FARZAD H. FARNOUD

Associate Professor
Department of Electrical & Computer Engineering
Department of Computer Science
University of Virginia

Office: Thornton Hall E309
351 McCormick Rd, Charlottesville, VA
Email: farzad@virginia.edu
Web: http://www.ece.virginia.edu/~ffh8x

a. Experience

Associate Professor August 2023–present
Assistant Professor August 2016–2023
Department of Electrical & Computer Engineering
Department of Computer Science (since 2017)
University of Virginia

b. Education

California Institute of Technology, Pasadena, CA 2013–2016
Postdoctoral Training in Electrical Engineering
Advisor: Prof. Jehoshua Bruck

University of Illinois at Urbana-Champaign, Urbana, IL May 2013
Ph.D. in Electrical and Computer Engineering
Thesis Title: *Distances on Rankings: from Social Choice to Flash Memories*
Advisor: Prof. Olgica Milenkovic

University of Illinois at Urbana-Champaign, Urbana, IL Dec. 2012
M.Sc. in Mathematics

University of Toronto, Toronto, ON, Canada Aug. 2008
M.Sc. in Electrical and Computer Engineering
Thesis Title: *Reliable Broadcast of Safety Messages in Vehicular Ad hoc Networks*

Sharif University of Technology, Tehran, Iran July 2006
B.Sc. in Electrical Engineering

c. Awards & Honors

- ◇ CAREER Award, National Science Foundation 2022
- ◇ Outstanding Teacher Award, University of Virginia, Electrical and Computer Engineering Department 2018
- ◇ IEEE Data Storage Best Student Paper Award 2014
- ◇ Robert T. Chien Memorial Award, 2013
  presented by UIUC to one Ph.D. candidate in ECE for *demonstrating excellence in research*.
- ◇ Member of Phi-Kappa-Phi honor society 2009
- ◇ Rogers Graduate Scholar, University of Toronto 2007
- ◇ Granted Admission to Graduate Program of EE Dept. at Sharif University 2005
  without Entrance Exam (Through Exceptional Talents Admissions Office)

- ◇ Ranked 14 among over 300,000 contestants in Iran's National Universities Entrance Exam 2002
  Ranked 1 in the Province of Khorasan
- ◇ Silver Medalist in Iran's National Physics Olympiad 2001

d. Publications

My advisees are underlined.

Peer-Reviewed Journal Publications

29. Y. Li, Y. Tang, H. Lou, R. Gabrys, and **F. Farnoud**, "Optimal Codes Correcting a Substring Edit," *IEEE Trans. Information Theory*, Available: https://doi.org/10.1109/TIT.2025.3562730, Apr. 2025.

28. Y. Tang, S. Motamen, H. Lou, K. Whritenour, S. Wang, R. Gabrys, and **F. Farnoud**, "Correcting a Substring Edit Error of Bounded Length," *IEEE Trans. Communications*, Available: https://doi.org/10.1109/TCOMM.2024.3420721, Jan. 2025.

27. S. Wang, Y. Tang, J. Sima, R. Gabrys, and **F. Farnoud**, "Non-binary Codes for Correcting a Burst of at Most t Deletions," *IEEE Trans. Information Theory*, Available: https://doi.org/10.1109/TIT.2023.3340246, Feb. 2024.

26. Y. Tang, S. Wang, H. Lou, R. Gabrys, and **F. Farnoud**, "Low-Redundancy Codes for Correcting Multiple Short-Duplication and Edit Errors," *IEEE Trans. Information Theory*, Available: https://doi.org/10.1109/TIT.2022.3233733, May 2023.

25. H. Lou and **F. Farnoud**, "Data Deduplication with Random Substitutions," *IEEE Trans. Information Theory*, Available: https://doi.org/10.1109/TIT.2022.3176778, May 2022, IF: 2.5.

24. Y. Tang and **F. Farnoud**, "Error-Correcting Codes for Short Tandem Duplication and Edit Errors," *IEEE Trans. Information Theory*, Available: https://doi.org/10.1109/TIT.2021.3125724, Feb. 2022, IF: 2.5.

23. L.J. Dunphy, G.L. Kolling, M.L. Jenior, J. Carroll, A.E. Attai, **F. Farnoud**, A.J. Mathers, M.A. Hughes, J.A. Papin, "Multidimensional Clinical Surveillance of Pseudomonas aeruginosa Reveals Complex Relationships between Isolate Source, Morphology, and Antimicrobial Resistance," *mSphere*, Available: https://doi.org/10.1128/mSphere.00393-21, July 2021, IF: 4.4.

