

# Taha Ameen

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## Research Interests

Design and analysis of optimal and efficient algorithms for stochastic networks.

## Education

<b>University of Illinois Urbana-Champaign</b> <i>PhD in Electrical and Computer Engineering</i>	<i>Sep 2020 – Present</i> <i>GPA: 4.0/4.0</i>
<b>American University of Sharjah</b> <i>BS in Electrical Engineering</i> <i>BS in Mathematics</i>	<i>Sep 2015 – Dec 2019</i> <i>GPA: 4.0/4.0</i> <i>GPA: 4.0/4.0</i>

## Awards and Fellowships

– A.R. “Buck” Knight Fellowship	2025
– INFORMS APS Best Student Paper Prize, <i>Finalist</i>	2024
– MAVIS Future Faculty Fellowship	2024
– Robert T. Chien Memorial Award in Electrical Engineering	2024
– Joan and Lalit Bahl Fellowship	2023, 2022
– James M. Henderson Fellowship	2021
– President’s Cup, <i>highest GPA in undergraduate class</i>	2019
– Sheikh Khalifa Scholarship	2019
– Chancellor’s Scholar Award, <i>100% tuition waiver for undergraduate study</i>	2015 – 2019

## Publications and Preprints

### Preprints and Working Papers

2. [T. Ameen](#) and B. Hajek, “Aligning Multiple Inhomogeneous Random Graphs: Fundamental Limits of Exact Recovery”, *Under review at Operations Research*.
1. [T. Ameen](#), K Kytölä and S.C. Park, “Slit-strip Ising boundary conformal field theory 2: Scaling limits of fusion coefficients”, *Under review at Probability and Mathematical Physics*. [\[arXiv\]](#)

### Accepted Publications

12. **[ISIT’25b]** [T. Ameen](#) and B. Hajek, “Detecting correlation between multiple unlabeled Gaussian networks”, *To appear at IEEE International Symposium on Information Theory (ISIT) ’25*. [\[arXiv\]](#)
11. **[ISIT’25a]** [T. Ameen](#) and B. Hajek, “Exact random graph matching with multiple graphs”, *To appear at IEEE International Symposium on Information Theory (ISIT) ’25*. [\[arXiv\]](#)
  - Poster presented at *Stochastic Networks Conference*, 2024.
  - Finalist for *INFORMS APS Best Student Paper Competition*, 2024.
10. **[ICML’24]** [T. Ameen](#) and B. Hajek, “Robust graph matching when nodes are corrupt”, *International Conference on Machine Learning*, 2024. [\[Link\]](#)
9. **[TAC’23]** [T. Ameen](#), S. Mukhopadhyay and N. Qaddoumi, “Computing robust forward invariant sets of multidimensional nonlinear systems via geometric deformation of polytopes”, *IEEE Transactions on Automatic Control*, 2023. [\[Link\]](#)

8. [WDC'22] T. Ameen, S. Sankagiri and B. Hajek, "Blockchain security when messages are lost", *ACM Workshop on Developments on Consensus*, 2022. [\[Link\]](#)
7. [MPAG'22] T. Ameen, K. Kytölä, S.C. Park and D. Radnell, "Slit-strip Ising boundary conformal field theory 1: Discrete and continuous function spaces", *Mathematical Physics, Analysis and Geometry*, Springer, 2022. [\[Link\]](#)
6. [FE'22] S. Shahriar, J. Ramesh, A. Towheed, T. Ameen, A. Sagahyroon and A. Al-Ali, "NICE: Narrative Integrated Career-Exploration Platform", *Frontiers in Education*, 2022. [\[Link\]](#)
5. [DCC'21] UIUC Info Theory Students, S. Basu and L. Varshney, "The twelvefold way of non-sequential lossless compression", *IEEE Data Compression Conference*, 2021. [\[Link\]](#)
4. [Access'20] T. Ameen, M. Hasan and M. Ismail, "A Novel Medium Access Control Algorithm for Ad Hoc Networks based on Ising Model", *IEEE Access*, 2020. [\[Link\]](#)
3. [PhyCom'20] T. Ameen, Y. Aborahama, M. Hasan and M. Ismail, "A PDE-based approach for the evaluation of probability of starvation in video streaming", *Physical Communication*, Elsevier, 2020. [\[Link\]](#)
2. [WTS'20] T. Ameen, M. Hasan and M. Ismail, "A queue-length based approach to metropolized Hamiltonians for distributed scheduling in wireless networks", *IEEE Wireless Telecommunications Symposium*, 2020. [\[Link\]](#)
1. [Allerton'19] T. Ameen, S. Mukhopadhyay and S. Farhana, "A Novel Expression for Computing Time Response of LTI Systems of Arbitrary Order with Applications to Fractional and Stochastic Control", *Allerton Conference on Communication, Control and Computing*, 2019. [\[Link\]](#)

