

Sina Rezaei Aghdam

CV

Department of Electrical Engineering
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Date of Birth: May 25, 1989

Highlights

- Highly motivated, creative, and hard working
- Effective team leader and team player
- Excellent communication and presentation skills

Research Interests

- Multi-Antenna Systems and Massive MIMO
- Hardware Impairment Modeling/Compensation
- Hardware-Aware Signal Processing
- Differential Privacy and Federated Learning
- Machine Learning for Communications
- Physical Layer Security

Education

- 2013 - 2018 **Ph.D. in Electrical & Electronics Engineering**, *Bilkent University*, Ankara, Turkey.
Supervisor: Prof. Tolga M. Duman
- 2011 - 2013 **M.Sc. in Electrical & Electronics Engineering**, *Amirkabir University of Technology*, Tehran, Iran.
- 2007 - 2011 **B.S. in Electrical & Electronics Engineering**, *Specialization: Telecommunication Systems*, Amirkabir University of Technology, Tehran, Iran.

Professional Experience

- 2018 - present **Postdoctoral Researcher**, *Chalmers University of Technology*, Gothenburg, Sweden.
- 2013 - 2017 **Research Assistant**, *Communication Theory and Applications Research (CTAR) Lab.*, *Bilkent University*, Ankara, Turkey.
Thesis title: Secure multi-antenna transmission with finite-alphabet signaling
- 2011 - 2013 **Research Assistant**, *Millimeter wave, Microwave and Wireless Communications Laboratory (MMWCL)*, *Amirkabir University of Technology*, Tehran, Iran.
Research topic: Spatial modulation and space shift keying

Supervision

- **Co-supervisor** Yasaman Etefagh (PhD student), main supervisor: Prof. Giuseppe Durisi, Chalmers, 2020-present.
- **Co-supervisor** Mohammad Hossein Moghaddam (PhD student), main supervisor: Prof. Thomas Eriksson, Chalmers 2018-present.
- **Co-supervisor** Nima Hajiabdollahi (PhD student), main supervisor: Prof. Thomas Eriksson, Chalmers 2019-2020.
- **Co-supervisor** Serdar Hanoglu (MSc student), main supervisor: Prof. Tolga M. Duman, Bilkent, 2016-2017.

Teaching

- **Teaching Assistant:** EEE 431-432 (Telecommunications I and II), Bilkent University 2013–2017
- **Lab Instructor:** EEE 321 (Signals and systems), Bilkent University, Summer 2015.

Selected Publications

○ **Published Journal Papers (in chronological order)**

- A. Nooraiepour and **S. Rezaei Aghdam**, "Learning end-to-end codes for the BPSK-constrained Gaussian wiretap channel," *Physical Communication (Elsevier)*, vol. 46, Jun. 2021 (to appear).
- A. Nooraiepour, **S. Rezaei Aghdam** and T. M. Duman, "On Secure Communications Over Gaussian Wiretap Channels via Finite-Length Codes," *IEEE Commun. Lett.*, vol 24, no. 9, pp. 1904–1908, Sep. 2020.
- **S. Rezaei Aghdam**, A. Nooraiepour and T. M. Duman, "An Overview of Physical Layer Security with Finite Alphabet Signaling," *IEEE Commun. Surveys Tuts.*, vol. 21, no. 2, pp. 1829–1850, Nov 2018.
- **S. Rezaei Aghdam** and T. M. Duman, "Joint precoder and artificial noise design for MIMO wiretap channels with finite-alphabet inputs based on the cut-off rate," in *IEEE Trans. Wireless Commun.*, vol. 16, no. 6, pp. 3913–3923, June 2017.
- **S. Rezaei Aghdam** and T. M. Duman, "Physical layer security for space shift keying transmission with precoding," *IEEE Wireless Commun. Lett.*, vol. 5, no. 2, pp. 180–183, Apr. 2016.

