# Arash Gholami Davoodi

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🖥 http://arashgholami.github.io/

## Interests

Algorithms, Information Theory, Statistics, Probability Theory, Machine Learning, 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
Finding associations in large datasets with subquadratic complexity
Large scale string alignment (Locality sensitive hashing)

## 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 $1^{st}$ in the Ph.D. Preliminary Exam, EECS, UCI.

**2012**   Ranked $2^{nd}$ (top 0.007%) among 20,000 participants in the Iranian nationwide Ph.D. entrance exam.

**2009**   Ranked $2^{nd}$ (top 0.007%) among 30,000 participants in the Iranian nationwide M.Sc. entrance exam.

**2005**   Ranked $8^{th}$ (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.

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| 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. |

## Conference Papers

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

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

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| 2018–Present | PhD Students: Mihir Mongia, Mohsen Ferdowsi |
| 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