22. Y. Tang and **F. Farnoud**, "Error-correcting Codes for Noisy Duplication Channels," *IEEE Trans. Information Theory*, Available: https://doi.org/10.1109/TIT.2021.3059095, Feb. 2021, IF: 3.0.

21. Y. Tang, Y. Yehezkeally, M. Schwartz, and **F. Farnoud**, "Single-Error Detection and Correction for Duplication and Substitution Channels," *IEEE Trans. Information Theory*, Available: https://doi.org/10.1109/TIT.2020.3006228, Nov. 2020, IF: 3.0.

20. H. Lou, **F. Farnoud**, M. Schwartz, and J. Bruck, "Evolution of k-mer Frequencies and Entropy in Duplication and Substitution Mutation Systems," *IEEE Trans. Information Theory*, Available: https://doi.org/10.1109/TIT.2019.2946846, May, 2020, IF: 2.7.

19. O. Elishco, **F. Farnoud**, M. Schwartz, and J. Bruck, "The Entropy Rate of Some Pólya String Models," *IEEE Trans. Information Theory*, Available: https://doi.org/10.1109/TIT.2019.2936556, Dec. 2019, IF: 2.7.

18. R. Gabrys, **F. Farnoud**, "Reconciling Similar Sets of Data," *IEEE Trans. Communications*, Available: https://doi.org/10.1109/TCOMM.2019.2910578, Aug. 2019, IF: 5.69.

17. **F. Farnoud**, M. Schwartz, and J. Bruck, "Estimation of Duplication History under a Stochastic Model for Tandem Repeats," *BMC Bioinformatics*, Available: https://doi.org/10.1186/s12859-019-2603-1, Feb. 2019, IF: 2.21.

16. N. Alon, J. Bruck, **F. Farnoud**, and S. Jain, "Duplication Distance to the Root for Binary Sequences," *IEEE Trans. Information Theory*, vol. 63, Dec. 2017, IF: 2.7.

15. **F. Farnoud**, O. Milenkovic, G. J. Puleo, and L. Su, "Computing Similarity Distances Between Rankings," *Discrete Applied Mathematics*, vol. 232., Dec. 2017, IF: 0.8.

14. S. Jain, **F. Farnoud**, and J. Bruck, "Capacity and Expressiveness of Genomic Tandem Duplication" *IEEE Trans. Information Theory*, vol. 63, Oct. 2017, IF: 2.7.

13. S. Jain, **F. Farnoud**, M. Schwartz, and J. Bruck, "Duplication-Correcting Codes for Data Storage in the DNA of Living Organisms," *IEEE Trans. Information Theory*, vol. 63, Aug. 2017, IF: 2.7.

12. **F. Farnoud**, E. Yaakobi, and J. Bruck, "Approximate Sorting of Data Streams with Limited Storage," *J. Combinatorial Optimization*, 32(4), Nov. 2016, IF: 0.9.

11. **F. Farnoud**, M. Schwartz, and J. Bruck, "The Capacity of String-Duplication Systems," *IEEE Trans. Information Theory*, vol. 62, Feb. 2016, IF: 2.7.

10. **F. Farnoud**, M. Schwartz, and J. Bruck, "Bounds for Permutation Rate-Distortion," *IEEE Trans. Information Theory*, vol. 62, Feb. 2016, IF: 2.7.

9. R. Gabrys, E. Yaakobi, **F. Farnoud**, F. Sala, J. Bruck, and L. Dolecek, "Codes Correcting Erasures and Deletions for Rank Modulation," *IEEE Trans. Information Theory*, vol. 62, Jan. 2016, IF: 2.7.

8. M. Kim, X. Zhang, J.G. Ligo, **F. Farnoud**, V.V. Veeravalli, and O. Milenkovic, "MetaCRAM: An Integrated Pipeline for Metagenomic Data Processing and Compression," *BMC Bioinformatics*, Feb. 2016, IF: 2.2.

7. M. Kim, **F. Farnoud**, and O. Milenkovic, "HyDRA: Gene Prioritization via Hybrid Distance-Score Rank Aggregation," *Bioinformatics*, 31(7):1034–1043, 2015, IF: 5.5.

6. **F. Farnoud**, and O. Milenkovic, "An Axiomatic Approach to Constructing Distances for Rank Comparison and Aggregation," *IEEE Trans. Information Theory*, vol. 60, Oct. 2014, IF: 2.7.

5. **F. Farnoud** and O. Milenkovic, "Multipermutation Codes in the Ulam Metric for Nonvolatile Memories," *IEEE J. Selected Areas in Communications*, vol. 32, May 2014, IF: 8.1, ***IEEE Data Storage Best Student Paper Award for 2014***.