## Research Experience

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### PhD Research: University of Illinois Urbana-Champaign

*Urbana, IL, USA*

*Statistical Inference on Random Networks*

*Aug 2022 – Present*

- Studied fundamental limits of the graph matching problem – impacts of heterogeneity, multiple graphs and robustness considerations.
- Studied security of blockchain proof-of-work protocol under unbounded message delays.

### Research Intern: Nokia Bell Labs

*Murray Hill, NJ, USA*

*Efficient Hybrid Beamforming for Multiple Access in mmWave Systems*

*June 2022 – Aug 2022*

- Designed and implemented a software framework to test and compare multiple access algorithms.
- Developed an algorithm for hybrid beamforming at base stations for 5G and beyond, accounting for throughput, latency and power efficiency.

### Research Intern: Department of Mathematics, Aalto University

*Espoo, Finland*

*Scaling Limits of the Ising Model*

*June 2019 – Aug 2019*

- Studied the scaling limit of the planar Ising model in a novel geometry and its relation to conformal field theory.

### Research Associate: American University of Sharjah

*Sharjah, UAE*

*Microwave Sensing for Crack Detection in Railway Tracks*

*Dec 2019 – Aug 2020*

- Designed, developed and deployed an autonomous robot that uses microwaves to scan railway tracks for cracks and classifies their severity.
- The project included a sensing module, signal processing module, communications module and a neural network for crack severity estimation.

## Selected Talks and Posters

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- INFORMS APS Best Student Paper Award Competition, 2024.
- INFORMS Annual Meeting, APS Session on Theoretical Advances in Networks, Dynamics and Inference, 2024.
- IDEAL Workshop at Northwestern University, 2024.
- Stochastic Networks Conference, 2024.
- International Conference on Machine Learning, 2024.
- Coordinated Science Lab Student Conference at UIUC, 2024.
- ACM Workshop on Developments in Consensus, 2022.
- IEEE Wireless Telecommunications Symposium, 2020.
- Allerton Conference, 2019.

## Coursework and Teaching

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### *PhD Coursework at UIUC.*

- Electrical Engineering: Random Processes, Information Theory, Machine Learning, Optimization, Statistical Learning Theory, Control Systems, Communication Network Analysis, MDPs and Reinforcement Learning, Quantum Information Theory.
- Mathematics: Real Analysis, Probability Theory I, Probability Theory II, Combinatorial Optimization, High Dimensional Statistics, Stochastic Processes on Graphs.

### *Teaching and Mentorship.*

- Teaching Assistant: ECE 534 (Random Processes): *Spring '24, Fall '24*. ECE 543 (Statistical Learning Theory): *Spring '25*.
- Undergraduate Mentor: Academic Support Center, 2016-19.

## Technologies

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**Software:** Python – *NumPy, PyTorch, Pandas*, C/C++, MATLAB, Simulink, Comsol, Mathematica, PSPICE, Multisim, Cadence, HFSS, MS Office Suites.