○ **Journal Papers Under Review (in chronological order)**

- **S. Rezaei Aghdam**, S Jacobsson, U Gustavsson, G Durisi, C Studer and T Eriksson, "Distortion-Aware Linear Precoding for Massive MIMO Downlink Systems with Nonlinear Power Amplifiers," submitted to *IEEE Trans. Wireless Commun.*, 2020.
- N. Amani, A. Farsaei, **S. Rezaei Aghdam**, T. Eriksson, M. V. Ivashina, and R. Maaskant, "Sparse Array Synthesis Including Mutual Coupling for MU-MIMO Average Capacity Maximization," submitted to *IEEE Trans. Antennas Propag.*, 2020.
- S. Hesami, P. Ramabadran, **S. Rezaei Aghdam**, K. Hausmair, C. Fager, T. Eriksson, R. Farrel, and J. Dooley, "OTA-based MIMO Transceiver Modeling and Linearization using Intra-Array Coupling Estimation," submitted to *IEEE Trans. Microw. Theory Tech.*, 2019.

○ **non-IEEE Journal Papers**

- E. Amid, **S. Rezaei Aghdam**, and H. Amindavar, "Enhanced Performance for Support Vector Machines as Multi-Class Classifiers in Steel Surface Defect Detection," *World Acad. Sci., Eng. Technol.*, vol. 6, no. 7, pp. 1096–1100, 2012.
- E. Amid, and **S. Rezaei Aghdam**, "Musical Instrument Classification Using Embedded Hidden Markov Models," *World Acad. Sci., Eng. Technol.*, vol. 6, no. 7, pp. 678–683, 2012.

○ **Conference Papers**

- **S. Rezaei Aghdam**, E. Amid, M. Furdek, A. Grael i Amat, "Privacy-preserving wireless federated learning exploiting inherent hardware impairments," *submitted to IEEE ICC 2021 Workshops*.
- S. Hesami, **S. Rezaei Aghdam**, J. Dooley, T. Eriksson, C. Fager, "Amplitude varying phased array linearization," *EuMC 2020*, Utrecht, Netherlands, pp. 348-351.
- M. H. Moghaddam, **S. Rezaei Aghdam**, A. Filippi, T. Eriksson, "Statistical study of hardware impairments effect on mmWave 77 GHz FMCW automotive radar," *IEEE RadarConf20*, Florence, Italy, 2020, pp. 1-6.
- N. Hajiabdolrahim, **S. Rezaei Aghdam**, T. Eriksson, "An extended Kalman filter framework for joint phase noise, CFO and sampling time error estimation," *IEEE PIMRC 2020*, London, UK, 2020, pp. 1-6.

○ Conference Papers (cont'd)

- M. H. Moghaddam, **S. Rezaei Aghdam**, T. Eriksson, "Statistical analysis of antenna array systems with perturbations in phase, gain and element positions," *IEEE GlobalSIP 2019*, Ottawa, Canada, 2019, pp. 1-6.
- **S. Rezaei Aghdam**, T. Eriksson, "On the performance of distortion-aware linear receivers in uplink massive MIMO systems," *IEEE ISWCS 2019 (invited paper)*, Oulu, Finland, 2019, pp. 208-212.
- **S. Rezaei Aghdam**, S. Jacobsson, T. Eriksson, "Distortion-aware linear precoding for millimeter-wave multiuser MISO downlink," *IEEE ICC 2019 Workshops*, Shanghai, China, 2019, pp. 1-6.
- M. H. Moghaddam, **S. Rezaei Aghdam**, T. Eriksson, "An additive noise modeling technique for accurate statistical study of residual RF hardware impairments," *IEEE ICC 2019 Workshops*, Shanghai, China, 2019, pp. 1-6.
- **S. Rezaei Aghdam**, A. Fhager, C. Fager, T. Eriksson, "Reducing motion artifacts in microwave-based hemorrhagic stroke detection," *EuCAP 2019*, Krakow, Poland, 2019, pp. 1-3.
- S. Hesami, **S. Rezaei Aghdam**, C. Fager, T. Eriksson, R. Farrell, J. Dooley, "Intra-array coupling estimation for MIMO transceivers utilizing blind over-the-air measurements," *IMS 2019*, Boston, MA, USA, 2019, pp. 468-471.
- S. Hesami, **S. Rezaei Aghdam**, C. Fager, T. Eriksson, R. Farrell, J. Dooley, "Single digital predistortion technique for phased array linearization," *IEEE ISCAS 2019*, Sapporo, Japan, 2019, pp. 1-5.
- S. Hanoglu, **S. Rezaei Aghdam** and T. M. Duman, "Artificial-noise-aided secure transmission over finite-input intersymbol interference channels," *IEEE ICT 2018*, Saint Malo, France, 2018, pp. 346-350.
- **S. Rezaei Aghdam** and T. M. Duman, "Secrecy Rate and Harvested Energy Trade-off for MISO Channels with Finite-Alphabet Inputs," *IEEE ICC 2018*, Kansas City, MO, 2018, pp. 1-6.
- **S. Rezaei Aghdam** and T. M. Duman, "Transmit signal design for MIMO wiretap channels with statistical CSI and arbitrary inputs," *IEEE PIMRC 2017*, Montreal, QC, Canada, 2017, pp. 1-5.
- **S. Rezaei Aghdam** and T. M. Duman, "Secure space shift keying transmission using dynamic antenna index assignment," *IEEE GLOBECOM 2017*, Singapore, 2017, pp. 1-6.
- **S. Rezaei Aghdam** and T. M. Duman, "Low complexity precoding for MIMOME wiretap channels based on cut-off rate," *IEEE ISIT 2016*, Barcelona, 2016, pp. 2988-2992.
- **S. Rezaei Aghdam**, T. M. Duman and M. Di Renzo, "On secrecy rate analysis of spatial modulation and space shift keying," *IEEE BlackSeaCom 2015*, Romania, 2015, pp. 63-67.
- **S. Rezaei Aghdam**, E. Amid, M. F. Imani, "A fast method of steel defect detection using decision trees applied to LBP-based features," *IEEE ICIEA 2012*, Singapore, 2012, pp. 1447-1452.

