Alireza Vahid, PhD

Gleason Endowed Associate Prof. of Electrical and Microelectronic Engineering arveme@rit.edu
Rochester Institute of Technology www.alirezavahid.com

Who I am

I work at the intersection of information and coding theory, wireless networking, and data storage. I devise solutions across data acquisition, processing, and communications to render new technologies practical. In my interdisciplinary research, I collaborate with experts in circuit design, cyber-security, and computational biology to name a few. My work has been supported by a wide range of federal, state, and industry agencies.

Research Interests

Wireless networking & security, communication theory, information and coding theory, dynamic spectrum access, sensing security, joint communications and sensing, data storage, genomics, sequence assembly.

Education

- **Cornell University** Ithaca, NY
  M.Sc. & Ph.D. in Electrical and Computer Engineering – GPA 4.0/4.0 2015
  - Ph.D. Thesis: The Impact of Imperfect Feedback on the Capacity of Wireless Networks
  - **2015 Cornell Best PhD Thesis Award**
  - Advisor: Professor Salman Avestimehr
  - Thesis Committee: Professor Lang Tong, Professor Stephen Wicker
- **Sharif University of Technology** Tehran, Iran
  B.Sc. in Electrical Engineering – GPA 18.95/20 2009

Professional Appointments

- **Rochester Institute of Technology** Rochester, NY
  Tenured Associate Professor of Electrical and Microelectronic Engineering Aug. 2023 to present
- **University of Colorado Denver** Denver, CO
  Assistant Professor of Electrical Engineering (tenure awarded Aug. 23) Aug. 2017 to Aug. 2023
- **Duke University** Durham, NC
  Adjunct Assistant Professor of Electrical & Computer Engineering 2018
- **Duke University** Durham, NC
  Postdoctoral Research Scientist. Supervisor: Professor Robert Calderbank 2015-2017
- **Qualcomm Inc.** San Diego, CA
  Innovation Fellow 2013
- **Bell Labs** Holmdel, NJ
  Research Intern 2012

Awarded Grants

10. **Army Research Laboratory**
    Program: DoD Spectrum Innovation Center
    Role: co-PI Budget: $2.6m Share: $100k Start: Oct. 2023 Duration: 1 year
    Title: Spectrum Management with Adaptive and Reconfigurable Technologies (SMART Hub)

9. **National Science Foundation**
    Program: Spectrum Innovation Initiative National Radio Dynamic Zones (SII-NRDZ)
    Role: PI Budget: $1.5m Share: $400k Start: Oct. 2022 Duration: 3 years
    Title: Enabling Autonomous Fine-Grained Spatial Spectrum Sensing and Sharing

8. **SONY**
    Program: Faculty Innovation Award
    Role: PI Budget: $100k Share: $100k Start: Oct. 2022 Duration: 1 year
    Title: Beyond beamforming with smart surfaces

7. **National Science Foundation**
    Program: Division of Computer and Network Systems Core program
    Role: PI Budget: $1.1m Share: $275k Start: Oct. 2022 Duration: 3 years
    Title: Programmable Computational Antennas for Sensing and Communications

6. **National Science Foundation**
    Program: Division of Computer and Network Systems Core program
    Role: PI Budget: $500k Share: $170k Start: Oct. 2021 Duration: 3 years
    Title: Smart surfaces for channel morphing and multi-user scaling

5. **National Science Foundation**
    Program: Spectrum and Wireless Innovation enabled by Future Technologies (SWIFT)
    Role: PI Budget: $500k Share: $250k Start: 2020 Duration: 3 years
    Title: Cross-layer interference management

4. **Lab Venture Partners/State of Colorado**
    Program: Lab Venture Challenge
    Role: PI Budget: $125k Share: $125k Start: 2019 Duration: 1 year
    Topic: Theia–the interference alignment antenna

