Farhad Shirani Chaharsooghi

Contact Information

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Current Appointment

New York University, New York, NY

- Research Assistant Professor — Sep. 2017-Present

Previous Appointments

University of Michigan, Ann Arbor, MI

- Lecturer/ Postdoctoral Research Fellow — Jan 2017- Aug 2017

Education

University of Michigan, Ann Arbor, MI

- Ph.D., Electrical Engineering: Systems, 2012-2017
  Advisor: S. Sandeep Pradhan
  Ph.D. Thesis: Structural Results for Coding Over Communication Networks
  GPA: 4.00
- M.Sc., Mathematics, 2014-2016
  Major: Applied Mathematics
  GPA: 4.00
- M.Sc., Electrical Engineering: Systems, 2011-2012
  Major: Communications
  GPA: 4.00

Sharif University of Technology, Tehran, Iran

- B.Sc., Electrical Engineering, 2007-2011
  B.Sc., Thesis: A New Method for Variable Elimination for Systems of Inequations
  Advisor: M. R. Aref

Research Interests

Privacy and Security, Wireless Communications, Information Theory, Learning Theory

Research Experience

New York University, Brooklyn, NY

- Research Assistant Professor, Sep 2017-Present
  Member at NYU WIRELESS

University of Michigan, Ann Arbor, MI

- Postdoctoral Research Fellow, Jan 2017-Aug 2017
- Graduate Student Research Assistant, 2012-2016
  Advisor: Sandeep Pradhan

Sharif University of Technology, Tehran, Iran

- Member of Information Science and Security Lab 2010-2012
  Advisor: Mohammadreza Aref

Research Support

CIF: Small: An Information Theoretic Framework for Web Privacy, 2018-2021
Investigators: E. Erkip, **F. Shirani Chaharsooghi**, S. Garg,
NSF: Communications and Information Foundations,
Amount Awarded: $487,000

Teaching Experience

New York University, Brooklyn, NY

- Course Instructor, Spring 2018, Spring 2019
  EL-GY 6063: Information Theory
- Course Instructor, Spring 2020
  EL-GY 9113: Statistical Learning Theory

University of Michigan, Ann Arbor, MI

- Course Instructor Winter 2017
  EECS:501 Probability and Random Processes
- Graduate Student Instructor Fall 2014, Winter 2015
  EECS:501 Probability and Random Processes

Sharif University of Technology, Tehran, Iran

- Teaching Assistant, Winter 2009
  Introduction to Logic Circuits

Awards and Honors

- **Finalist of Towner Award for Outstanding Engineering GSIs,** Winter 2015
  This is an engineering school-wide award for graduate teaching instructors (GSI).
- **Technical Session Award,** Systems Engineering and Communication, Fall 2015
  Engineering Graduate Symposium,
  This is a college-wide annual poster competition at the University of Michigan.
- **EECS Department Graduate Fellowship,** University of Michigan 2013
  This fellowship is awarded to students with outstanding academic background.
  It includes tuition and stipend for one year.
- **EECS Guaranteed Graduate Funding,** University of Michigan 2012-2016
  This award includes guaranteed tuition and stipend for five years in forms
  of research or teaching assistantships, or departmental fellowships.
- **Ranked** 27^{th}, National university entrance exam among more than Fall 2007
  150,000 contestants,
- **Iran's National Elites Foundation Scholarship** 2007-2010
  Members of INEF include students and faculty who have been recipients of
  scientific prizes in national competitions.
- **President's Honorary Award**
  Presented by president of Sharif University of Technology Fall 2007

Invited Talks

- "Fundamental Limits and Matching Algorithms for Online Fingerprinting and Database Alignment", GRAND Workshop in Maynooth University, Ireland, 2019
- "Social network de-anonymization based on group memberships: An information theoretic approach", ITA Workshop in UCSD, 2018
- "On the Structure of Optimality Achieving Codes in Multi-terminal Communications", ITA Graduation Day Talk, Nominated by the University of Michigan to present during "Graduation Day", ITA Workshop in UCSD, 2017
- "Preserving Common Information", SPeecs Seminars Series, University of Michigan, 2016
- "Distributed Source Coding in Absence of Common Components", Stanford University, Feb. 2014
- "Distributed Source Coding in Absence of Common Components", DSSD, Menlo Park, CA, 2014

Tutorial Presentations

- "An Information Theoretic Framework for Web Privacy", 2019 IEEE 30th Annual International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC)
- "A Communication Theoretic Framework for Web Privacy", 2019 IEEE Global Communications Conference (Globecom)

Workshops and Poster Presentations

- "Finite Block-Length Codes Trump Random Coding over Infinite Length Blocks", (poster), Shannon Centennial Symposium, University of Michigan, Sep 2016
- "Finite Block-length Gains in Distributed Source Coding", (poster), North American School of Information theory (NASIT) San Diego, CA, Aug 2015

Publications, Submissions and Preprints

Journals: Accepted Papers

[J1] **F. Shirani Chaharsooghi**, S. Pradhan, *On the Sub-optimality of Single-Letter Coding in Networks*, IEEE Transactions on Information Theory, vol. 65, no. 10, pp. 6115-6135, Oct. 2019.

