Amin (Aminzadeh) Gohari

Tehran Institute for Advanced Studies
Tehran, Iran
Email: a.gohari@teias.institute, amin.aminzadeh@gmail.com
https://teias.institute/people/faculty/cs/amin-gohari/

Education

- **University of California, Berkeley** (2004-2010)
  MSc, PhD in Electrical Engineering and Computer Sciences
- **Sharif University of Technology** (2000-2004)
  BSc in Electrical Engineering

Research Interests

- Classical information theory
- Molecular communication
- Quantum information theory
- Game theory

Appointments

- **Faculty member** (2020-)
  Tehran Institute for Advanced Studies (Tehran, Iran)
  Associate Professor
- **Faculty member** (2011-2020)
  Sharif University of Technology (Tehran, Iran)
  Associate Professor: 2016-
  Assistant Professor: 2011-2016
- **Postdoctral Researcher** (2010)
  The Chinese University of Hong Kong (Hong Kong)

Awards

Exemplary reviewer for the IEEE Transactions on Communications 2017
Exemplary reviewer for the IEEE Transactions on Communications 2016
IEEE Jack Keil Wolf Student Paper Award Finalist (as supervisor) 2015
IEEE Jack Keil Wolf Student Paper Award (as supervisor) 2013
IEEE Jack Keil Wolf Student Paper Award Finalist (as supervisor) 2012
Eli Jury Award, U.C. Berkeley 2010
Bernard Friedman Memorial Prize in Applied Mathematics, U.C. Berkeley 2010
IEEE Jack Keil Wolf Student Paper Award Finalist (as student) 2010
IEEE Jack Keil Wolf Student Paper Award Finalist (as student) 2009
IEEE Jack Keil Wolf Student Paper Award Finalist (as student) 2008
Graduate Fellowship, U.C. Berkeley 2004
Gold Medal, 41st International Mathematical Olympiad (IMO) 2000
First Prize, 9th International Mathematical Competition for University Students (IMC) . . . 2002
Gold Medal, Iran National Mathematical Competition for University Students (Zanjan, Iran) 2002
Gold Medal, Iran National International Mathematical Olympiad 1999
Silver Medal, Iran National International Mathematical Olympiad 1998

Professional Services

- Associate Editor for the IEEE Transactions on Information Theory (Associate Editor at Large) from July 15, 2018-July 15, 2021. The main domain of an AE at Large is Applied Probability and Statistics.
- Secretary of the IEEE Iran Section Society on Communications and Information Theory, 2015-2018. Since 2018, I am on the management board of the IEEE Iran Section Society on Communications and Information Theory.
- Executive Co-Chair, Iran Workshop on Communication and Information Theory, 2013-2018
- Technical Program Committee member for ISIT (2018-2021 and 2016), ITW 2021, IWCIT 2013-2020, ICC 2014, ICCVE 2013, WCSP'12.
- Reviewer for IEEE Transactions on Information Theory (51 returned reviews), IEEE Transactions on Communications (19 returned reviews)

Course Teaching

Graduate courses are marked with a dagger. All courses were offered in Iran, except for Probabilistic Methods which was offered at the Technical University of Munich (TUM), Germany, Summer 2017.

- Network Information Theory †
- Quantum Information Theory †
- Mathematics for Data Science †

- High-Dimensional Probability †
- Stochastic Processes †
- Probabilistic Methods †
- Advanced Topics in Statistics †
- Advanced Engineering Mathematics
- Engineering Mathematics
- Probability and Statistics
- Numerical Calculations
- Analog Circuits
- Circuit Theory

Student Supervision

PhD students:

- Niloufar Ahmadipour, Graduation: 2021, Thesis title: Theoretical Foundations of Communication of Numbers in Finite Time.
- Mehrdad Valizadeh, Graduation: 2020, Thesis title: Simulation of a Random Variable and its Application to Game Theory.
- Hamidreza Arjmandi (co-advised), Graduation: 2016, Thesis title: Information Transfer in Molecular Bio-Nano Communication Networks.
- Gholamali Aminian (co-advised), Graduation: 2017, Thesis title: Efficient Transmission and Achievable Rates in Molecular Communication.
- Reza Mosayebi (co-advised), Graduation: 2017, Thesis title: Efficient Methods for Transmission and Reception of Information in Molecular Communication Systems.