3. **University of Colorado**
    Program: Young Faculty Award
    Role: PI Budget: $30k Share: $30k Start: 2018 Duration: 1 year
    Topic: Secure communications

2. **National Science Foundation**
    Program: Division of Communication and Information Foundations Core program
    Role: SP Budget: $500k Share: $25k Start: 2017 Duration: 3 years
    Topic: High performance computer memory

1. **Qualcomm Inc.**
    Program: Qualcomm Innovation Fellowship
    Role: PI Budget: $100k Share: $50k Start: 2013 Duration: 1 year
    Topic: Collaborative interference management

Selected Honors & Awards

- Gleason Endowed Professorship, RIT ($50k/year) 2023
- SONY Faculty Innovation Award ($100k) 2022
- Dean's Faculty Fellow, CU Denver ($10k/year for three years) 2021
- Best Paper Award at IEEE CCWC with my PhD student 2020
- Lab Venture Challenge Award for my invention "Theia" ($125k) 2019
- Runner-up Best Paper Award at Dependable Systems and Networks (DSN) 2019
- New Faculty Research Award, CU Denver ($30k) 2019
- Creative Research Collaborative (CRC) Fellowship, CU Denver 2018
- Best PhD Thesis Award, School of ECE, Cornell University 2015
- Qualcomm Innovation Fellowship ($100k) 2013
- Best PhD Teaching Award, School of ECE, Cornell University 2010
- Jacobs Scholar Fellowship, School of ECE, Cornell University 2009
- Ranked 2nd among over 360,000 participants in Iranian University Entrance Exam 2004
- Silver Medal in Iranian National Physics Olympiad 2003

Surveys & Tutorials

1. T. M. Hoang, A. Vahid, T. Hoang, and L. Hanzo, "Physical Layer Authentication and Security Design in the Machine Learning Era," *IEEE Communications Surveys & Tutorials*, 2024. DOI: 10.1109/COMST.2024.3363639

Journal Publications

28. S. Nassirpour, I. Shomorony, A. Vahid, "DNA Merge-Sort: A Family of Nested Varshamov-Tenengolts Reassembly Codes for Out-of-Order Media," *IEEE Transactions on Communications*, 2023. DOI: 10.1109/TCOMM.2023.3335409

27. M. S. Nguyen, D. T. Do, A. Vahid, S. Muhaidat, D. Sicker, "Enhancing NOMA Backscatter IoT Communications with RIS," *IEEE Internet of Things Journal*, 2023. DOI: 10.1109/JIOT.2023.3308786

26. S. Nassirpour, A. Vahid, D. T. Do, D. Bharadia, "Beamforming Design in Reconfigurable Intelligent Surface-Assisted IoT Networks Based on Discrete Phase Shifters and Imperfect CSI," *IEEE Internet of Things Journal*, 2023. DOI: 10.1109/JIOT.2023.3305914

25. T. M. Hoang, C. Xu, A. Vahid, T. Q. Duong, T. Hoang, and L. Hanzo, "Secrecy-Rate Optimization of Double RIS-Aided Space-Ground Networks," *IEEE Internet of Things Journal*, 2023. DOI: 10.1109/JIOT.2023.3262481

24. D. T. Do, C. Le, A. Vahid, S. Mumtaz, "Antenna Selection and Device Grouping for Spectrum-Efficient UAV-Assisted IoT Systems," *IEEE Internet of Things Journal*, 2022. DOI: 10.1109/JIOT.2022.3229592

23. A. Niakanlahiji, S. Orlowski, A. Vahid, H. Jafarian, "Toward Practical Defense against Traffic Analysis Attacks on Encrypted DNS Traffic," *Computers & Security*, 2022.
DOI: 10.1016/j.cose.2022.103001

22. S. Nassirpour, A. Gupta, A. Vahid, D. Bharadia, "Power-Efficient Analog Front-End Interference Suppression with Binary Antennas," *IEEE Transactions on Wireless Communications*, 2022.
DOI: 10.1109/TWC.2022.3212937

