

MD KAMRAN CHOWDHURY SHISHER

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Summary

- Currently, I am a PostDoctoral Researcher at Purdue University working with Prof. Christopher G. Brinton and Prof. Mung Chiang. My research work focuses on designing communication networks for inference, learning, and control at wireless edge.
- I received Ph.D. degree in Electrical Engineering from Auburn University, AL, USA. I was Research Assistant and Teaching Assistant at Auburn University from Aug. 2018 to May. 2024.
- My Ph.D. work started a new research area called “Remote Inference,” a crucial part of Next-G wireless networks. I developed a novel information-theoretic tool to evaluate the importance of information freshness on remote inference/estimation. By using information-theoretic analysis, I designed low-complexity intelligent scheduling algorithms so that every smart device connected to wireless communication networks gets the right information when it is needed. This means better real-time experience from connected smart devices.
- I have been actively involved in AI research and education. I am mentoring a Ph.D. student at Purdue University on Federated Learning. Additionally, I have contributed to interdisciplinary AI research in agriculture by mentoring an undergraduate student at Auburn University and a Ph.D. student at Tuskegee University, teaching machine learning labs, and leading a USDA project on AI-based food demand forecasting.
- I maintained a web page that contains a list of the research papers about the Age of Information.

Education

Ph.D. in Electrical Engineering

Aug 2018 – May 2024

Auburn University, Auburn, AL; Advisor: Yin Sun

CGPA: 4.00/4.00

Thesis Topic: Timely Inference over Networks

M.S. in Electrical Engineering

Aug 2022

Auburn University, Auburn, AL; Advisor: Yin Sun

CGPA: 4.00/4.00

B.Sc. in Electrical and Electronics Engineering

Feb 2013- Sep 2017

Bangladesh University of Engineering and Technology

CGPA: 3.80/4.00

Research Interests

Communication Networks, Information Freshness, Machine Learning, Information Theory, Multi-armed Bandit, Reinforcement Learning, Federated Learning, Optimization and Decision Theory

Research Experience

PostDoctoral Researcher, ION Lab and EDGE Lab, Purdue University

May 2024-present

- Working on designing communication networks for inference, learning, and control at wireless edge.
- Mentoring a Ph.D. student on federated learning research.
- Contributed to the writing of a research proposal.

Research Assistant, Real-time Networking Lab, Auburn University

Fall 2018-May 2024

- Developed information theoretic tools to understand the impact of information freshness in remote inference/estimation
- Design new network control policies for remote inference/estimation systems
- Designed new asymptotically optimal algorithms for restless multi-armed bandit

Teaching Experience

Teaching Assistant ELEC-5970/6970: Applied Statistical and Machine Learning
Auburn University

Spring 2023, 2024

- Delivered in-class coding lectures on K-nearest neighbors algorithm, SVM, decision tree, XGBoost, neural network, image classification with transfer learning, text classification with LSTM.
- Developed and graded assignments.

Teaching Assistant ELEC-7970: Reinforcement Learning
Auburn University

Spring 2020, 2021, 2022, Fall 2022

- Delivered in-class coding lectures on value iteration, policy iteration, temporal difference, SARSA, Q-learning, DQN, and REINFORCE algorithms.
- Developed and graded assignments.

Teaching Assistant ELEC-2120: Signals and Systems
Auburn University

Fall 2022

- Conducted labs. Graded homework and lab reports.

Lecturer Department of Electrical and Electronic Engineering
Bangladesh Army University of Science and Technology

Nov 2017-June 2018

Publications

In Preparation:

1. **Md Kamran Chowdhury Shisher**, Vishrant Tripathi, Christopher G. Brinton, and Mung Chiang “Scheduling Correlated Sources for Remote Inference,” 2024.

