

## AMIR R. ASADI

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### RESEARCH INTERESTS

- Machine learning
- Information theory
- High dimensional probability and statistics
- Data compression
- Community detection

### EDUCATION

- **Princeton University**, Princeton, New Jersey, USA.
  - Ph.D. candidate in Electrical Engineering Sep. 2017 to present
    - \* Advisor: Prof. Emmanuel Abbe
  - M.A. in Electrical Engineering Sep. 2015 to Sep. 2017
    - \* Advisors: Prof. Emmanuel Abbe and Prof. Sergio Verdú
  - GPA: 3.972/4
- **Sharif University of Technology**, Tehran, Iran. Sep. 2010 to Aug. 2015
  - B.Sc., Electrical Engineering, Communications.
    - \* Project advisor: Dr. Amin Gohari
  - B.Sc., Mathematics.  
(Double major program.)
  - Total GPA: 18.48/20
- **Shahid Ejei High School (National Organization for Development of Exceptional Talents)**, Isfahan, Iran. Sep. 2006 to Aug. 2010
  - High School Diploma in Mathematics and Physics

## **AWARDS AND HONORS**

- Department of Electrical Engineering Teaching Assistant Award, Princeton University (2019)
- Anthony Ephremides Fellowship in Electrical Engineering, Princeton University (2016)
- Iranian Mathematical Olympiad Bronze Medal (2009)
- Winner of the *Tournament of Towns*: International mathematical contest certified by the Russian Academy of Sciences (2009)
- Membership of the Iranian National Elite Foundation (2009-present)

## **PUBLICATIONS**

1. **Asadi, A. R.** & Abbe, E. (2020). A Self-similarity Approach to Neural Network Learning (In Preparation)
2. **Asadi, A. R.**, Abbe, E. & Verdú, S. (2020). Information-Theoretic Chaining Techniques. (In Preparation).
3. **Asadi, A. R.** & Abbe, E. (2020). Maximum Multiscale Entropy and Neural Network Regularization. *arXiv preprint arXiv:2006.14614* (Submitted).
4. **Asadi, A. R.** & Abbe, E. (2020). Chaining Meets Chain Rule: Multilevel Entropic Regularization and Training of Neural Networks. *Journal of Machine Learning Research*, 21(139), 1-32.
5. **Asadi, A. R.**, Abbe, E., & Verdú, S. (2018). Chaining Mutual Information and Tightening Generalization Bounds. *Advances in Neural Information Processing Systems (NeurIPS)* (pp. 7245-7254)
6. **Asadi, A. R.** , Abbe, E., & Verdú, S. (2017). Compressing data on graphs with clusters. *IEEE International Symposium on Information Theory (ISIT) 2017* (pp. 1583-1587)
7. Asadi, M. **Asadi, A. R.** (2014) "On the Failure Probability of Used Coherent Systems". *Communications in Statistics, Theory and Methods*, Vol. 43, pp. 2468-2475.
8. **Asadi, A. R.** (2013), Problem 96.J with solution, *The Mathematical Gazette*, Vol. 97, No. 539, pp. 345-346, United Kingdom. (Available at <https://www.jstor.org/stable/24496830>.)

## **TALKS**

- Department of EECS, Massachusetts Institute of Technology, Dec. 2020
- Center for Data Science, New York University, June 2020
- Laboratoire de Physique, École Normale Supérieure, Paris, May 2020
- Department of Statistical Sciences, University of Toronto, Canada, Apr. 2020
- Department of Engineering, University of Cambridge, UK, Mar. 2020
- Institute for Advanced Study, Princeton, New Jersey, Oct. 2019  
(Available at <https://youtu.be/YdYXpaE3Tm0>)
- Microsoft Research AI, Redmond, Washington, Sep. 2019

## **RESEARCH INTERNSHIPS AND VISITS**

- **Institute of Network Coding** Chinese University of Hong Kong, Hong Kong, Summer 2014
  - Advisor: Prof. Raymond Yeung
  - Title: Some Schemes for File Dissemination in Networks Employing Linear Network Coding
- **Microsoft Research AI** Redmond, Washington state, USA, Sep. 2019
  - Host: Prof. Sebastien Bubeck

## **TEACHING ASSISTANTSHIPS**

- Princeton University
  - Transmission and Compression of Information (ELE\APC 486), Spring 2017-2018
    - \* Instructor: Prof. Emmanuel Abbe
  - Probability in High Dimension (ORF\APC 550), Fall 2018-2019
    - \* Instructor: Prof. Ramon van Handel

## **GRADUATE COURSES (Princeton University)**

<b>Course Title</b>	<b>Instructor(s)</b>	<b>Grade</b>
Coding Theory and Random Graphs	Emmanuel Abbe	<i>A<sup>+</sup></i>
Information Theory	Sergio Verdú	<i>A<sup>+</sup></i>
Theory of Detection and Estimation	Paul Cuff	<i>A</i>
Theory of Algorithms	Robert Tarjan	<i>A</i>
Theoretical Machine Learning	Elad Hazan	<i>A</i>
Lossless Data Compression	Sergio Verdú	<i>A<sup>+</sup></i>
Random Graphs and Networks	Emmanuel Abbe	<i>A</i>
Probability Theory	Ovidiu Calin	<i>A</i>
Probability in High Dimension	Ramon van Handel	<i>A</i>
Sparsity, Structure and Inference	Yuxin Chen	<i>A</i>
Information Theory and Machine Learning (Grad Seminar)	Emmanuel Abbe	<i>P</i>
Random Processes in Information Systems	Sergio Verdú	<i>A<sup>-</sup></i>
Theory of Detection and Estimation	Sergio Verdú	<i>AUD</i>
New Directions in Theoretical Machine Learning	Sanjeev Arora	<i>AUD</i>
The Probabilistic Method	Noga Alon	<i>AUD</i>
Introduction to Statistical Mechanics	Salvatore Torquato & Roberto Car	<i>AUD</i>

## **ONLINE COURSES (Coursera)**

<b>Course Title</b>	<b>Instructor(s)</b>	<b>Institution</b>	<b>Grade</b>
First Course in Python	Charles Severance	University of Michigan	<i>P</i>
Python Data Structures	Charles Severance	University of Michigan	(in progress)

## **SCHOOLS**

- East Asian School of Information Theory, Hong Kong, July 7-11, 2014
- North American School of Information Theory, Durham, NC, June 21-23, 2016
- North American School of Information Theory, College Station, TX, May 20-23, 2018
- North American School of Information Theory, Boston, MA, July 2-5, 2019

## **PROFESSIONAL SERVICES**

- Neural Information Processing Systems (NeurIPS) Conference 2020 (Reviewer)
- Conference on Learning Theory (COLT) 2020 (Reviewer)
- IEEE International Symposium on Information Theory (ISIT) 2020 (Reviewer)
- IEEE Journal on Selected Areas in Information Theory (Reviewer)
- Conference on Information Sciences and Systems (CISS) 2020 (Technical Program Committee)
- Neural Information Processing Systems (NeurIPS) Conference 2019 (Reviewer)
- IEEE Information Theory Workshop 2019 (Reviewer)
- IEEE Transactions on Information Theory (Reviewer)
- IEEE International Symposium on Information Theory (ISIT) 2018 (Reviewer)
- Conference on Information Sciences and Systems (CISS) 2018 (Reviewer)
- IEEE International Symposium on Information Theory (ISIT) 2016 (Reviewer)

## **PROGRAMMING LANGUAGES**

- MATLAB
- C++
- Python and Keras
- $\text{\LaTeX}$