21. A. Narayan Ravi, A. Vahid, I. Shomorony, "Coded Shotgun Sequencing," *IEEE Journal on Selected Areas in Information Theory*, vol. 3, no. 1, pp. 147–159, 2022.
DOI: 10.1109/JSAIT.2022.3151737

20. M. Askarzadeh, A. Vahid, A. Goodwell, "Evaluating Ecohydrological Model Sensitivity to Forcing Variability with an Information Theory-Based Approach," *Entropy*, vol. 24, no. 7, 2022.
[Interdisciplinary publication]
DOI: 10.3390/E24070994

19. A. Vahid, "Topological Content Delivery with Feedback and Random Receiver Cache," *IEEE Journal on Selected Areas in Information Theory*, vol. 2, no. 4, pp. 1180–1190, 2021.
DOI: 10.1109/JSAIT.2021.3126209

18. A. Vahid, S. C. Lin, I. H. Wang, "Erasure Broadcast Channels with Intermittent Feedback," *IEEE Transactions on Communications*, vol. 69, no. 11, pp. 7363–7375, 2021.
DOI: 10.1109/TCOMM.2021.3102648

17. I. Shomorony, A. Vahid, "Torn-Paper Coding," *IEEE Transactions on Information Theory*, vol. 67, no. 12, pp. 7904–7913, 2021.
DOI: 10.1109/TIT.2021.3120920

16. S. Nassirpour, A. Vahid, "On the Stability Regions of Intermittent Interference Networks," *IEEE Transactions on Communications*, vol. 69, no. 11, pp. 7335–7349, 2021.
DOI: 10.1109/TCOMM.2021.3101868

15. M. Johnny, A. Vahid, "Low-Complexity Blind Interference Suppression with Reconfigurable Antennas," *IEEE Transactions on Wireless Communications*, vol. 21, no. 4, pp. 2757–2768, 2021.
DOI: 10.1109/TWC.2021.3115696

14. A. Vahid, S. C. Lin, I. H. Wang, Y. C. Lai, "Content Delivery over Broadcast Erasure Channels with Distributed Random Cache," *IEEE Journal on Selected Areas in Information Theory*, vol. 2, no. 4, pp. 1191–1205, 2021.
DOI: 10.1109/JSAIT.2021.3126622

13. S. C. Lin, I. H. Wang, A. Vahid, "Capacity of Broadcast Packet Erasure Channels with Single-User Delayed CSI," *IEEE Transactions on Information Theory*, vol. 67, no. 10, pp. 6283–6295, 2021.
DOI: 10.1109/TIT.2021.3103801

12. T. Levy, A. Vahid, R. Giryes, "Ranking Recovery from Limited Comparisons using Low-Rank Matrix Completion," *Elsevier Applied and Computational Harmonic Analysis*, vol. 54, pp. 227–249, 2021.
DOI: 10.1016/J.ACHA.2021.03.004

11. S. Nassirpour, A. Vahid, "Embedded Codes for Reassembling Non-Overlapping Random DNA Fragments," *IEEE Transactions on Molecular, Biological, and Multi-Scale Communications*, vol. 7, no. 1, pp. 40–50, 2020.
DOI: 10.1109/TMBMC.2020.3035370

10. M. Johnny, A. Vahid, "Exploiting Coherence Time Variations for Opportunistic Blind Interference Alignment," *IEEE Transactions on Communication Theory*, vol. 68, no. 10, pp. 6054–6069, 2020. DOI: 10.1109/TCOMM.2020.3011687

9. A. Vahid, "On the Degrees-of-Freedom of Two-Unicast Wireless Networks with Delayed CSIT," *IEEE Transactions on Information Theory*, vol. 65, no. 8, pp. 5176–5188, 2019. DOI: 10.1109/TIT.2019.2913996