Supervised or co-supervised 18 MSc students:

- Mohammad Amin Charoosayi, Mohammad Sina Aieneh, Nastaran Abadi, Nafiseh Ghoroghchian, Mahdiyeh Mehrabi, Farzad Shahrivari, Ladan Khaloopour, Ashkan Divband, Hamid Ghourchian, Mohammad Movahednasab, Sina Molavipour, Mahed Abroshan, Payam Delgosha, Kamran Keykhosravi, Reza Mosayebi, Morteza Noshad, Farzin Hadadpour, Sadjad Nemati

Grants

- Iran National Science Foundation (INSF) grant no. 89003743: Finding the Shannon capacity of wireless networks; 2011-2012.
- Iran National Science Foundation (INSF) grant no. 95824657: Randomness generation from an information-theoretic perspective; 2017-2018.

- A member of the National Center of Excellence on Communication Systems (Ghotbe Mokhaberat), 2018-2020.

Recent Invited Talks

- Iran Workshop on Communication and Information Theory, 2021
- Mathematical Summer in Paris, 2021
- Maryam Mirzakhani Foundation Seminar, Tehran, 2021
- University of Maryland, Communication, Control and Signal Processing (CCSP) Seminar, August 2020
- Data Science Winter School, Tehran Institute for Advanced Studies, 2020
- The Technical University of Munich, Institute for Communications Engineering, 2017
- 28th Stony Brook International Conference on Game Theory (in honor of Pradeep Dubey and Yair Tauman), 2017
- Institute Henri Poincare, Distributed Computation and Communication Theme, Feb 2016

Journal Papers

Shannon Theory:

1. A. Gohari, O. Gunlu and G. Kramer, Coding for Positive Rate in the Source Model Key Agreement Problem, IEEE Transactions on Information Theory, 66 (10), 6303-6323, 2020.
2. V. Anantharam, A. Gohari, and C. Nair, On the Evaluation of Marton's Inner Bound for Two-Receiver Broadcast Channels, IEEE Transactions on Information Theory, 65 (3), 1361-1371, 2018.
3. H. Ghourchian, G. Aminian, A. Gohari, M. Mirmohseni and M. Nasiri-Kenari, On the Capacity of a Class of Signal-Dependent Noise Channels. IEEE Transactions on Information Theory, 64 (12), 7828-7846, 2018.
4. Hamid Ghourchian, Arash Amini and A. Gohari, How Compressible are Innovation Processes? IEEE Transactions on Information Theory, 64 (7), 4843-4871, 2018.
5. A. Gohari and V. Anantharam, Comments On "Information-Theoretic Key Agreement of Multiple Terminals—Part I", IEEE Transactions on Information Theory, 63 (8), 5440-5442, 2017.
6. H. Ghourchian, A. Gohari and A. Amini, Existence and Continuity of Differential Entropy for a Class of Distributions, IEEE Communications Letters, 21 (7), 1469-1472, 2017.
7. F. Haddadpour, MH Yassaee, S. Beigi, A. Gohari and M. R. Aref, Simulation of a Channel with Another Channel, IEEE Transactions on Information Theory, 63 (5), 2659-2677, 2017.
8. M. M. Mojahedian, M. R. Aref and A. Gohari, Perfectly Secure Index Coding, IEEE Transactions on Information Theory, 63 (11), 7382-7395, 2017.

9. M. H. Yassaee, A. Gohari and M. R. Aref, Channel Simulation via Interactive Communications, IEEE Transactions on Information Theory, 61 (6), 2964-2982, 2015.

10. S. Molavipour and A. Gohari, Recovery From Random Samples in a Big Data Set, IEEE Communication Letters, 19 (11), 1929-1932, 2015.

11. M. Tahmasbi, A. Shahrasbi and A. Gohari, Critical Graphs in Index Coding, IEEE Journal on Selected Areas in Communications, 33 (2), 225-235, 2015.

12. M. H. Yassaee, M. R. Aref and A. Gohari, Achievability Proof via Output Statistics of Random Binning, IEEE Transactions on Information Theory, 60 (11), 6760-6786, 2014.

13. A. Gohari and V. Anantharam, Infeasibility Proof and Information State in Network Information Theory, IEEE Transactions on Information Theory, 60 (10), 5992-6004, 2014.