[J2] H. Heidari, **F. Shirani Chaharsooghi**, S. Pradhan, *Quasi Structured Codes for Multi-Terminal Communications*, IEEE Transactions on Information Theory, vol. 65, no. 10, pp. 6263-6289, Oct. 2019.

[J3] S. Shahsavari, **F. Shirani Chaharsooghi**, E. Erkip, *A General Framework for Temporal Fair User Scheduling in NOMA Systems*, IEEE Journal on Selected Topics on Signal Processing, vol. 13, no. 3, pp. 408-422, 2019.

[J4] **F. Shirani Chaharsooghi**, S. Pradhan, *An achievable rate-distortion region for multiple descriptions source coding based on coset codes*, IEEE Transactions on Information Theory, vol. 64, no. 5, pp. 3781-3809, 2018.

Journals: Preprints/Working Papers

[J5] **F. Shirani Chaharsooghi**, S. Pradhan, *A New Achievable Rate-Distortion Region for Distributed Source Coding*, submitted to IEEE Transactions on Information Theory (earlier version appeared in [C23,25]).

[J6] A. Khalili, **F. Shirani Chaharsooghi**, E. Erkip, Y. C. Eldar, *On MIMO Communication with Low Resolution Quantization at the Receivers*, to be submitted to IEEE Transactions on Wireless Communications (earlier version appeared in [C3,4]).

[J7] **F. Shirani Chaharsooghi**, S. Garg, E. Erkip, *A Concentration of Measure Approach to Matching of Correlated Graphs*, to be submitted to IEEE Transactions on Information Theory (earlier version appeared in [C6,9,12]).

[J8] **F. Shirani Chaharsooghi**, S. Pradhan, *Lattices from linear codes and fine quantization: general continuous sources and channels*, to be submitted to IEEE Transactions on Information Theory (earlier version appeared in [C8,24]).

Conference Publications

[C1] S. Shahsavari, **F. Shirani Chaharsooghi**, A. Khojastepour, E. Erkip, *Opportunistic Temporal Fair Mode Selection and User Scheduling for Full-duplex Systems*, 2019 IEEE 30th Annual International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC), Accepted: June 2019.

[C2] **F. Shirani Chaharsooghi**, S. Garg, E. Erkip, *A Concentration of Measure Approach to Database De-anonymization*, 2019 IEEE International Symposium on Information Theory (ISIT), pp. 2748-2752, 2019.

[C3] A. Khalili, **F. Shirani Chaharsooghi**, E. Erkip, Y. C. Eldar, *Tradeoff Between Delay and High SNR Capacity in Quantized MIMO Systems*, 2019 IEEE International Symposium on Information Theory (ISIT), pp. 597-601, 2019.

[C4] A. Khalili, **F. Shirani Chaharsooghi**, E. Erkip, Y. C. Eldar, *On Multiterminal Communication over MIMO Channels with One-bit ADCs at the Receivers*, 2019 IEEE International Symposium on Information Theory (ISIT), pp. 602-606, 2019.

[C5] S. Shahsavari, **F. Shirani Chaharsooghi**, E. Erkip, *On the Fundamental Limits of Multi-user Scheduling under Short-term Fairness Constraints*, 2019 IEEE International Symposium on Information Theory (ISIT), pp. 408-422, 2019.

[C6] **F. Shirani Chaharsooghi**, S. Garg, E. Erkip, *Matching graphs with community structure: a concentration of measure approach*, 56th IEEE Annual Allerton Conference on Communication, Control, and Computing, pp. 1028-1035, 2018

[C7] S. Shahsavari, **F. Shirani Chaharsooghi**, E. Erkip, *Opportunistic temporal fair scheduling for non-orthogonal multiple access*, 56th IEEE Annual Allerton Conference on Communication, Control, and Computing, pp. 391-398, 2018

[C8] **F. Shirani Chaharsooghi**, S. Pradhan, *Lattices from linear codes and fine quantization: general continuous sources and channels*, IEEE International Symposium on Information Theory (ISIT), pp. 2356-2360, 2018.

[C9] **F. Shirani Chaharsooghi**, S. Garg, E. Erkip, *Typicality matching for pairs of correlated graphs*, IEEE International Symposium on Information Theory (ISIT), pp. 221-225, 2018.