Honors & Awards

- Marie Sklodowska-Curie Actions **Seal of Excellence** on a proposal entitled "Securing Millimeter-Wave Wireless Communications at Physical Layer: Bridging the Gap Between Theory and Practice", European Union/European Commission, 2018.
- IEEE Turkey **Best Thesis Award** 2018
- Ranked 2nd among the M.Sc. students, class of 2013, Amirkabir University of Technology
- Ranked 410th in the nationwide university entrance exam among more than 1M candidates (**Top 0.05%**), Iran, 2007

Travel Grants

- The Ericsson Research Foundation grant to attend LSIT 2019.
- Erasmus+ Staff Mobility Grant to visit Bilkent University, 2019.
- SPCodingSchool, Campinas, Brazil, Jan. 2015.

Professional Activities

- **TPC Member**
 - IEEE International Black Sea Conference on Communications and Networking, 2019, Sochi, Russia.
- **Reviewer**
 - Journal Papers (IEEE Transactions on Communications, IEEE Transactions on Vehicular Technology, IEEE Communications Letters, IEEE Wireless Communications Letters)
 - Recognized as the **Outstanding Reviewer** by Physical Communications journal, ELSEVIER, Jan. 2017.
 - Conference papers (Globecom, ICC, ISIT, PIMRC, WCNC, SPAWC, etc.)

Posters and Invited Talks

- Evaluation of Information Theoretic Secrecy Metrics for Explicit Wiretap Codes Using Neural Estimation, *London Symposium on Information Theory (LSIT) 2019*, London, UK, May, 2019.
- Transmit Signal Design Based on Correlation Matrices for MIMO Wiretap Channel with Discrete Signaling, *IEEE ISIT 2017 Recent Results Session*, Aachen, Germany, Jun., 2017.
- Precoder Design for MIMO Wiretap Channels Driven by Finite Alphabet Inputs, invited talk [in Turkish], *3rd ASELSAN Workshop on Communication Technologies*, Ankara, Turkey, Nov. 2016.

Selected Courses

- Deep Machine Learning
- Coding Theory
- Detection and Estimation Theory
- Random Processes
- RF Design for Wireless Communications
- Information Theory
- Wireless Communications
- Digital Communications Theory
- Linear System Theory
- Convex Optimization (audit)

Skills

Languages Azeri (Native) Persian (Native) English (Fluent) Turkish (Fluent) Swedish (B2)
Programming MATLAB, python, C++, L^AT_EX

Personal Information

Nationality Iranian
Marital Status Married

References

- Prof. Thomas Eriksson (thomase@chalmers.se)
- Prof. Tolga M. Duman (duman@ee.bilkent.edu.tr)
- Prof. Alexandre Graell i Amat (alexandre.graell@chalmers.se)