4. **F. Farnoud**, V. Skachek, and O. Milenkovic, "Error-Correction in Flash Memories via Codes in the Ulam Metric," *IEEE Trans. Information Theory*, vol. 59, May 2013, IF: 2.7.

3. **F. Farnoud** and O. Milenkovic, "Sorting of Permutations by Cost-Constrained Transpositions," *IEEE Trans. Information Theory*, vol. 58, Jan. 2012, IF: 2.7.

2. S.M.S.T. Yazdi, S.A. Savari, G. Kramer, K. Carlson, and **F. Farnoud**, "On the Multimessage Capacity Region for Undirected Ring Networks," *IEEE Trans. Information Theory*, vol. 56, Apr. 2010, IF: 2.7.

1. **F. Farnoud**, M. Ibrahimi, and J. Salehi, "A Packet-Based Photonic Label Switching Router for a Multirate All-Optical CDMA-Based GMPLS Switch," *IEEE J. Selected Topics in Quantum Electronics*, vol. 13, May 2007, IF: 3.5.

Selected Conference Publications

8. T. Jin, Y. Wu, Q. Gu, **F. Farnoud**, "Ranking with Multiple Oracles: From Weak to Strong Stochastic Transitivity," *Int. Conf. Machine Learning*, July 2025, Acceptance Rate: **26.9%**.

7. Y. Wu, T. Jin, Q. Di, H. Lou, **F. Farnoud**, Q. Gu, "Borda Regret Minimization for Generalized Linear Dueling Bandits," *International Conference on Machine Learning (ICML)*, Available: https://openreview.net/forum?id=3Tzdpjc59k, Jul. 2024, Acceptance Rate: **27.5%**.

6. Q. Di, T. Jin, Y. Wu, H. Zhao, **F. Farnoud**, Q. Gu, "Variance-aware Regret Bounds for Stochastic Contextual Dueling Bandits," In *Proc. International Conference on Learning Representations (ICLR)*, Available: https://openreview.net/pdf?id=rDH7dIFn20, Vienna, Austria, May 2024, Acceptance Rate: **31%**.

5. H. Lou, T. Jin, Y. Wu, P. Xu, Q. Gu, **F. Farnoud**, "Active Ranking without Strong Stochastic Transitivity," *Conference on Neural Information Processing Systems (NeurIPS)*, Available: https://openreview.net/pdf?id=Vhd-jh9B8Hc, New Orleans, Louisiana, Nov. 2022, Acceptance Rate: **25.6%**.

4. Y. Wu, T. Jin, H. Lou, **F. Farnoud**, Q. Gu, "Adaptive Sampling for Heterogeneous Rank Aggregation from Noisy Pairwise Comparisons," In *Proc. Artificial Intelligence and Statistics (AISTATS)*, Available: https://arxiv.org/abs/2110.04136, Virtual, Mar. 2022, Acceptance Rate: **29.2%** (492/1685).

3. Y. Wang, H. Lou, P. Kumar, A. Dutta and **F. Farnoud**, "Efficient Search of Circular Repeats and MicroDNA Reintegration in DNA Sequences," In *Proc. IEEE 20th Int. Conf. Bioinformatics and Bioengineering (BIBE)*, Cincinnati, OH, Oct. 2020, Acceptance Rate: **32%**.

2. T. Jin, P. Xu, Q. Gu, **F. Farnoud**, "Rank Aggregation via Heterogeneous Thurstone Preference Models," In *Proc. AAAI Conference on Artificial Intelligence*, Available: https://arxiv.org/abs/1912.01211, New York, NY, Feb. 2020, Acceptance Rate: 20.6%, **Oral est. 4.5%** (348/7737).

1. **F. Farnoud** and S. Valaee, "Reliable Broadcast of Safety Messages in Vehicular Ad Hoc Networks," In *Proc. IEEE INFOCOM*, Rio de Janeiro, Brazil, Apr. 2009, Acceptance Rate: **19.7%**.

Complete List of Peer-Reviewed Conference Publications

56. (*) H. Luo, **F. Farnoud**, "Improving Smoothness in Huffman Coding: Canonical and Pre-allocated Variations," Submitted to *IEEE Information Theory Workshop*, 2025.

55. T. Jin, Y. Wu, Q. Gu, **F. Farnoud**, "Ranking with Multiple Oracles: From Weak to Strong Stochastic Transitivity," *Int. Conf. Machine Learning*, July 2025.

54. Y. Wu, T. Jin, Q. Di, H. Lou, **F. Farnoud**, Q. Gu, "Borda Regret Minimization for Generalized Linear Dueling Bandits," *International Conference on Machine Learning (ICML)*, Available: https://openreview.net/forum?id=3Tzdpjc59k, Jul. 2024.