14. Y. Geng, A. Gohari, C. Nair and Y. Yu, On Marton's Inner Bound and its Optimality for Classes of Product Broadcast Channels, IEEE Transactions on Information Theory, 60 (8), 22-41, 2014

15. A. Gohari, A. El Gamal and V. Anantharam, On Marton's Inner Bound for the General Broadcast Channel, IEEE Transactions on Information Theory, 60 (1), 3748-3762, 2014.

16. A. Gohari, S. Yang and S. Jaggi, Beyond the Cut Set Bound: Uncertainty Computations in Network Coding with Correlated Sources, IEEE Transactions on Information Theory, 59 (5), 5708-5722, 2013.

17. A. Gohari and V. Anantharam, Evaluation of Marton's Inner Bound for the General Broadcast Channel, IEEE Transactions on Information Theory, 58 (2), 608-619, 2012.

18. A. Gohari and V. Anantharam, Information-Theoretic Key Agreement of Multiple Terminals - Part I: Source Model, IEEE Transactions on Information Theory, 56 (8), 3973-3996, 2010.

19. A. Gohari and V. Anantharam, Information-Theoretic Key Agreement of Multiple Terminals - Part II: Channel Model, IEEE Transactions on Information Theory, 56 (8), 3997-4010, 2010.

20. A. G. Dimakis, A. Gohari and M. Wainwright, Guessing Facets: Polytope Structure and Improved LP Decoding, IEEE Transactions on Information Theory, 55 (8), 3479-3487, 2009.

Game Theory and Information Theory:

21. M. Valizadeh and A. Gohari, Simulation of a Random Variable and its Application to Game Theory, Mathematics of Operations Research, 46 (2), 452-470, 2021.

22. M. Valizadeh and A. Gohari, Playing Games with Bounded Entropy, Games and Economic Behavior, 115, 363-380, 2019.

23. P. Delgosha, A. Gohari and M. Akbarpour, High-Probability Guarantees in Repeated Games: Theory and Applications in Information Theory, Proceedings of the IEEE, 105 (2), 189-204, 2017.

24. P. Delgosha and A. Gohari, Information Theoretic Cutting of a Cake, IEEE Transactions on Information Theory, 63 (11), 6950-6978, 2017.

Measures of Correlation:

25. M. M. Mojahedian, S. Beigi, A. Gohari, M. H. Yassaee and M. R. Aref, A Correlation Measure Based on Vector-Valued L_p-Norms, IEEE Transactions on Information Theory, 65 (12), 7985-8004, 2019.

26. S. Beigi and A. Gohari, Phi-Entropic Measures of Correlation, IEEE Transactions on Information Theory, 64 (4), 2193-2211, 2018.

27. S. Beigi, O. Etesami and A. Gohari, Deterministic Randomness Extraction from Generalized and Distributed Santha-Vazirani Sources, SIAM Journal on Computing, 46 (1), 1-36, 2017.

28. O. Etesami and A. Gohari, Maximal Rank Correlation, IEEE Communication Letters, 20 (1), 117-120, 2016.

29. S. Beigi and A. Gohari, Monotone Measures for Non-Local Correlations, IEEE Transactions on Information Theory, 61 (9), 5185-5208, 2015.

Quantum Information Theory:

30. S. Beigi and A. Gohari, Quantum Achievability Proof via Collision Relative Entropy, IEEE Transactions on Information Theory, 60 (12), 7980-7986, 2014.

31. S. Beigi and A. Gohari, On Dimension Bounds for Auxiliary Quantum Systems, IEEE Transactions on Information Theory, 60 (10), 368-387, 2014.

Molecular Communication:

32. N. Ahmadypour and A. Gohari, Transmission of a Bit over a Discrete Poisson Channel with Memory, IEEE Transactions on Information Theory, 67 (7), 4710-4727, 2021.

33. N. Abadi, A. Gohari, M. Mirmohseni and M. Nasiri-Kenari, On Zero-Error Molecular Communication with Multiple Molecule Types, IEEE Transactions on Communications, 68 (7), 4311-4324, 2020.

34. S. Aeeneh, N. Zlatanov, A. Gohari, M. Nasiri-Kenari and M. Mirmohseni, Timing Modulation for Macro-scale Molecular Communication, IEEE Wireless Communications Letters, 9 (9), 1356-1360, 2020.

