Arash Gholami Davoodi

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https://arashgholami.github.io/

Research Interests

Statistics, Machine Learning, Algorithms, Information Theory, Convex Optimization

Employment

2018–Present **Research Fellow**, *School of Computer Science, Carnegie Mellon University*.
Research Topics:
High dimensional classification, universal hash design for discrete probability distributions (Locality sensitive hashing)
Finding associations in large datasets with subquadratic complexity
Large scale string alignment (Hidden Markov Model)

Education

2013–2018 **University of California Irvine**, *PhD in Electrical Engineering and Computer Science*, *Information Theory*, GPA: 4.00/4.00.
Research Topics:
Finding asymptotic bounds on the entropies (Measure theory approach)
Capacity region Characterization (Graph theory point of view)
Sum-set Inequalities for entropies of discrete random variables (Combinatorics)

2009–2012 **Sharif University of Technology**, *M.Sc. in Electrical Engineering*.
Research Topics:
Power Allocation characterization (Convex optimization perspective)
Power allocation (Game theoretic approach)
Partial differential equations

2005–2009 **Sharif University of Technology**, *B.Sc. in Electrical Engineering (Minor in Mathematics)*.

Honors and Awards

2019 IEEE Communications Society and Information Theory Society Joint **Best Paper Award**, France.
2018-2020 **Lane Fellowship** from School of Computer Science, Carnegie Mellon University.
2014 IEEE GLOBECOM **Best Paper Award**, Austin, Texas.
2014 University of California Fellowship for Graduate Studies.
2014 Henry Samueli Fellowship Summer 2014.
2013 Ranked $\mathbf{1}^{st}$ in the Ph.D. Preliminary Exam, EECS, UCI.
2012 Ranked $\mathbf{2}^{nd}$ (top 0.007%) among 20,000 participants in the Iranian nationwide Ph.D. entrance exam.
2009 Ranked $\mathbf{2}^{nd}$ (top 0.007%) among 30,000 participants in the Iranian nationwide M.Sc. entrance exam.
2005 Ranked $\mathbf{8}^{th}$ (top 0.002%) among 400,000 participants in the Iranian nationwide B.Sc. entrance exam.
2005 Iran National Elite Foundation Fellowship.
2003 **Bronze Medal** National Mathematics Olympiad.

Journal Papers

DAMI 2020 **A. G. Davoodi**, S. Chang, H. Yoo, A. Baweja, M. Mongia, H. Mohimani, "ForestDSH: A Universal Hash Design for Discrete Probability Distributions", Data Mining and Knowledge Discovery.

IEEE IT 2020 **A. G. Davoodi**, S. A. Jafar, "Sum-set Inequalities from Aligned Image Sets: Instruments for Robust GDoF Bounds," IEEE Transactions on Information Theory.

IEEE IT 2020 **A. G. Davoodi**, S. A. Jafar, "DoF Region of the MIMO (M, N_1, N_2) Broadcast Channel with Partial CSIT," IEEE Transactions on Information Theory.

IEEE IT 2019 **A. G. Davoodi**, S. A. Jafar, "Optimality of Simple Layered Superposition Coding in the 3 User MISO BC with Finite Precision CSIT," IEEE Transactions on Information Theory.

IEEE IT 2018 **A. G. Davoodi**, S. A. Jafar, "Aligned Image Sets and the GDoF of Symmetric MIMO Interference Channel with Partial CSIT," IEEE Transactions on Information Theory.

IEEE IT 2018 **A. G. Davoodi**, S. A. Jafar, "K-User Symmetric $M \times N$ MIMO Interference Channel with Finite Precision CSIT: A GDoF Perspective," IEEE Transactions on Information Theory.

IEEE IT 2018 **A. G. Davoodi**, B. Yuan, S. A. Jafar, "GDoF of the MISO BC: Bridging the gap between finite precision CSIT and perfect CSIT," IEEE Transactions on Information Theory.

IEEE IT 2018 **A. G. Davoodi**, S. A. Jafar, "Network Coherence Time Matters: Interference Networks with Finite Precision CSIT Perfect CSIR," IEEE Transactions on Information Theory.

IEEE IT 2017 **A. G. Davoodi**, S. A. Jafar, "Generalized DoF of the symmetric K-user interference channel under finite precision CSIT," IEEE Transactions on Information Theory.

IEEE IT 2016 **A. G. Davoodi**, S. A. Jafar, "Aligned image sets under channel uncertainty: Settling conjectures on the collapse of degrees of freedom under finite precision CSIT," IEEE Transactions on IT. Recipient of IEEE Communications Society and Information Theory Society Joint **Best Paper Award**.

IEEE IT 2016 **A. G. Davoodi**, S. A. Jafar, "Transmitter cooperation under finite precision CSIT: A GDoF perspective.

IEEE IET 2013 M. J. Emadi, **A. G. Davoodi**, M. R. Aref, "Analytical power allocation for a full duplex decode-and-forward relay channel," IET Communications.

Elsevier 2010 A. Davodi, D. Ganji, **A G. Davoodi**, A. Asgari, "Finding general and explicit solutions $(2+1)$ dimensional Broer-Kaup-Kupershmidt system nonlinear equation," Applied Mathematics and Computation.

Wiley 2010 G. Domairry, A. Davodi, **A. G. Davoodi**, "Solutions for the Double Sine-Gordon equations by Exp-function method, Tanh and Extended Tanh methods," Numerical Method For PDE.

Selected Conference Papers

For the complete list of my conference publications, please see my Google Scholar profile.

AISTATS 2020 M. Ferdowsi, **A. G. Davoodi**, H. Mohimani, "Measuring Mutual Information Between All Pairs of Variables in Subquadratic Complexity.

PAKDD 2020 M. Mongia , B. Soudry, **A. G. Davoodi**, H. Mohimani, "Efficient Database Search via Tensor Distribution Sensitive Bucketing.

IEEE Globecom 2014 **A. G. Davoodi**, S. A. Jafar, " Settling conjectures on the collapse of degrees of freedom under finite precision CSIT. Recipient of IEEE Globecom **Best Paper Award**.

Advising

2018–Present PhD Students: Mohsen Ferdosi, Mihir Mongia

2018–Present Master Students: Chengze Shen

2018–2019 Undergraduate Students: Anubhav Bajewa, Benjamin Sourdi, Hyungon Yoo, Sean Chang

Reviewing activities

IEEE Transactions on Information Theory

IEEE Transactions on Communication Systems

IEEE ISIT, IEEE GLOBECOM, IEEE ICC

Programming

Python, C++, HTML, Matlab