53. Y. Li, Y. Tang, H. Lou, R. Gabrys, and **F. Farnoud**, "Asymptotically Optimal Codes Correcting One Substring Edit," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Available: https://doi.org/10.1109/ISIT57864.2024.10619199, July 2024, Athens, Greece.

52. Q. Di, T. Jin, Y. Wu, H. Zhao, **F. Farnoud**, Q. Gu, "Variance-aware Regret Bounds for Stochastic Contextual Dueling Bandits," In *Proc. Int. Conf. Learning Representations (ICLR)*, Available: https://openreview.net/pdf?id=rDH7dIFn20, Vienna, Austria, May 2024, Acceptance Rate: 31%.

51. Y. Tang, S. Motamen, H. Lou, K. Whritenour, S. Wang, R. Gabrys, **F. Farnoud**, "Correcting a Substring Edit Error of Bounded Length," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Taipei, Taiwan, June 2023.

50. Y. Li, **F. Farnoud**, "Linial's Algorithm and Systematic Deletion-Correcting Codes," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Taipei, Taiwan, June 2023.

49. H. Lou, T. Jin, Y. Wu, P. Xu, Q. Gu, **F. Farnoud**, "Active Ranking without Strong Stochastic Transitivity," *Conference on Neural Information Processing Systems (NeurIPS)*, Available: https://openreview.net/pdf?id=Vhd-jh9B8Hc, New Orleans, Louisiana, Nov. 2022, Acceptance Rate: 25.6%.

48. S. Wang, Y. Tang, R. Gabrys and **F. Farnoud**, "Permutation Codes for Correcting a Burst of at Most t Deletions," In Proc. *58th Allerton Conf. Communication, Control, and Computing*, Monticello, Illinois, Sep. 2022.

47. H. Lou, **F. Farnoud**, "Universal Compression of Large Alphabets With Constrained Compressors," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Espoo, Finland, June 2022.

46. Y. Tang, S. Wang, R. Gabrys and **F. Farnoud**, "Correcting Multiple Short Duplication and Substitution Errors," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Espoo, Finland, June 2022.

45. Y. Wu, T. Jin, H. Lou, **F. Farnoud**, Q. Gu, "Adaptive Sampling for Heterogeneous Rank Aggregation from Noisy Pairwise Comparisons," In *Proc. Artificial Intelligence and Statistics (AISTATS)*, Available: https://arxiv.org/abs/2110.04136, Virtual, Mar. 2022, Acceptance Rate: 29.2% (492/1685).

44. Y. Tang, H. Lou and **F. Farnoud**, "Correcting Deletion Errors in DNA Data Storage with Enzymatic Synthesis," In *Proc. IEEE Information Theory Workshop (ITW)*, Melbourne, Australia, July 2021.

43. Y. Tang, **F. Farnoud**, "Error-correcting Codes for Short Tandem Duplications and At Most p Substitutions," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Kanazawa, Japan, Oct. 2021.

42. H. Lou and **F. Farnoud**, "Asymptotic Analysis of Data Deduplication with a Constant Number of Substitutions," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Melbourne, Australia, July 2021.

41. S. Wang, J. Sima and **F. Farnoud**, "Non-binary Codes for Correcting a Burst of at Most 2 Deletions," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Melbourne, Australia, July 2021.

40. Y. Wang, H. Lou, P. Kumar, A. Dutta and **F. Farnoud**, "Efficient Search of Circular Repeats and MicroDNA Reintegration in DNA Sequences," In *Proc. IEEE 20th Int. Conf. Bioinformatics and Bioengineering (BIBE)*, Cincinnati, OH, Oct. 2020, Acceptance Rate: 32%.

39. Y. Tang and **F. Farnoud**, "Error-correcting Codes for Short Tandem Duplication and Substitution Errors," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Los Angeles, CA, June 2020.

38. H. Lou and **F. Farnoud**, "Data Deduplication with Random Substitutions," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Los Angeles, CA, June 2020.

37. S. Jain, **F. Farnoud**, M. Schwartz, and J. Bruck, "Coding for Optimized Writing Rate in DNA Storage," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Los Angeles, CA, June 2020.

36. T. Jin, P. Xu, Q. Gu, **F. Farnoud**, "Rank Aggregation via Heterogeneous Thurstone Preference Models," In *Proc. AAAI Conference on Artificial Intelligence*, Available: https://arxiv.org/abs/1912.01211, New York, NY, Feb. 2020, Acceptance Rate: 20.6%, **Oral est. 4.5%** (348/7737).