35. R. Mosayebi, A. Gohari, M. Mirmohseni and M. Nasiri-Kenari, Type-Based Sign Modulation and Its Application for ISI Mitigation in Molecular Communication, IEEE Transactions on Communications, 66 (1), 180-193, 2018.

36. M. Farahnak-Ghazani, G. Aminian, M. Mirmohseni, A. Gohari and M. Nasiri- Kenari, On Medium Chemical Reaction in Diffusion-Based Molecular Communication: a Two-Way Relaying Example, IEEE Transactions on Communications, 67 (2), 1117-1132, 2018.

37. H. Arjmandi, M. Movahednasab, A. Gohari, M. Mirmohseni and M. Nasiri-Kenari, ISI-Avoiding Modulation for Diffusion-Based Molecular Communication, IEEE Transactions on Molecular, Biological and Multi-Scale Communications, 3 (1), 48-59, 2017.

38. A. Gohari, M. Mirmohseni and M. Nasiri-Kenari, Information Theory of Molecular Communication: Directions and Challenges, IEEE Transactions on Molecular, Biological and Multi-Scale Communications, 2016.

39. M. Movahednasab, M. Soleimanifar, A. Gohari, M. Nasiri-Kenari and U. Mitra, Adaptive Transmission Rate with a Fixed Threshold Decoder for Diffusion-Based Molecular Communication, IEEE Transactions on Communications, 64 (1), 236-248, 2016.

40. G. Aminian, H. Arjmandi, A. Gohari, M. Nasiri-Kenari and U. Mitra, Capacity of Diffusion-Based Molecular Communication Networks Over LTI-Poisson Channels, IEEE Transactions on Molecular, Biological and Multi-Scale Communications, 1 (2), 188-201, 2015.

41. R. Mosayebi, H. Arjmandi, A. Gohari, M. Nasiri-Kenari and U. Mitra, Receivers for Diffusion Based Molecular Communication: Exploiting Memory and Sampling Rate, IEEE Journal on Selected Areas in Communications, 32 (12), 2368-2380, 2014.

42. H. Arjmandi, A. Gohari, M. Nasiri-Kenari and F. Bateni, Diffusion Based Nanonetworking: A New Modulation Technique and Performance Analysis, IEEE Communications Letter, 17 (4), 645-648, 2013.

Miscellaneous:

43. E. Mohammadi, A. Gohari and F. Marvasti, A Square Root Sampling Law for Signal Recovery, in IEEE Signal Processing Letters, 26 (4), 562-566, April 2019.

44. A. Daneshi, H. Azarnoush, F. Towhidkhah, A. Gohari, and A. Ghazizadeh, Drift-diffusion Explains Response Variability and Capacity for Tracking Objects, Scientific Reports, 9 (1), 1-15, 2019.

45. S. Beigi, O. Etesami and A. Gohari, The Value of Help Bits in Randomized and Average-Case Complexity, Computational Complexity, 26 (1), 119-145, 2017.

Conference Papers

1. A. El Gamal, A. Gohari and C. Nair, Achievable Rates for the Relay Channel with Orthogonal Receiver Components, IEEE Information Theory Workshop, 2021.

2. A. Gohari, C. Nair and D. Ng, An Information Inequality Motivated by the Gaussian Z-Interference Channel, IEEE International Symposium on Information Theory, 2021.

3. A. El Gamal, A. Gohari and C. Nair, Strengthened Cutset Upper Bounds on the Capacity of the Relay Channel and Applications, IEEE International Symposium on Information Theory, 2021.

4. M. S. Masiha, A. Gohari, M. H. Yassaee and M. R. Aref, Learning under Distribution Mismatch and Model Misspecification, IEEE International Symposium on Information Theory, 2021.

5. N. Ahmadypour and A. Gohari, Transmission of a Bit over a Discrete Poisson Channel with Memory, IEEE Information Theory Workshop, 2020.

6. H. Abin, A. Gohari and M. Nasiri-Kenari, Molecular Communication over a Non-linear Reaction-Diffusion Medium: A Tractable Model, IEEE Global Communications Conference, 2020.

7. A. Gohari and C. Nair, New Outer Bounds for the Two-Receiver Broadcast Channel, IEEE International Symposium on Information Theory, 2020.