Under Submission:

1. Tasmeen Zaman Ornee, **Md Kamran Chowdhury Shisher**, Clement Kam, and Yin Sun, “Contextual Status Updating: How to Maximize Situational Awareness?,” 2024.
2. Cagri Ari, **Md Kamran Chowdhury Shisher**, Elif Uysal, and Yin Sun, “Goal-Oriented Communications for Real-time Inference with Two-Way Delay,” 2024.

Peer-reviewed Journal Papers:

- J1. **Md Kamran Chowdhury Shisher**, Yin Sun, and I-Hong Hou, “Timely Communications for Remote Inference,” *IEEE/ACM Transactions on Networking*, in press, 2024. Available online: <https://ieeexplore.ieee.org/document/10559951>
- J2. **Md Kamran Chowdhury Shisher**, Bo Ji, I-Hong Hou, and Yin Sun, “Learning and Communications Co-Design for Remote Inference Systems: Feature Length Selection and Transmission Scheduling,” *IEEE Journal on Selected Areas in Information Theory*, vol. 4, pp. 524-538, 2023.
- J3. Kevin Yan, **Md Kamran Chowdhury Shisher**, and Yin Sun, “A Transfer Learning-Based Deep Convolutional Neural Network for Detection of Fusarium Wilt in Banana Crops,” *AgriEngineering*, vol. 5, no. 4, pp. 2381-2394, 2023.

Peer-reviewed Conference Papers:

- C1. Cagri Ari, **Md Kamran Chowdhury Shisher**, Elif Uysal, and Yin Sun, “Goal-Oriented Communications for Remote Inference with Two-Way Delay,” *IEEE ISIT*, 2024.
- C2. **Md Kamran Chowdhury Shisher** and Yin Sun, “On the Monotonicity of Information Aging,” *IEEE INFOCOM ASoI Workshop*, 2024.
- C3. Tasmeen Zaman Ornee, **Md Kamran Chowdhury Shisher**, Clement Kam, and Yin Sun, “Context-aware Status Updating: Wireless Scheduling for Maximizing Situational Awareness in Safety-critical Systems,” *IEEE MILCOM*, 2023.
- C4. **Md Kamran Chowdhury Shisher** and Yin Sun, “How Does Data Freshness Affect Real-time Supervised Learning?” *ACM MobiHoc*, 2022. [Acceptance Rate: 19.8%]
- C5. **Md Kamran Chowdhury Shisher**, Heyang Qin, Lei Yang, Feng Yan, and Yin Sun, “The Age of Correlated Features in Supervised Learning based Forecasting,” *IEEE INFOCOM AoI Workshop*, 2021.
- C6. **Md. Kamran Chowdhury Shisher**, Tasmeen Zaman Ornee, and Md. Farhad Hossain, “QoS aware user association in massive MIMO enabled hetnets for DTU and NDTU traffic,” *IEEE ICAEE*, 2017.

Talks

Timely Inference over Networks

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| • Invited Talk at Purdue University, 2024 | March 2024 |
| • Invited Talk at Northwestern University, 2024 | March 2024 |
| • Invited Poster Presentation at ITA, 2024 | Feb 2024 |
| • Invited talk at Southeast Control Conference, 2024 | Feb 2024 |
| • Talk at Dept. of ECE, Auburn University | Feb 2024 |

Learning and Communications Co-design For Remote Inference: Feature Length Selection and Transmission Scheduling

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| • Invited Talk at University of Maryland, College Park, MD | Oct 2023 |
| • Graduate Engineering Research Showcase, Auburn University
(Both Oral and Poster Presentations) | Oct 2023 |

Communications of Timely Information for Real-time Machine Learning and Networked Intelligence

- North American School of Information Theory, Philadelphia, PA June 2023

How Does Data Freshness Affect Real-time Supervised Learning?

