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Ali Eslami

Education

Ph.D., Electrical and Computer Engineering — Feb. 2013
University of Massachusetts Amherst, Amherst, MA
Thesis: *A Non-Asymptotic Approach to the Analysis of Communication Networks: From Error Correcting Codes to Network Properties*
Advisor: Prof. Hossein Pishro-Nik

M.Sc., Electrical Engineering — Sept. 2006
Sharif University of Technology, Tehran, Iran
Thesis: *Analysis of Network Coding in Wireless Networks*
Advisor: Prof. B. H. Khalaj

B.Sc., Electrical Engineering — Sept. 2004
Sharif University of Technology, Tehran, Iran
Thesis: *Investigating ISI in Digital Modulation Techniques*
Advisor: Prof. M. H. Bastani

Work Experience

Associate Professor, Dept. of Electrical and Computer Engineering — Aug. 2021-present
Wichita State University, Wichita, KS

Assistant Professor, Dept. of Electrical and Computer Engineering — Jul. 2015-May 2021
Wichita State University, Wichita, KS

Visiting Research Scholar, Information Initiative at Duke (iiD) — Aug. 2014-Jun. 2015
Duke University, Durham, NC
Supervisor: Prof. Robert Calderbank

Post-Doctoral Research Associate, Electrical and Computer Engineering — Mar. 2013-Apr. 2015
Texas A&M University, College Station, TX
Supervisors: Prof. Shuguang Cui (TAMU), Prof. Junshan Zhang (ASU)

Honors & Awards

Wichita State University's Young Faculty Risk-Taker Award, May 2017.

Outstanding Teaching Assistant Award of ECE Department, University of Massachusetts Amherst, May 2011.

Iran’s National Electrical Engineering Olympiad Finalist (ranked 9th), June 2004.

Ranked 43rd among 430,000 in Iran’s national university entrance exam, June 2000.

Research Interests

- Application of probabilistic methods and machine learning to study complex networks such as gene regulatory networks and networked cyber-physical systems.
- Error control coding in communications, data storage, and biological systems.

- Advanced data analytics for multi-layer interconnected networks.
- Evolutionary artificial general intelligence.

Funding

PI: Ali Eslami
NSF EPSCoR
Dec. 2023-Jan. 2025
Developing a Network Science to Study Cascading Failures in the Cyber-Physical Infrastructure

PI: Ali Eslami
Excelacom Inc.
Jul. 2021-Jan. 2022
Advanced Analytics

PI: Ali Eslami
NASA EPSCoR
Jul. 2020-Jan. 2022
Probabilistic Approach to Reverse Engineering of Spaceflight Molecular Networks

PI: Ali Eslami
NSF EPSCoR
May 2018-Jul. 2020
A Study of DNA Mutations through Error Control Coding Theory

PI: Ali Eslami
Flossie E. West Memorial Foundation
May 2016-Aug. 2018
Error Correction for the Code of Life in A New Era of Genome Editing

PI: Ali Eslami, Co-PI: Davood Askari
Wichita State University's Multidisciplinary Research Project Award (MURPA)
May-Aug. 2018
Design and Fabrication of a Micro Communication Device for Biosensing

PI: Ali Eslami
Wichita State University's Research/Creative Projects Award (URCA)
Dec. 2015-Dec. 2016
Developing a Network Science to Study Cascading Failures in Cyber-Physical Systems

Publications

*Student coauthors are indicated with an asterisk.

Patents

A. Eslami, A. Asaduzzaman, and M. H. Erjaei*, "Internet-Based Remote Control and Monitoring System for Commercial Doors Using Mobile Devices." U.S. Patent 10,689,898, Granted June 2020.

Journals:

1. M. Okwori* and **A. Eslami**, "Feature Engineering from Meta-Data for Prediction of Differentially Expressed Genes: An Investigation of Mus musculus Exposed to Space-Conditions", *Computational Biology and Chemistry*, Vol. 109, Apr. 2024.
2. S. Kotiang* and **A. Eslami**, "Density Evolution for Noise Propagation Analysis in Biological Networks," *IEEE Access*, vol. 10, pp. 4261-4270, Jan. 2022.
3. S. Kotiang* and **A. Eslami**, "Boolean Factor Graph Model for Biological Systems: The Yeast Cell-cycle Network," *BMC Bioinformatics*, vol. 22, pp. 1-27, Sep. 2021. https://doi.org/10.1186/s12859-021-04361-8
4. M. Nadji-Tehrani* and **A. Eslami**, "A Brain-Inspired Framework for Evolutionary Artificial General Intelligence," *IEEE Transactions on Neural Networks and Learning Systems*, vol. 31, no. 12, pp. 5257-5271, Dec. 2020.
5. M. Nekoui, L. Chu, and **A. Eslami**, "Energy-Efficient Optimal Admission Control for Body Area Networks," *IEEE Transactions on Green Communications and Networking* vol. 4, no. 4, pp. 956-972, Dec. 2020.
6. M. Okwori* and **A. Eslami**, "Investigating the Impact of Gene Cofunctionality in Predicting Gene Mutations of *E. coli*," *IEEE Access*, vol. 8, pp. 167397-167410, Sept. 2020.
7. M. Okwori*, A. Behfarnia*, and **A. Eslami**, "Towards Microscale NFC-Enabled IoT Sensors: Physical and MAC Layer Design Analysis," *IEEE Access*, vol. 8, pp. 88076-88084, May 2020.
8. S. Kotiang* and **A. Eslami**, "A Probabilistic Graphical Model for System-Wide Analysis of Gene Regulatory Networks," *Bioinformatics*, vol. 36, no. 10, pp. 3192-3199, Feb. 2020.
9. A. Behfarnia* and **A. Eslami**, "Misbehavior Detection in Ephemeral Networks: A Local Voting Game in Presence of Uncertainty," *IEEE Access*, vol. 7, pp. 184629-184642, Dec. 2019.
10. A. Behfarnia* and **A. Eslami**, "Error Correction Coding Meets Cyber-Physical Systems: Message-Passing Analysis of Self-Healing Interdependent Networks," *IEEE Transactions on Communications*, vol. 65, no. 7, pp. 2753-2768, Jul. 2017.
11. D. Lv*, **A. Eslami**, and S. Cui, "Load-Dependent Cascading Failures in Finite-Size Erdős-Rényi Random Networks," *IEEE Transactions on Network Science and Engineering*, vol. 4, no. 2, pp. 129-139, Apr.-Jun. 2017.
12. **A. Eslami,** C. Huang, J. Zhang, and S. Cui, "Cascading Failures in Load-Dependent Finite-Size Random Geometric Networks," *IEEE Transactions on Network Science and Engineering*, vol. 3, no. 4, pp. 183-196, Oct.-Dec. 2016.
13. **A. Eslami**, M. Nekoui, H. Pishro-Nik, and F. Fekri, "Results on Finite Wireless Sensor Networks: Connectivity and Coverage," *ACM Transactions on Sensor Networks*, vol. 9, no. 4, pp. 1-22, June 2013.
14. **A. Eslami** and H. Pishro-Nik, "On Finite-Length Performance of Polar Codes: Stopping Sets, Error Floor, and Concatenated Design," *IEEE Transactions on Communications*, vol. 61, no. 3, pp. 919-929, Mar. 2013.
15. **A. Eslami**, M. Nekoui, and H. Pishro-Nik, "Results on Finite Wireless Networks on A Line," *IEEE Transactions on Communications*, vol. 58, no. 8, pp. 2204-2211, Aug. 2010.

16. **A. Eslami**, S. Vangala, and H. Pihsro-Nik, "Hybrid Channel Codes for Efficient FSO/RF Communication Systems," *IEEE Transactions on Communications*, vol. 58, no. 10, pp. 2926-2938, Oct. 2010.

Conferences:

17. M. Okwori* and **A. Eslami**, "CGN-MPred: Cofunctional Gene Network-based Mutation Prediction from Exposure Conditions," in *Proc. IEEE International Conference on Bioinformatics & Biomedicine (BIBM)*, Virtual Conference, pp. 2451-2455, Dec. 2021.
18. S. Kotiang* and **A. Eslami**, "Probabilistic Factor Graph Modeling and Analysis of Biological Networks," in *Proc. 28th International Conference on Intelligent Systems for Molecular Biology (ISMB)*, Held Virtually, July 2020.
19. A. Behfarnia* and **A. Eslami**, "Local Voting Games for Misbehavior Detection in VANETs in Presence of Uncertainty," in *Proc. 57th Annual Allerton Conference on Communication, Control, and Computing*, Monticello, IL, USA, Sept. 2019.
20. A. Behfarnia* and **A. Eslami**, "Risk Assessment of Autonomous Vehicles Using Bayesian Defense Graphs," in *Proc. IEEE Vehicular Technology Conference*, Chicago, IL, USA, Aug. 2018.
21. P. Vuka*, A. Behfarnia*, and **A. Eslami**, "A Mobile-Enabled Micro Communication Device for Biosensing," in *Proc. IEEE Nano '17*, Pittsburg, PA, USA, Jul. 2017.
22. A. Behfarnia* and **A. Eslami**, "Dynamics and Steady-State Behavior of Self-Healing Cyber-Physical Networks in Light of Cyber-Node Delays," in *Proc. IEEE Global Communications Conference (GLOBECOM)*, Washington, D.C., USA, Dec. 2016.
23. A. Behfarnia* and **A. Eslami**, "Message Passing for Analysis and Resilient Design of Self-Healing Interdependent Cyber-Physical Networks," in *Proc. 25th IEEE International Conference on Computer Communications and Networks (ICCCN)*, Waikoloa, Hawaii, USA, Aug. 2016.
24. **A. Eslami**, A. Velasco, A. Vahid, G. Mappouras, R. Calderbank, and D. Sorin, "Writing without Disturb on Phase Change Memories by Integrating Coding and Layout Design," in *Proc. International Symposium on Memory Systems (MEMSYS)*, Washington, DC, USA, Oct. 2015.
25. D. Lv*, **A. Eslami**, and S. Cui, "Load-based Cascading Failure Analysis in Finite Erdős-Rényi Random Networks," in *Proc. IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, Atlanta, GA, USA, Dec. 2014.
26. **A. Eslami**, C. Huang, J. Zhang, and S. Cui, "An Analytical Approach to Study Cascading Failures in Finite-Size Random Geometric Networks," in *Proc. IEEE 52nd Annual Allerton Conference on Communication, Control, and Computing*, Monticello, IL, USA, Oct. 2014.
27. A. Banaei, **A. Eslami**, C. Georghiades, and S. Cui, "Joint Random Spectrum Sensing and Access Scheme for Decentralized Cognitive Radio Networks," in *Proc. IEEE International Conference on Communications (ICC)*, Sydney, Australia, May 2014.
28. H. Mamani, **A. Eslami**, H. Saeedi, and H. Pishro-Nik, "On Generalized EXIT Charts of LDPC Code Ensembles over Binary-Input Output-Symmetric Memoryless Channels," in *Proc. IEEE International Symposium on Information Theory (ISIT)*, Boston, MA, USA, July 2012.

29. **A. Eslami** and H. Pishro-Nik, "A Practical Approach to Polar Codes," in *Proc. IEEE International Symposium on Information Theory (ISIT)*, Saint Petersburg, Russia, Aug 2011.
30. **A. Eslami** and H. Pishro-Nik, "On Bit Error Rate Performance of Polar Codes in Finite Regime," in *proc. 48th Annual Allerton Conference on Communication, Control, and Computing*, Monticello, IL, USA, Sept. 2010.
31. **A. Eslami**, M. Nekoui, and H. Pishro-Nik, "Results on Finite Wireless Networks on A Line," in *Proc. IEEE Information Theory Workshop (ITW)*, Cairo, Egypt, Jan. 2010.
32. M. Nekoui, **A. Eslami**, and H. Pishro-Nik, "The Capacity of Vehicular Ad Hoc Networks with Infrastructure," in *Proc. 6th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks and Workshops (WiOPT)*, Berlin, Germany, Apr. 2008.
33. M. Nekoui, **A. Eslami**, and H. Pishro-Nik, "Scaling Laws for Distance Limited Communications in Vehicular Ad Hoc Networks," in *Proc. IEEE International Conference on Communications (ICC)*, Beijing, China, May 2008.
34. **A. Eslami** and B. H. Khalaj, "Capacity of Network Coding for Wireless Multicasting," in *Proc. 8th Annual IEEE Wireless and Microwave (WAMI) Technology Conference*, Clearwater Beach, Florida, USA, Dec. 2006.
35. **A. Eslami** and B. H. Khalaj, "Wireless Multicasting Using Network Coding," in *Proc. 1st IEEE International Workshop on Operator-Assisted (Wireless Mesh) Community Networks (OpComm)*, Berlin, Germany, Sept. 2006.

Theses/Dissertations Advised

Stephen Kotiang, *Ph.D. Dissertation: Application of Graphical Models to Inference and Analysis of Biological Networks*, Sep. 2022.

Michael Okwori, *Ph.D. Dissertation: Application of Machine Learning Models and Feature Engineering to Predict Genomic Phenomena,* May 2022.

A. Behfarnia, *Ph.D. Dissertation: Application of Probabilistic Inference to Resiliency and Security Analysis of Cyber-Physical Systems*, May 2020.