8. M. M. Mojahedian, S. Beigi, A. Gohari, M. H. Yassaee and M. R. Aref, A Correlation Measure Based on Vector-Valued L_p Norms, IEEE International Symposium on Information Theory, 2019.

9. N. Abadi, A. Gohari, M. Mirmohseni and M. Nasiri-Kenari, Zero-Error Codes for Multi-Type Molecular Communication in Random Delay Channel, Iran Workshop on Communication and Information Theory, 2018.

10. A. Gohari, O. Gunlu and G. Kramer, On Achieving a Positive Rate in the Source Model Key Agreement Problem, IEEE International Symposium on Information Theory, 2018.

11. G. Aminian, H. Ghourchian, A. Gohari, M. Mirmohseni and M. Nasiri-Kenari, On the Capacity of Signal Dependent Noise Channels, Iran Workshop on Communication and Information Theory, 2017.

12. M. M. Mojahedian, A. Gohari and M. R. Aref, On the Equivalency of Reliability and Security Metrics for Wireline Networks, IEEE International Symposium on Information Theory, 2017.

13. M. Valizadeh and A. Gohari, Playing Games with Bounded Entropy, IEEE International Symposium on Information Theory, 2017.

14. M. Farahnak Ghazani, G. Aminian, M. Mirmohseni, A. Gohari and M. Nasiri-Kenari, Physical Layer Network Coding in Molecular Two-Way Relay Networks, Iran Workshop on Communication and Information Theory, 2016.

15. R. Mosayebi, A. Gohari, M. Mirmohseni and M. Nasiri-Kenari, Type Based Sign Modulation for Molecular Communication, Iran Workshop on Communication and Information Theory, 2016.

16. P. Delgosha, A. Gohari and M. Akbarpour, High Probability Guarantees in Repeated Games: Theory and Applications in Information Theory, IEEE International Symposium on Information Theory, 2016.

17. M. Abroshan, A. Gohari and S. Jaggi, Zero Error Coordination, IEEE Information Theory Workshop, 2015.

18. S. Beigi and A. Gohari, On the Duality of Additivity and Tensorization, IEEE International Symposium on Information Theory, 2015.

19. M. M. Mojahedian, A. Gohari and M. R. Aref, Perfectly Secure Index Coding, IEEE International Symposium on Information Theory, 2015.

20. S. Beigi, O. Etesami and A. Gohari, The Value of Information-Theoretic Content of Help Bits for Computation, Iran Workshop on Communication and Information Theory, 2015.

21. S. Beigi and A. Gohari, Two-way Channel Simulation, Iran Workshop on Communication and Information Theory, 2015.

22. M. Sefidgaran, A. Gohari and M. R. Aref, On Korner-Marton's Sum Modulo Two Problem, Iran Workshop on Communication and Information Theory, 2015.

23. M. Movahednasab, M. Soleimanifar, A. Gohari, M. Nasiri-Kenari and U. Mitra, Adaptive Molecule Transmission Rate for Diffusion Based Molecular Communication, IEEE International Conference on Communications, 2015.

24. G. Aminian, H. Arjmandi, A. Gohari, M. Nasiri-Kenari and U. Mitra, Capacity of LTI-Poisson Channel for Diffusion based Molecular Communication, IEEE International Conference on Communications, 2015.

25. R. Mosayebi, H. Arjmandi, A. Gohari, M. Nasiri-Kenari and U. Mitra, Diffusion Based Molecular Communication: A Simple Near Optimal Receiver, Iran Workshop on Communication and Information Theory, 2014.

26. K. Keykhosravi, M. Mahzoon, A. Gohari and M. R. Aref, From Source Model to Quantum Key Distillation: An Improved Upper Bound, Iran Workshop on Communication and Information Theory, 2014.

27. M. Tahmasbi, A. Shahrasbi and A. Gohari, Critical Graphs in Index Coding, IEEE International Symposium on Information Theory, 2014.

28. V. Anantharam, A. Gohari, S. Kamath and C. Nair, On Hypercontractivity and a Data Processing Inequality, IEEE International Symposium on Information Theory, 2014.

29. V. Anantharam, A. Gohari, S. Kamath and C. Nair, On Hypercontractivity and the Mutual Information between Boolean Functions, 51st Annual Allerton Conference on Communication, Control, and Computing (Allerton), 2013.