35. H. Lou, **F. Farnoud**, "Finite-Time Behavior of k-mer Frequencies and Waiting Times in Noisy-Duplication Systems," In *Proc. Asilomar Conference on Signals, Systems, and Computers*, Monterey, CA, Nov. 2019.

34. Y. Tang, **F. Farnoud**, "Error-correcting Codes for Noisy Duplication Channels," In *Proc. Allerton Conference on Communication, Control, and Computing*, Monticello, IL, Sep. 2019.

33. Y. Tang, Y. Yehezkeally, M. Schwartz, **F. Farnoud**, "Single-Error Detection and Correction for Duplication and Substitution Channels," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Paris, France, July 2019.

32. H. Lou, M. Schwartz, **F. Farnoud**, "Evolution of N-gram frequencies under duplication and substitution mutations," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, pp. 2246–2250, Vail, Colorado, June 2018.

31. R. Gabrys, **F. Farnoud**, "Reconciling Similar Sets," In *Proc. 55th Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, Monticello, IL, Oct. 2017.

30. S. Jain, **F. Farnoud**, M. Schwartz, and J. Bruck, "Noise and Uncertainty in String-Duplication Systems," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Aachen, Germany, June 2017.

29. N. Alon, J. Bruck, **F. Farnoud**, and S. Jain, "On the Duplication Distance of Binary Strings," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Barcelona, Spain, July 2016.

28. S. Jain, **F. Farnoud**, M. Schwartz, and J. Bruck, "Duplication-Correcting Codes for Data Storage in the DNA of Living Organisms," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Barcelona, Spain, July 2016.

27. O. Elishco, **F. Farnoud**, M. Schwartz, and J. Bruck, "The Capacity of Some Polya String Models," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Barcelona, Spain, July 2016.

26. **F. Farnoud**, M. Schwartz, and J. Bruck, "A Stochastic Model for Genomic Interspersed Duplication," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Hong Kong, China, June 2015.

25. S. Jain, **F. Farnoud**, and J. Bruck, "Capacity and Expressiveness of Genomic Tandem Duplication," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Hong Kong, China, June 2015.

24. R. Gabrys, and **F. Farnoud**, "Reconciling Similar Sets of Data," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Hong Kong, China, June 2015.

23. **F. Farnoud**, E. Yaakobi, and J. Bruck, "Approximate Sorting of Data Streams with Limited Storage," In *Proc. Computing and Combinatorics Conf. (COCOON)*, Atlanta, GA, Aug. 2014, Acceptance Rate: 41.6%.

22. **F. Farnoud**, M. Schwartz, and J. Bruck, "The Capacity of String-Duplication Systems," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Honolulu, HI, June 2014.

21. **F. Farnoud**, M. Schwartz, and J. Bruck, "Bounds for Permutation Rate-Distortion," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Honolulu, HI, June 2014.

20. **F. Farnoud** and O. Milenkovic, "Multipermutation Codes in the Ulam Metric," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Honolulu, HI, June 2014.

19. L. Su, **F. Farnoud**, and O. Milenkovic, "Similarity Distances between Permutations," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Honolulu, HI, June 2014.

18. R. Gabrys, E. Yaakobi, **F. Farnoud**, F. Sala, J. Bruck, and L. Dolecek, "Single-Deletion-Correcting Codes over Permutations," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Honolulu, HI, June 2014.

17. R. Gabrys, E. Yaakobi, **F. Farnoud**, and J. Bruck, "Codes Correcting Erasures and Deletions for Rank Modulation," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Honolulu, HI, June 2014.

16. M. Kim, F. Raisali, **F. Farnoud**, and O. Milenkovic, "Gene Prioritization via Weighted Kendall Rank Aggregation," In *Proc. IEEE Int. Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*, Dec. 2013.

15. M. Kim, J.G. Ligo, A. Emad, **F. Farnoud**, O. Milenkovic, and V.V. Veeravalli, "MetaPar: Metagenomic Sequence Assembly via Iterative Reclassification," In *Proc. IEEE Global Conf. Signal and Information Processing (GlobalSIP)*, Dec. 2013.

14. **F. Farnoud**, O. Milenkovic, "Aggregating Rankings with Positional Constraints," In *Proc. IEEE Information Theory Workshop (ITW)*, Seville, Spain, Sep. 2013.

13. **F. Farnoud**, E. Yaakobi, O. Milenkovic, and J. Bruck, "Building Consensus via Iterative Voting," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Istanbul, Turkey, Jul. 2013.

12. F. Raisali, **F. Farnoud**, and O. Milenkovic, "Weighted Rank Aggregation via Relaxed Integer Programming," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Istanbul, Turkey, Jul. 2013.

