies, K-State.
- Founding member and the 1st president of Bangladeshi Students' Association (2019) at K-State.
- Former volunteer of the American Red Cross Club (ARCC) at K-State.