8. A. Vahid, R. Calderbank, "Throughput Region of Spatially Correlated Interference Packet Networks," *IEEE Transactions on Information Theory*, vol. 65, no. 2, pp. 1220–1235, 2019. DOI: 10.1109/TIT.2018.2860041

7. G. Mappouras, A. Vahid, R. Calderbank, D. Sorin, "Extending Flash Lifetime in Embedded Processors by Expanding Analog Choice," *IEEE Transactions on Computer-Aided Design Integrated Circuits and Systems*, vol. 37, no. 11, pp. 2462–2473, 2018. DOI: 10.1109/TCAD.2018.2857059

6. A. Vahid, V. Aggarwal, S. Avestimehr, A. Sabharwal, "Interference Management with Mismatched Partial Channel State Information," *EURASIP Journal on Wireless Communications and Networking*, 2017. DOI 10.1186/s13638-017-0917-0

5. 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. DOI: 10.1109/TIT.2017.2688335

4. A. Vahid, R. Calderbank, "Two-User Erasure Interference Channels with Local Delayed CSIT," *IEEE Transactions on Information Theory*, vol. 62, no. 9, pp. 4910–4923, 2016. DOI: 10.1109/TIT.2016.2594224

3. 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. DOI: 10.1109/TCOMM.2016.2574867

2. 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. DOI: 10.1109/TIT.2014.2345371

1. 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. DOI: 10.1109/TIT.2011.2181938

Conference Publications

30. A. Gupta, S. Nassirpour, M, Dunna, E. Patamasing, A. Vahid, D. Bharadia, "GreenMO: Flexible and Virtualized Green Communications Architecture," *Proceedings of the 29th Annual International Conference on Mobile Computing and Networking (MobiCom)*, 2023. DOI: 10.1145/3570361.3592509

29. Y. C. Chu, A. Vahid, S. K. Chung, S. C. Lin, "Broadcast Packet Erasure Channels with Alternating Single-User Feedback," *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, 2023.
DOI: 10.1109/ISIT54713.2023.10206795

28. A. Narayan Ravi, A. Vahid, I. Shomorony, "Capacity of the Shotgun Sequencing Channel," *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, pp. 210–215, 2022.
DOI: 10.1109/ISIT50566.2022.9834409

27. M. Abolfathi, I. Shomorony, A. Vahid, H. Jafarian, "A Game-Theoretically Optimal Defense Paradigm against Traffic Analysis Attacks using Multi-path Routing and Deception," *Proceedings of the 27th ACM Symposium on Access Control Models and Technologies (SACMAT)*, pp. 67–78, 2022.
DOI: 10.1145/3532105.3535015

26. A. Vahid, "Harnessing Random Receiver Cache in Erasure Interference Channels with Feedback," *Proceedings of the IEEE Global Communications Conference (GLOBECOM)*, pp. 1–6, 2021.
DOI: 10.1109/GLOBECOM46510.2021.9685921

25. A. Vahid, "Distortion-Based Outer-Bounds for Channels with Rate-Limited Feedback," *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, pp. 284–289, 2021.
DOI: 10.1109/ISIT45174.2021.9518024

24. A. Narayan Ravi, A. Vahid, I. Shomorony, "Capacity of the Torn Paper Channel with Lost Pieces," *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, pp. 1937–1942, 2021.
DOI: 10.1109/ISIT45174.2021.9518272

23. I. Shomorony, A. Vahid, "Communicating over the Torn-Paper Channel," *Proceedings of the IEEE Global Communications Conference (GLOBECOM)*, pp. 1–6, 2020.
DOI: 10.1109/GLOBECOM42002.2020.9348147

22. S. C. Lin, I. H. Wang, A. Vahid, "Capacity of Erasure Broadcast Channels with Single-User Delayed CSI and Common Messages," *Proceedings of the IEEE Global Communications Conference (GLOBECOM)*, pp. 1–6, 2020.
DOI: 10.1109/GLOBECOM42002.2020.9322324