11. B. Touri, **F. Farnoud**, A. Nedich, and O. Milenkovic, "A General Framework for Distributed Vote Aggregation," In *Proc. American Control Conf.*, Washington, DC, Jun. 2013.

10. **F. Farnoud**, N.P. Santhanam, and O. Milenkovic, "Alternating Markov Chains for Distribution Estimation in the Presence of Errors," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Boston, MA, Jul. 2012.

9. **F. Farnoud**, V. Skachek, and O. Milenkovic, "Rank Modulation for Translocation Error Correction," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Boston, MA, Jul. 2012.

8. **F. Farnoud**, B. Touri, and O. Milenkovic, "Nonuniform Vote Aggregation Algorithms," In *Proc. IEEE Int. Conf. Signal Processing and Communications (SPCOM)*, Bangalore, India, Jul. 2012.

7. **F. Farnoud** and O. Milenkovic, "Decomposing Permutations via Cost-Constrained Transpositions," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Saint Petersburg, Russia, Jul./Aug. 2011.

6. **F. Farnoud**, C.-Y. Chen, O. Milenkovic, and N. Kashyap, "A Graphical Model for Computing the Minimum Cost Transposition Distance," In *Proc. IEEE Information Theory Workshop (ITW)*, Dublin, Ireland, Aug./Sep. 2010.

5. **F. Farnoud**, O. Milenkovic, and N. Santhanam, "Small-Sample Distribution Estimation over Sticky Channels," In *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Jun./Jul. 2009.

4. **F. Farnoud** and S. Valaee, "Reliable Broadcast of Safety Messages in Vehicular Ad Hoc Networks," In *Proc. IEEE INFOCOM*, Rio de Janeiro, Brazil, Apr. 2009, Acceptance Rate: 19.7%.

3. **F. Farnoud** and S. Valaee, "Repetition-Based Broadcast in Vehicular Ad Hoc Networks in Rician Channel with Capture," In *Proc. IEEE INFOCOM Workshops*, Phoenix, AZ, Apr. 2008.

2. **F. Farnoud**, B. Hassanabadi, and S. Valaee, "Message Broadcast Using Optical Orthogonal Codes in Vehicular Communication Systems," In *Proc. ACM Int. Workshop on Wireless Networking for Intelligent Transportation Systems*, Vancouver, BC, Aug. 2007.

1. S. Yazdi, S. Savari, **F. Farnoud**, and G. Kramer, "A Multimessage Capacity Region for Undirected Ring Networks," In *Proc. IEEE Int. Symp. Information Theory*, Nice, France, June 2007.

e. Graduate Students

Doctoral Students:

- ◇ Hao Lou, Graduate Research Assistant, ECE, UVA, Joined Aug. 2017, Qual exam passed in Fall 2018, Proposal exam passed in Fall 2021, Awarded UVA's *Teaching Fellowship* in Fall 2022, Graduated: Spring 2023.
- ◇ Yuanyuan Tang, Graduate Research Assistant, ECE, UVA, Joined Aug. 2018, Qual exam passed in Spring 2019, Proposal exam passed in Summer 2022, Graduated: Fall 2023.
- ◇ Tao Jin, Graduate Research Assistant, CS, UVA, Joined Jan. 2018, First phase of Qual exam passed in Summer 2022, Graduated: Spring 2025.
- ◇ Kallie Whritenour, Graduate Research Assistant, CS, UVA, Joined July 2019, Qual exam passed in Summer 2022, Expected graduation: Fall 2025.
- ◇ Yuting Li, Graduate Research Assistant, CS, UVA, Joined Aug. 2023, Expected graduation: Spring 2026.
- ◇ Sarvin Motamen, Graduate Research Assistant, ECE, UVA, Joined Aug. 2022, Expected graduation: Spring 2027.
- ◇ Haoxuan Luo, Graduate Research Assistant, ECE, UVA, Joined Aug. 2024, Expected graduation: Spring 2029.