- Information Theory Application Workshop, San Diego, CA Feb 2023
- Auburn University Research Symposium (Poster Presentation) March 2023
- ACM MobiHoc, Seoul, South Korea. Oct 2022
- College of Engineering Research Showcase at the U.S. Space and Rocket Center, Huntsville, AL (Poster Presentation) Aug 2022

The Age of Correlated Features in Supervised Learning based Forecasting

- IEEE INFOCOM AoI Workshop, Vancouver, BC, Canada (virtual) May 2021

Student Mentoring

Adam Piaseczny , Purdue University Graduate Student	May 2024-Present
Zachary Gayford , Auburn University Undergraduate Student	Jan 2024-May 2024
Cason B. Vazquez , Auburn University Undergraduate Student	Aug 2023-Dec 2023
Justin Tran , Auburn University Undergraduate Student	May 2021-May 2022
Cagri Ari , Middle East Technical University Graduate Student	Aug 2023-Present
Mengxue Li , Tuskegee University Graduate Student	Aug 2023-Present
Kevin Yan , Auburn High School Student	Aug 2022-Dec 2023

Services

Maintainer of an online paper repository on Age of Information	Aug 2018-May 2024
Volunteer on E-Day, Auburn University, Auburn, AL	Feb 2020
Organizing Secretary , Bangladesh Student Organization, Auburn University	Aug 2022-Aug 2023
House Cultural Prefect, Rangpur Cadet College, Bangladesh	2012
Junior Prefect, Rangpur Cadet College, Bangladesh	2011

TPC member

- IEEE WCNC, 2021, 2022

Reviewer for Journal Manuscript Submissions

- IEEE Transactions on Mobile Computing, 2024
- IEEE Transactions on Network Science and Engineering, 2024
- IEEE Transactions on Green Communications and Networking, 2024
- IEEE Journal of Communications and Networks, 2020, 2023
- IEEE Journal on Selected Areas in Information Theory, 2023
- IEEE Open Journal of the Communications Society, 2023
- IEEE Transactions on Wireless Communications, 2022

- IEEE Journal on Selected Areas in Communication, 2020

Reviewer for Conference Manuscript Submissions

- IEEE ITW, 2024
- IEEE WiOpt, 2024
- ACM MobiHoc ASoI Workshop, 2024
- IEEE ISIT, 2022
- IEEE INFOCOM, 2020, 2022
- IEEE WCNC, 2021, 2022
- IEEE INFOCOM, 2020
- IEEE INFOCOM AoI Workshop, 2019, 2020

Awards and Honors

Research Profile , ACM SIGMETRICS Performance Evaluation Review	Dec 2023
NSF Student Travel Grant , ACM MobiHoc	Oct 2023
NSF Travel Grant , North American School of Information Theory	June 2023
ACM SIGMOBILE Student Travel Grant , ACM MobiHoc	Oct 2022
IEEE INFOCOM Student Conference Grant	June 2022
NSF Student Conference Award , IEEE INFOCOM	June 2022
Dean's Award , BUET, Bangladesh	2017, 2016, 2015
Best Cadet , Rangpur Cadet College	2012
SSC Scholarship (Talent) , Government of Bangladesh	2010
Primary Scholarship (Talent) , Government of Bangladesh	2005

Professional Membership

IEEE Member

IEEE Information Theory Society Member

IEEE Communication Society Member

ACM SIGMOBILE Member

Skills

Programming Language: Python, C, MATLAB, Object Oriented Programming

Mathematics: Optimization and Decision Theory, Markov Decision Process, Dynamic Programming, Probability, Information Theory, Multi-armed Bandit

Machine Learning: Supervised Learning, Deep Learning, Reinforcement Learning, Transfer Learning, CNN, RNN, Federated Learning

Machine Learning Tools: TensorFlow, Keras, Scikit-learn, Pandas, Numpy

References

Prof. Yin Sun, yzs0078@auburn.edu, Auburn University

Prof. Christopher G. Brinton, cgb@purdue.edu, Purdue University

Prof. Shiwen Mao, szm0001@auburn.edu, Auburn University

Prof. Bo Ji, boji@vt.edu, Virginia Tech

Prof. I-Hong Hou, ihou@tamu.edu, Texas A&M University