[C10] M. Heidari, **F. Shirani Chaharsooghi**, S. Pradhan, *Bounds on the effective-length of optimal codes for interference channel with feedback*, IEEE International Symposium on Information Theory (ISIT), pp. 1126-1130, 2018.

[C11] **F. Shirani Chaharsooghi**, S. Garg, E. Erkip, *Optimal active social network de-anonymization using information thresholds*, IEEE International Symposium on Information Theory (ISIT), pp. 1445-1449, 2018.

[C12] **F. Shirani Chaharsooghi**, S. Garg, E. Erkip, *Seeded graph matching: efficient algorithms and theoretical guarantees*, 51st Asilomar Conference on Signals, Systems, and Computers, pp. 253-257, 2017.

[C13] **F. Shirani Chaharsooghi**, S. Garg, E. Erkip, *An information theoretic framework for active de-anonymization in social networks based on group memberships*, 55th Annual Allerton Conference on Communication, Control, and Computing, pp. 470-477, 2017.

[C14] **F. Shirani Chaharsooghi**, S. Pradhan, *On the sub-optimality of single-letter coding in multi-termianl communications*, IEEE International Symposium on Information Theory (ISIT), pp. 1823-1827, 2017.

[C15] **F. Shirani Chaharsooghi**, S. Pradhan, *On the correlation between boolean functions of random variables*, IEEE International Symposium on Information Theory (ISIT), pp. 1301-1305, 2017.

[C16] M. Heidari, **F. Shirani Chaharsooghi** , S. Pradhan, *A new achievable rate region for the multiple-access channel with states*, IEEE International Symposium on Information Theory (ISIT), pp. 36-40, 2017.

[C17] M. Heidari, **F. Shirani Chaharsooghi** , S. Pradhan, *On the necessity of structured codes for communication over MAC with feedback*, IEEE International Symposium on Information Theory (ISIT), pp. 2298-2302, 2017.

[C18] **F. Shirani Chaharsooghi** , S. Pradhan, *Trade-off between communication and cooperation in the interference channel*, IEEE International Symposium on Information Theory (ISIT), pp. 2214-2218, 2016.

[C19] **F. Shirani Chaharsooghi** , M. Heidari, S. Pradhan, *Quasi linear codes: application to point-to-point and multi-terminal source coding*, IEEE International Symposium on Information Theory (ISIT), pp. 730-734, 2016.

[C20] M. Heidari, **F. Shirani Chaharsooghi** , S. Pradhan, *New sufficient conditions for multiple-access channel with correlated sources*, IEEE International Symposium on Information Theory (ISIT), pp. 2019-2023, 2016.

[C21] M. Heidari, **F. Shirani Chaharsooghi** , S. Pradhan, *Beyond group capacity in multi-terminal communications*, IEEE International Symposium on Information Theory (ISIT), pp. 2081-2085, 2015.

[C22] **F. Shirani Chaharsooghi** , M. Heidari, S. Pradhan, *New lattices for multiple-descriptions*, IEEE International Symposium on Information Theory (ISIT), pp. 1580-1584, 2015.

[C23] **F. Shirani Chaharsooghi**, S. Pradhan, *Finite-length gains in distributed source coding*, IEEE International Symposium on Information Theory (ISIT), pp. 1702-1706, 2014.

[C24] **F. Shirani Chaharsooghi** , S. Pradhan, *An achievable rate-distortion region for the multiple-descriptions problem*, IEEE International Symposium on Information Theory (ISIT), pp. 576-580, 2014.

[C25] **F. Shirani Chaharsooghi** , A. Ghasemian Sahebi, S. Pradhan, *Distributed source coding in absence of common components*, IEEE International Symposium on Information Theory (ISIT), pp. 1362-1366, 2013.

[C26] **F. Shirani Chaharsooghi** , M. Emadi, M. Zamanighomi and M. R. Aref, *A new method for variable elimination in systems of inequations*, IEEE International Symposium on Information theory (ISIT), pp. 1215-1219, 2011.

[C27] M. Zamanighomi, M. Emadi, **F. Shirani Chaharsooghi**, M. R. Aref, *Achievable rate region for multiple access channel with correlated channel states and cooperating encoders*, IEEE Information Theory Workshop (ITW), pp. 628-632, 2011.

Service

- **Outreach Committee Member:** Information Theory Society, 03/22/18 until 12/31/20.
- **Reviewer**: IEEE Transactions on Information Theory, IEEE Transactions on Communications, Iran Workshop on Communication and Information Theory, International Symposium on Information Theory.
- **Co-Chair** for two sessions, Multiple Access Channels, Multiuser Information Theory, and Network Information Theory, ITA 2015

References

- Elza Erkip
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  Professor, Electrical Engineering and Computer Science, University of Michigan
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