Master's Students:

- ◇ Zhuoer Shen, Graduate Research Assistant, CS, UVA, Joined Jan. 2024, Graduated: Spring 2025.

f. External Research Grants

- ○ Organization: National Science Foundation. Award number: 2312873. Period of support: 6/15/2023–5/31/2026. Role: PI; Title: *Collaborative Research: CIF: Small: Versatile Data Synchronization: Novel Codes and Algorithms for Practical Applications*. Amount: $600,000 (Share: $265,000).
- ○ Organization: National Science Foundation. Award number: 2144974. Period of support: 10/1/2022–9/30/2027. Role: PI; Title: *CAREER: Model-based compression and probabilistic analysis of non-Markovian sequences*. Amount: $559,477.00 (Sole PI).
- ◇ Organization: National Science Foundation. Award number: 1908544. Period of support: 10/1/2019–9/30/2023. Role: CoPI. Title: *CIF: Small: Collaborative Research: Rank Aggregation with Heterogeneous Information Sources: Efficient Algorithms and Fundamental Limits*. Amount: $500,000 (Share: $250,000).
- ◇ Organization: National Science Foundation. Award number: 1816409; Period of support: 10/1/2018–9/30/2023. Role: PI. Title: *CIF: NSF-BSF: Small: Collaborative Research: Characterization and Mitigation of Noise in a Live DNA Storage Channel*. Amount: $499,999 (Share: $284,272).

- ◇ Organization: National Science Foundation. Award number: 1755773. Period of support: 3/15/2018–2/28/2022. Role: PI. Title: *CRII: CIF: Model-based Compression of Biological Sequences*. Amount: $175,000 (Sole PI).

In addition, I have received *two SEAS Research Innovation Awards* as PI (Total: 3 semesters of GRA support and 1.5 months of salary), two *SEAS Research Innovation Awards* as CoPI (1.5 semester GRA and 1 month of salary), and a *UVA Global Infectious Diseases Institute Award* as PI ($70,000).

g. Invited Talks

24. *Active ranking without strong stochastic transitivity*
    59th Annual Allerton Conference on Communication, Control, and Computing, Allerton Park, IL, Sep. 2023.

23. *Active ranking without strong stochastic transitivity*
    Information Theory and Applications Workshop (ITA), San Diego, CA, Feb. 2023.

22. *Low-redundancy codes for correcting short-duplication and edit errors*
    Information Theory and Applications Workshop (ITA), San Diego, CA, May 2022.

21. *Data compression and sequence analysis for two non-Markovian sources*
    University of Minnesota, Minneapolis, Nov. 2021.

20. *Simultaneous correction of duplication and substitution errors in DNA storage*
    Information Theory and Applications Workshop (ITA), San Diego, CA, Feb. 2020.

19. *On the entropy of biological sequences*
    52nd Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Oct. 2018.

18. *Evolution of k-mer frequencies in stochastic mutation systems*
    Information Theory and Applications Workshop (ITA), San Diego, CA, Feb. 2018.

17. *Duplication-Correcting Codes for Data Storage in DNA of Living Organisms*
    Allerton Conf. on Communications Control and Computing, Allerton Retreat Center, Monticello, IL, Sep. 29, 2016.

16. *Stochastic and Information-theoretic Approaches to Analysis of Biological Data*
    - ◇ ECE, University of Virginia, Charlottesville, VA, May 2016
    - ◇ EE, University of Hawaii at Manoa, Honolulu, HI, Apr. 2016
    - ◇ EECS, University of Michigan, Ann Arbor, MI, Mar. 2016.
    - ◇ EE, University of Southern California, Los Angeles, CA, Mar. 2016.
    - ◇ ECEE, Arizona State University, Tempe, AZ, Mar. 2016.

15. *On Estimation of DNA Repeat Mutation Rates*
    Information Theory and Applications Workshop (ITA), San Diego, CA, Feb. 2016.

14. *Stochastic Models for DNA Tandem Duplication*
    Molecular Programming Project Workshop, University of Washington, WA, Jan. 2016.

13. *Diversity of biologically-inspired duplication systems*
    Information Theory and Applications Workshop (ITA), San Diego, CA, Feb. 2015.

12. *Biological Diversity through Duplication: Combinatorial and Stochastic Models*
    - ◇ SEAS, Harvard University, Cambridge, MA, Jan. 23, 2015.
    - ◇ ECE, University of Houston, Houston, TX, Jan. 28, 2015.

11. *Biological Diversity through Duplication*
    Molecular Programming Project Workshop, San Francisco, CA, Jan. 2015.

10. *On the Capacity of String-Duplication Systems and Genomic Duplication*
Asilomar Conf. on Signals, Systems, and Computers, Pacific Grove, CA, Nov. 2014.

9. *Approximate Sorting for Streams and Preference Rankings with Limited Storage*
Allerton Conf. on Communications, Control, & Computing, Monticello, IL, Oct. 2014.

8. *Sorting Big Data with Small Memory*
Information Theory and Applications Workshop (ITA), San Diego, CA, Feb. 2014.

7. *Approximate Sorting of Data Streams with Limited Storage*
   - ◇ Conf. in Information Sciences & Systems (CISS), Princeton University, NJ, Mar. 2014
   - ◇ Comm. Seminars, CSL, University of Illinois at Urbana-Champaign, IL, May 2014.