30. F. Haddadpour, M. H. Yassaee, A. Gohari and M. R. Aref, When is it Possible to Simulate a DMC Channel from Another?, IEEE Information Theory Workshop, 2013.

31. M. H. Yassaee, M. R. Aref and A. Gohari, A Technique for Deriving One-Shot Achievability Results in Network Information Theory, IEEE International Symposium on Information Theory, 2013.

32. M. H. Yassaee, M. R. Aref and A. Gohari, Non-Asymptotic Output Statistics of Random Binning and Its Applications, IEEE International Symposium on Information Theory, 2013.

33. V. Anantharam, A. Gohari and C. Nair, Improved Cardinality Bounds on the Auxiliary Random Variables in Marton's Inner Bound, IEEE International Symposium on Information Theory, 2013.

34. M. H. Yassaee, A. Gohari and M. R. Aref, Secure Noisy Network Coding, Iran Workshop on Communication and Information Theory, 2013.

35. S. Beigi and A. Gohari, On Dimension Bounds for Quantum Systems, Iran Workshop on Communication and Information Theory, 2013.

36. A. Gohari, M. H. Yassaee and M. R. Aref, Secure Channel Simulation, IEEE Information Theory Workshop, 2012.

37. P. Delgosha and A. Gohari, Information Theoretic Cutting of a Cake, IEEE Information Theory Workshop 2012.

38. F. Haddadpour, M. H. Yassaee, A. Gohari and M. R. Aref, Coordination via a Relay, IEEE International Symposium on Information Theory, 2012.

39. A. Gohari, C. Nair and V. Anantharam, On Marton's Inner Bound for Broadcast Channels, IEEE International Symposium on Information Theory, 2012.

40. M. H. Yassaee, A. Gohari and M. R. Aref, Channel Simulation via Interactive Communications, IEEE International Symposium on Information Theory, 2012.

41. M. H. Yassaee, M. R. Aref and A. Gohari, Achievability Proof via Output Statistics of Random Binning, IEEE International Symposium on Information Theory, 2012.

42. E. Mohammadi, A. Gohari and H. Aghaeinia, Transmission of Non-Linear Binary Input Functions over a CDMA System, IEEE International Symposium on Information Theory, 2012.

43. A. Gohari and V. Anantharam, Generating Dependent Random Variables Over Networks, IEEE Information Theory Workshop, 2011.

44. Y. Geng, A. Gohari, C. Nair and Y. Yu, The Capacity Region for Two Classes of Product Broadcast Channels, IEEE International Symposium on Information Theory, 2011.

45. A. Gohari, S. Yang and S. Jaggi, Beyond the Cut-Set Bound: Uncertainty Computations in Network Coding with Correlated Sources, IEEE International Symposium on Information Theory, 2011.

46. Y. Geng, A. Gohari, C. Nair, and Y. Yu, On Marton's Inner Bound for Two Receiver Broadcast Channels, Information Theory and Applications (ITA), 2011.

47. A. Gohari, A. El Gamal and V. Anantharam, On an Outer Bound and an Inner Bound for the General Broadcast Channel, IEEE International Symposium on Information Theory, 2010.

48. A. Gohari and V. Anantharam, Evaluation of Marton's Inner Bound for the General Broadcast Channel, IEEE International Symposium on Information Theory, 2009.

49. A. Gohari and V. Anantharam, A Generalized Cut-Set Bound, IEEE International Symposium on Information Theory, 2009.

50. A. Gohari and V. Anantharam, An Outer bound to the Admissible Source Region of Broadcast Channels with Arbitrarily Correlated Sources and Channel Variations, 46th Annual Allerton Conference on Communication, Control, and Computing, 2008.

51. A. Gohari and V. Anantharam, New Bounds on the Information-Theoretic Key Agreement of Multiple Terminals, IEEE International Symposium on Information Theory, 2008.

52. A. Parsa, A. Gohari and A. Sahai, Exploiting Interference Diversity for Event-based Spectrum Sensing, 3rd IEEE Symposium on New Frontiers in Dynamic Spectrum Access Networks, 2008.

53. A. Gohari and V. Anantharam, Communication for Omniscience by a Neutral Observer and Information-Theoretic Key Agreement of Multiple Terminals, IEEE International Symposium on Information Theory, 2007.