M. Nadji-Tehrani, *Ph.D. Dissertation: A Brain-Inspired Framework for Evolutionary Artificial General Intelligence*, Feb. 2020.

M. H. Erjaei, *M.S. Thesis: Internet-Based Remote Control and Monitoring System for Commercial Doors Using Mobile Devices*, May 2019.

P. K. Vuka, *M.S. Thesis: A Mobile Enabled Micro Communication Device for Biosensing*, Dec. 2017.

Group Alumni

Stephen Kotiang (**Ph.D.**, Sep. 2022, first employment: Data Scientist at SAS Institute)

Michael Okwori (**Ph.D.**, May 2022, first employment: Assistant Professor of Electrical, Computer and Biomedical Engineering at Union College, NY)

Ali Behfarnia (**Ph.D.**, May 2020, first employment: Assistant Professor of Engineering at University of Tennessee, Martin)

Mohammad Nadji-Tehrani (**Ph.D.**, Feb. 2020, first employment: Staff Engineer at NetApp)

Mohammad Hossein Erjaei (M.Sc., 2019, first employment: Software Developer at Johnson Controls)

Phani K. Vuka (M.Sc., 2017, first employment: Systems Analyst at Apple Inc.)

Louis Gomez (B.Sc., 2019, first employment: Doctoral Student in Computer Science at Stevens Institute of Technology)

Sammir Jibril (B.Sc., 2019, first employment: Engineer at Bell Textron)

Chase Weber (B.Sc., 2017, first employment: IT administrator for Cañon City, Colorado)

Cooper Colglazier (B.Sc 2017, first employment: User Experience Researcher at Insomniac Games)

Timothy Rallings (B.Sc., 2017, first employment: Data Scientist at GHD)

Teaching Experience

Wichita State University (regular assignment: 2 courses per semester)

- Data-Driven Decision Making in Cyber-Physical Systems (ECE 777AC)
- Probabilistic Methods in Systems (ECE 754)
- Nano Communications (ECE 877Z)
- Data Communication Analysis I (ECE 777G)
- Signals and Systems (ECE 383)
- Digital Communications I (ECE 726)
- Digital Communications II (ECE 826)
- Error Control Coding (ECE 886)
- Introduction to Error Control Coding (ECE 577G)

Presentations & Invited Talks

"A Probabilistic Graphical Model for System-Wide Analysis of Gene Regulatory Networks" Kansas NSF EPSCoR MAPS Symposium, Lawrence, KS, USA, Mar. 2020.

"A Brain-Inspired Framework for Evolutionary Artificial General Intelligence," Information Theory and Applications (ITA) Workshop, San Diego, CA, USA, Feb. 2020.

"Error Correction Meets Cyber-Physical Systems: Resilient Design of Coupled Networks," Information Theory and Applications (ITA) Workshop, San Diego, CA, USA, Feb. 2016.

"A Factor Graph Framework for Resilient Design of Cyber-Physical Systems," PSERC Meeting, Stevenson, WA, USA, July 2015.

"How Channel Capacity Was Achieved: From Shannon to Arıkan," Information Initiative at Duke (iiD), Duke University, Durham, NC, Apr. 2015.

"Cascading Failures in Cyber-Physical Systems," California State University at Long Beach, Mar. 2015.

"Modeling and Analysis of Cascading Failures in Cyber-Physical Systems," Information Theory and Applications (ITA) Workshop, San Diego, CA, USA, Feb. 2015.

"Threshold Phenomena in Finite Wireless Networks," School of Electrical, Computer and Energy Engineering, Arizona State University, Tempe, AZ, Aug. 2013.

"A Practical Approach to Polar Codes," Broadcom Corporation, San Diego, CA, June 2012.

Computer Skills

Programming Languages: Python, C++, Pascal, Assembly, TCL

Software Packages: MATLAB/Simulink, NS-2, LaTeX, MS Office, MS Visio

Professional Activities

Member of the Institute of Electrical and Electronics Engineers (IEEE), IEEE Communications Society and IEEE Computer Society.

NSF Review Panelist

Frequent Reviewer of Technical Articles:

- IEEE Transactions on Neural Networks and Learning Systems, IEEE Trans. on Information Theory, IEEE Trans. on Communications, IEEE Communications Letters, IEICE Transactions on Communications, IEEE International Symposium on Information Theory, IEEE International Conference on Communications, IEEE GLOBECOM, IEEE Information Theory Workshop, International Conference on Telecommunications, IEEE SPAWC, Australian Communications Theory Workshop, International Symposium on Turbo Codes & Iterative Information Processing.