21. M. Johnny, A. Vahid, "Embedding Information in Radiation Pattern Fluctuations," *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, pp. 1534–1539, 2020.
DOI: 10.1109/ISIT44484.2020.9174354

20. S. Nassirpour, A. Vahid, "Throughput, Delay, and Complexity Tradeoffs in Interference Channels," *Proceedings of the 10th IEEE Annual Computing and Communication Workshop and Conference (CCWC)*, pp. 348–354, 2020. **Winner Best Paper Award**.
DOI: 10.1109/CCWC47524.2020.9031183

19. A. Vahid, I. H. Wang, S. C. Lin, "Capacity results for erasure broadcast channels with intermittent feedback," *Proceedings of the IEEE Information Theory Workshop (ITW)*, pp. 1–5, 2019.
DOI: 10.1109/ITW44776.2019.8989343

18. Mappouras, A. Vahid, R. Calderbank, D. Sorin, "GreenFlag: Protecting 3D-Racetrack Memory from Shift Errors," *Proceedings of the 49th Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN)*, pp. 1–12, 2019. **Runner-up Best Paper Award**.
DOI: 10.1109/DSN.2019.00016

17. S. C. Lin, I. H. Wang, A. Vahid, "No Feedback, No Problem: Capacity of Erasure Broadcast Channels with Single-User Delayed CSI," *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, pp. 1647–1651, 2019.
DOI: 10.1109/ISIT.2019.8849448

16. A. Vahid, "Finite Field X-Channels with Delayed CSIT and Common Messages," *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, pp. 2172–2176, 2018.
DOI: 10.1109/ISIT.2018.8437825

15. A. Vahid, R. Calderbank, "ARQ for interference packet networks," *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, pp. 781–785, 2018.
DOI: 10.1109/ISIT.2018.8437334

14. G. Mappouras, A. Vahid, R. Calderbank, D. R. Hower, D. Sorin, "Jenga: Efficient Fault Tolerance for Stacked DRAM," *Proceedings of the IEEE International Conference on Computer Design (ICCD)*, pp. 361–368, 2017.
DOI: 10.1109/ICCD.2017.62

13. A. Vahid, R. Calderbank, "When does spatial correlation add value to delayed channel state information?" *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, pp. 2624–2628, 2016.
DOI: 10.1109/ISIT.2016.7541774

12. G. Mappouras, A. Vahid, R. Calderbank, D. Sorin, "Methuselah Flash: Rewriting Codes for Extra-Long Storage Lifetime," *Proceedings of the 46th Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN)*, pp. 180–191, 2016.
DOI: 10.1109/DSN.2016.25

11. 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 the 2015 International Symposium on Memory Systems (MEMSYS)*, pp. 71–77, 2015.
DOI: 10.1145/2818950.2818962

10. A. Vahid, I. Shomorony, R. Calderbank, "Informational Bottlenecks in Two-Unicast Wireless Networks with Delayed CSIT," *Proceedings of the 53rd IEEE Annual Allerton Conference on Communication, Control, and Computing*, pp. 1256–1263, 2015.
DOI: 10.1109/ALLERTON.2015.7447152

9. A. Vahid, R. Calderbank, "Impact of Local Delayed CSIT on the Capacity Region of the Two-User Interference Channel," *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, pp. 2421–2425, 2015.
DOI: 10.1109/ISIT.2015.7282890

8. A. Vahid, G. Mappouras, A. Velasco, R. Calderbank, and D. J. Sorin, "Virtual Cells and Concatenated Codes for Flash Memory," *Proceedings of the Fifth Non-Volatile Memories Workshop (NVMW)*, 2015.

