

# Alireza Vahid, PhD

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## Research Interests

- Network Information Theory and Wireless Communications
- Coding Theory and its Applications in Computer and Memory Systems

## Education

- **Cornell University** Ithaca, NY  
MSc & PhD in Electrical and Computer Engineering 2015
  - PhD Thesis: The Impact of Imperfect Feedback on the Capacity of Wireless Networks
  - **2015 Best PhD Thesis Award**
  - Advisor: Salman Avestimehr, PhD
- **Sharif University of Technology** Tehran, Iran  
BSc in Electrical Engineering 2009

## Positions Held

- **University of Colorado Denver** Denver, CO  
Assistant Professor of Electrical Engineering 2017 to present
- **Duke University** Durham, NC  
Adjunct Professor of Electrical & Computer Engineering 2018 to present
- **Duke University** Durham, NC  
Postdoctoral Research Scientist 2014-2017
- **Qualcomm Inc.** San Diego, CA  
Innovation Fellow 2013
- **Bell Labs** Holmdel, NJ  
Research Intern 2012

## Selected Awards & Honours

- Young Upwardly Mobile Professor (YUMP) Award, CU Denver 2018
- Best PhD Thesis Award, School of ECE, Cornell University 2015
  - Awarded to one PhD candidate per year
  - The only winner of this award for a theoretical thesis
- Qualcomm Innovation Fellowship 2013
  - Innovation title: Collaborative Interference Management
  - \$100k research grant, eight awards per year
- Best PhD Teaching Award, School of ECE, Cornell University 2011
  - Awarded to one PhD candidate per year, \$3k cash reward
- Jacobs Scholar Fellowship, School of ECE, Cornell University 2009
- Ranked 2nd among over 360,000 in Iranian University Entrance Exam 2004
- Ranked 2nd in Azad University National Entrance Exam 2004
- Silver Medal in Iranian National Physics Olympiad 2003

## Teaching Experience and Student Mentorship

- **Data+ Summer Program, Duke University** Durham, NC  
Mentor for Water Reservoir Project Jun. to Aug. 2015
  - Advised a team of undergraduates and two graduate students
  - Aligned the capabilities of the undergraduates with the demands of the external client
  - Managed communication with the external client
  - Conducted comprehensive study of water reservoirs across North America
  - Quantified the role of human operator in water level fluctuations
- **Teaching Assistant, Cornell University** Ithaca, NY  
Random Signals in Communication and Signal Processing Fall 2010
  - The sole teaching assistant for the course
  - **2011 Best PhD Teaching Award**

## Professional Activities

- Reviewer:
  - IEEE Transactions on Information Theory
  - IEEE Transactions on Communications
  - IEEE Transactions on Wireless Communications
  - IEEE Transactions on Vehicular Technology
  - IEEE International Symposium on Information Theory
  - IEEE INFOCOM
- Organized the 2016 North American School of Information Theory
- Vice President of Persian Student Organization, Cornell University

## Journal Publications

- (J1) A. Vahid, V. Aggarwal, S. Avestimehr, A. Sabharwal, “An Algebraic Framework for Inter-Session Coding with Local Views in Two-Layer Wireless Networks,” *EURASIP Journal on Wireless Communications and Networking*, 2017.
- (J2) A. Vahid, M. Maddah-Ali, S. Avestimehr, and Y. Zhu, “Binary Fading Interference Channel with No CSIT,” *IEEE Transactions on Information Theory*, vol. 63, no. 6, pp. 3565–3578, 2017.
- (J3) A. Vahid, A. R. Calderbank, “Two-User Erasure Interference Channels with Local Delayed CSIT,” *IEEE Transactions on Information Theory*, vol. 62, no. 9, pp. 4910–4923, 2016.
- (J4) A. Vahid, M. Maddah-Ali, and S. Avestimehr, “Approximate Capacity Region of the MISO Broadcast Channels With Delayed CSIT,” *IEEE Transactions on Communications*, vol. 64, no. 7, pp. 2913–2924, 2016.
- (J5) A. Vahid, M. Maddah-Ali, and S. Avestimehr, “Capacity Results for Binary Fading Interference Channels with Delayed CSIT,” *IEEE Transactions on Information Theory*, vol. 60, no. 10, pp. 6093–6130, 2014.
- (J6) A. Vahid, C. Suh, and S. Avestimehr, “Interference Channels with Rate-Limited Feedback,” *IEEE Transactions on Information Theory*, vol. 58, no. 5, pp. 2788–2812, 2012.