6. *Fewer Axioms for a More Flexible Distance between Rankings*
NIPS Workshop on Social Choice: Theory and Practice, Lake Tahoe, NV, Dec. 2012.

5. *A Constrained Distance-based Approach to Social Choice*
Psychology Department, University of Illinois at Urbana-Champaign, IL, Nov. 2012.

4. *Rank Modulation Codes for Translocation Errors*
   - ◇ EE, Caltech, Pasadena, CA, Apr. 2012.
   - ◇ EE, UCLA, Los Angeles, CA, Apr. 2012.

3. *A Novel Distance Measure for Rank Aggregation*
CommNetS Seminars, USC, CA, Apr. 2012

2. *Novel Measures for Rank Aggregation*
Information Theory and Applications Workshop (ITA), San Diego, CA, Feb. 2012.

1. *Sorting of Permutations by Cost-Constrained Transposition*
AFOSR Complex Networks Review, Arlington, VA, Dec. 2010.

h. Professional Service

Journal Editorship and Conference Organization

- ◇ International Symposium on Information Theory (ISIT), Ann Arbor, Michigan, 2025, Technical Program Committee Member
- ◇ Non-volatile Memories Workshop (NVMW), UC San Diego, 2025, Technical Program Committee Member
- ◇ IEEE Transactions on Information Theory, Dec. 2023–present; Assoc. Editor
- ◇ IEEE Information Theory Workshop (ITW), Mumbai, India, Nov. 2022, Technical Program Committee Member
- ◇ IEEE Global Communications Conference: Selected Areas in Communications: Cloud Computing, Networking and Storage (Globecom SAC CLOUD), Rio De Janeiro, Brazil, Dec. 2022, Technical Program Committee Member
- ◇ IEEE Global Communications Conference: Selected Areas in Communications: Cloud & Fog/Edge Computing, Networking and Storage (Globecom SAC CCNS), Madrid, Spain, Dec. 2021, Technical Program Committee Member
- ◇ IEEE Information Theory Workshop (ITW), Riva del Garda, Italy, Sep. 2020, Technical Program Committee Member
- ◇ IEEE Global Communications Conference: Selected Areas in Communications: Cloud & Fog/Edge Computing, Networking and Storage (Globecom SAC CCNS), Taiwan, Dec. 2020, Technical Program Committee Member

◇ IEEE Global Communications Conference: Selected Areas in Communications: Cloud & Fog/Edge Computing, Networking and Storage (Globecom SAC CCNS), Puako, HI, 2019, Technical Program Committee Member

◇ International Symposium on Information Theory (ISIT), Paris, 2019, Technical Program Committee Member

◇ Non-volatile Memories Workshop (NVMW), UC San Diego, 2019, Technical Program Committee Member

◇ Asilomar Conf. on Signals, Systems, and Computers 2014, Co-organizer and chair of the session "Bioinformatics and DNA Computing"

◇ Allerton 2014, Co-organizer and chair of the session "Topics in Machine Learning"

◇ Conference on Information Sciences and Systems (CISS) 2014, Co-organizer of the session "Ordinal and Social Science Data Processing"

◇ Allerton 2013, Co-organizer and chair of the session "Information Aggregation Over Social Networks"

Journal and Conference Reviewer

◇ IEEE Transactions on Information Theory, 2014–2024

◇ IEEE Transactions on Communications, 2024, 2023, 2017, 2019

◇ PLOS One, 2019

◇ Transactions on Algorithms, 2018

◇ Gene 2017

◇ IEEE Transactions on Emerging Topics in Computing 2016

◇ IEEE Transactions on Molecular, Biological, and Multi-Scale Communications 2015

◇ Journal of Mathematical Psychology 2015

◇ IEEE Trans. Emerging Topics in Computing, special issue on Approximate & Stochastic Computing Circuits, Systems and Algorithms 2015

◇ Journal of Combinatorial Optimization 2014

◇ IEEE Transactions on Vehicular Technology 2013

◇ IEEE Communication Letters 2011, 2018

◇ Conferences: ISIT'24, ISIT'23, ISIT'22, ISIT'21, ISCA'20, ISIT'20, ISIT'19, ISIT'18, ISIT'17, ISIT'16, ITW'15, ISIT'14, ISIT'13, ITW'13, ISIT'12, ISIT'11, ISIT'09, ICC'09, CCNC'09, ICC'08, LCN'07, Globecom'07

Review Panels

- Jeffress Trust Awards Program in Interdisciplinary Research, Richmond, Virginia, Spring 2017–2021
- National Science Foundation, CISE, CRII-CIF, Dec. 2020