7. A. Vahid, M. Maddah-Ali, and S. Avestimehr, "Binary Fading Interference Channel with No CSIT," *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, pp. 666–670, 2014.
DOI: 10.1109/ISIT.2014.6874916

6. A. Vahid, M. Maddah-Ali, and S. Avestimehr, "Communication Through Collisions: Opportunistic Utilization of Past Receptions," *Proceedings of the IEEE Conference on Computer Communications (INFOCOM)*, pp. 2553–2561, 2014.
DOI: 10.1109/INFOCOM.2014.6848202

5. A. Vahid, M. Maddah-Ali, and S. Avestimehr, "Approximate Capacity of the Two-User MISO Broadcast Channel with Delayed CSIT," *Proceedings of the 51st IEEE Annual Allerton Conference on Communication, Control, and Computing*, pp. 1136–1143, 2013.
DOI: 10.1109/Allerton.2013.6736653

4. A. Vahid, M. Maddah-Ali, and S. Avestimehr, "Binary Fading Interference Channel with Delayed Feedback," *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, pp. 1882–1886, 2012.
DOI: 10.1109/ISIT.2012.6283624

3. A. Vahid, M. Maddah-Ali, and S. Avestimehr, "Interference Channel with Binary Fading: Effect of Delayed Network State Information," *Proceedings of the 49th IEEE Annual Allerton Conference on Communication, Control, and Computing*, pp. 894–901, 2011.
DOI: 10.1109/Allerton.2011.6120261

2. A. Vahid, V. Aggarwal, S. Avestimehr, and A. Sabharwal, "On the Capacity of Multi-hop Wireless Networks with Partial Network Knowledge," *Proceedings of the 48th IEEE Annual Allerton Conference on Communication, Control, and Computing*, pp. 1030–1037, 2010.
DOI: 10.1109/Allerton.2010.5707023

1. A. Vahid, S. Avestimehr, "The Two-User Deterministic Interference Channel with Rate-Limited Feedback," *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, pp. 460–464, 2010.
DOI: 10.1109/ISIT.2010.5513441

Manuscripts Under Review

8. S. Nassirpour, N. Kusashima, J. Flordelis, A. Vahid, "Mix-and-Conquer: Beamforming Design with Interconnected RIS for Multi-User Networks," *submitted to IEEE International Conference on Communications (ICC)*, 2023. Accept.

7. T. M. Hoang, A. Vahid, D. Sicker, A. Sabharwal, "Physical-Layer Spoofing in WiFi 6 to Steer the Beam Toward the Attacker," *submitted to IEEE International Conference on Communications (ICC)*, 2023. Accept.

6. A. Narayan Ravi, A. Vahid, I. Shomorony, "An Information Theory for Out-of-Order Media with Applications in DNA Data Storage," *submitted to IEEE Transactions on Molecular, Biological, and Multi-Scale Communications*, 2024.

5. T. M. Hoang, A. Vahid, D. Sicker, and L. Hanzo, "Deep Learning-Aided Pareto Front Prediction in Secure NOMA Systems," *submitted to IEEE Open Journal of Vehicular Technology*, 2023.

4. T. M. Hoang, A. Vahid, D. Sicker, A. Sabharwal, "BeamSteal: Control Channel Spoofing Attacks in WiFi Systems," *submitted to IEEE Transactions on Wireless Communications*, 2023.

3. T. M. Hoang, A. Vahid, D. Sicker, A. Sabharwal, "A Low-Cost RIS-Enabled Stealth Design in Dual-Function Radar-Communication Systems," *submitted to IEEE Internet of Things Journal*, 2023.

2. M. S. Van Nguyen, D. T. Do, P. T. Tin, A. Vahid, "Secure Performance Analysis of User Pairs in Active Reconfigurable Intelligent Surfaces-Aided IoT Systems," *submitted to IEEE Systems Journal*, 2023.