## Conference Publications

- (C1) A. Vahid, "Finite Field X-Channels with Delayed CSIT and Common Messages," *Proceedings of International Symposium on Information Theory (ISIT)*, 2018.
- (C2) A. Vahid, R. Calderbank, "ARQ for interference packet networks," *Proceedings of International Symposium on Information Theory (ISIT)*, 2018.
- (C3) A. Vahid, R. Calderbank, "When does spatial correlation add value to delayed channel state information?" *Proceedings of International Symposium on Information Theory (ISIT)*, 2016.
- (C4) G. Mappouras, A. Vahid, R. Calderbank, D. Sorin, "Methuselah Flash: Rewriting Codes for Extra-Long Storage Lifetime," *Proceedings of 46th Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN)*, 2016.
- (C5) A. Eslami, A. Velasco, A. Vahid, G. Mappouras, R. Calderbank, D. Sorin, "Writing without Disturb on Phase Change Memories by Integrating Coding and Layout Design," *Proceedings of Memory Systems (MEMSYS)*, 2015.
- (C6) A. Vahid, I. Shomorony, R. Calderbank, "Informational Bottlenecks in Two-Unicast Wireless Networks with Delayed CSIT," *Proceedings of Allerton conference*, 2015.
- (C7) A. Vahid, R. Calderbank, "Impact of Local Delayed CSIT on the Capacity Region of the Two-User Interference Channel," *Proceedings of International Symposium on Information Theory (ISIT)*, 2015.
- (C8) A. Vahid, G. Mappouras, A. Velasco, R. Calderbank, and D. J. Sorin, "Virtual Cells and Concatenated Codes for Flash Memory," *Proceedings of Fifth Non-Volatile Memories Workshop (NVMW)*.
- (C9) A. Vahid, M. Maddah-Ali, and S. Avestimehr, "Binary Fading Interference Channel with No CSIT," *Proceedings of International Symposium on Information Theory (ISIT)*, 2014.
- (C10) A. Vahid, M. Maddah-Ali, and S. Avestimehr, "Communication Through Collisions: Opportunistic Utilization of Past Receptions," *Proceedings of IEEE Infocom*, 2014.
- (C11) A. Vahid, M. Maddah-Ali, and S. Avestimehr, "Approximate Capacity of the Two-User MISO Broadcast Channel with Delayed CSIT," *Proceedings of Allerton conference*, 2013.
- (C12) A. Vahid, M. Maddah-Ali, and S. Avestimehr, "Binary Fading Interference Channel with Delayed Feedback," *Proceedings of International Symposium on Information Theory (ISIT)*, 2012.
- (C13) A. Vahid, M. Maddah-Ali, and S. Avestimehr, "Interference Channel with Binary Fading: Effect of Delayed Network State Information," *Proceedings of Allerton conference*, 2011.
- (C14) A. Vahid, V. Aggarwal, S. Avestimehr, and A. Sabharwal, "On the Capacity of Multi-hop Wireless Networks with Partial Network Knowledge," *Proceedings of Allerton conference*, 2010.
- (C15) A. Vahid and S. Avestimehr, "The Two-User Deterministic Interference Channel with Rate-Limited Feedback," *Proceedings of International Symposium on Information Theory (ISIT)*, 2010.

## Preprints and Submitted Papers

- (P1) A. Vahid, "On the Degrees-of-Freedom of Two-Unicast Wireless Networks with Delayed CSIT," *submitted to IEEE Transactions on Information Theory*, 2018.

- (P2) A. Vahid, "On the Degrees-of-Freedom of Two-Unicast Wireless Networks with Delayed CSIT," *submitted to IEEE Transactions on Information Theory*, 2018.
- (P3) T. Levy, A. Vahid, R. Giryes, "Ranking Recovery from Limited Comparisons using Low-Rank Matrix Completion," *under review*.
- (P4) A. Vahid, "Capacity Results for Finite-Field X-Channels with Delayed CSIT," *submitted to IEEE Transactions on Information Theory*, 2018.
- (P5) A. Vahid, A. R. Calderbank, "Throughput Region of Spatially Correlated Interference Packet Networks," *submitted to IEEE Transactions on Information Theory*, 2018.