1. M.Mahbub, M. Md. Saym, S. Jahan, A. K. Paul, A. Vahid, S. Hosseinalipour, B. Barua, H.-G. Yeh, C. Fischione, R. M. Shubair, T. Taleb, "A Holistic Survey of UAV-Assisted Wireless Communications in the Transition from 5G to 6G: Characteristics, Regulations, Standardization, Enabling Technologies, Intertwined Innovations, Challenges, and Opportunities," *submitted to Elsevier Journal of Network and Computer Applications*, 2024.

Patents

2. "Reconfigurable Intelligent Surface System including Interconnected Reconfigurable Elements," filed jointly with SONY Inc. in Sweden, patent application #2351168-6. US patent to be filed.

1. "Encrypted Traffic Obfuscations Method and System," US patent application #18/456,657.

Mentoring

- Sajjad Nassirpour (PhD'23, now postdoc at SDSU) — PhD Candidate
  - Best Paper Award at CCWC'20.
- Jafar Norolahi — PhD Candidate
- Thuan-Dinh Do (2022, now a tenure-track faculty at Mount Union) — Postdoctoral Researcher
- Tiep M Hoang (started May 2022), — Postdoctoral Researcher
- Michael Huntington (summer 2022), — High School Teacher
- Judith Pancheco (summer 2022), — High School Student Intern

Teaching Experience and Student Mentorship

- **Instructor, Rochester Institute of Technology** — 2023 to present
  - Data Inference Theory and Applications (G) — Spring 2023
- **Instructor, University of Colorado Denver** — Denver, CO
  Teaching load: $2 + 2$ excluding independent study — 2017 to 2023
  - Data and Information Inference Theory (G) — Fall 2019
  - Engineering Probability and Statistics (UG) — Spring 2019
  - Digital Communication Systems (UG/G) — Spring 2018, 2019, & 2020
  - Digital Signal Processing (UG/G) — Spring 2020
  - Random Processes (G) — Fall '18, 19, 20, 21, & 22
  - Information and Coding Theory (G) — Fall 2017 & 2019
- **Data+ Summer Program, Duke University** — Durham, NC
  Mentor for the 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
  - 2010 Cornell University Best PhD Teaching Award

Professional Activities

- Associate editor:
  - IEEE Communications Letters (COMML) July 2022 to present
- TPC member:
  - IEEE Annual Computing and Communication Workshop and Conference (CCWC) 2020
  - Non-Volatile Memories Workshop (NVMW) 2021
  - IEEE International Symposium on Information Theory (ISIT) 2021
  - IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN) 2024
  - IEEE International Conference on Communications (ICC) 2024
- Reviewer:
  - IEEE Transactions on Information Theory
  - IEEE BITS The Information Theory Magazine
  - IEEE Transactions on Communications
  - IEEE Transactions on Wireless Communications
  - IEEE Transactions on Vehicular Technology
  - IEEE International Symposium on Information Theory
  - IEEE INFOCOM
  - IEEE GLOBECOM
  - IEEE Information Theory Workshop
  - IEEE Communication Letters
  - IEEE Magnetic Letters
  - IEEE Transactions on Circuits and Systems
  - IEEE/ACM Transactions on Networking
- Panel Reviewer:
  - National Science Foundation – ECCS, CCF, SaTC, CNS
  - Department of Energy
- Organized the North American School of Information Theory 2016
- Chair of student travel award committee, IEEE ISIT 2020

Professional Memberships

- IEEE Senior Member (since 2020)

- IEEE Information Theory Society Member
- IEEE Communication Society Member
- IEEE Vehicular Technology Society
- IEEE Young Professionals Member

Media Coverage

- CU Denver News on SONY Faculty Innovation Award 2022
- CU Denver News on new NSF grant on spectrum coexistence 2022
- CU Denver News on new NSF grant to develop CompTenna 2022
- CU Denver News on two NSF grants 2021
- We revamped the EE curriculum at CU Denver 2021
- Cornell ECE Best PhD Thesis Award 2015
- Qualcomm Innovation Fellowship 2013