Sajad Daei

Permanent Researcher · KTH Royal Institute of Technology

Signal processing, inverse problems, communication and sensing

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Research profile

My research develops estimation, detection and optimization methods for physical-layer communication and sensing, particularly continuous near-field inference, blind multiuser access and distributed integrated sensing and communication (ISAC). I am KTH co-PI and institutional coordinator for QUEST-6G and MULTIPLY-6G, and supervise postdoctoral researchers.

Academic appointments

Nov 2026–present	**Researcher (permanent appointment)** · KTH Royal Institute of Technology, Sweden Near-field communication and sensing, channel inference and quantum signal processing.
Nov 2025–Oct 2026	**Senior Researcher** · KTH Royal Institute of Technology, Sweden Near-field ISAC and time-varying MIMO channel estimation.
Nov 2022–Oct 2025	**Postdoctoral Researcher** · KTH Royal Institute of Technology, Sweden Wireless inference, channel estimation, massive access and sensing.
Nov 2021–Oct 2022	**Postdoctoral Researcher** · EURECOM, France Goal-oriented communication, blind detection and massive access.
2021	**Assistant Researcher** · Electronic Research Institute, Sharif University of Technology, Iran Signal processing, target localization and interference suppression.

Education

2015–2020	**PhD, Telecommunications Engineering** Iran University of Science and Technology
2011–2014	**MSc, Telecommunications Engineering** Sharif University of Technology
2007–2011	**BSc, Electronic Engineering** University of Guilan

Selected honours

2026	IEEE Senior Member.
2026	IEEE SPAWC Best Paper Award, *Living Off the Grid*.
2025	IEEE GLOBECOM Best Proposal for Industry Research Collaboration, GOOD SENSE.
2020	Outstanding PhD Thesis Award, IEEE Iran Section.
2020	Professor Hesabi Special Award festival: Best Paper Award; Superior Dissertation (final-round selection); Top Researcher; Top Student.
2019	Top Researcher, doctoral programme in Communication Systems, Iran University of Science and Technology.
2011	First rank, BSc Electrical Engineering–Electronics cohort, University of Guilan.
2011	Third place, first round of the Iranian National Student Scientific Olympiad in Electrical Engineering.

Selected research contributions

Near-field super-resolution and ISAC. Continuous range–angle recovery from compressed hybrid measurements; lifted near-field inference, wavefront boundaries and recovery guarantees.

Distributed sensing and collaborative ISAC. Pilot-free uplink ISAC with continuous delay–Doppler–angle estimation and multiuser fusion for target sensing and message recovery.

Blind multiuser reception and interference mitigation. Off-grid message recovery and user demixing, and radar methods for separating target returns from impulsive interference.

Massive IoT and goal-oriented access. Blind goal-oriented massive-access detection and its extension to stationary IoT devices.

MIMO estimation and channel modelling. Spatial–temporal correlation, pilot spacing and power design in aging MIMO channels.

Quantum signal processing and sensing. Quantum-assisted near-field angle–range inference and second-moment bounds for quantum waveform design, reported as public preprints.

Funded projects and research leadership

QUEST-6G (2026–2029). Horizon Europe / SNS JU. KTH co-PI, institutional coordinator and Work Package 4 leader.

MULTIPLY-6G (2026–2029). Horizon Europe / SNS JU. KTH co-PI and institutional coordinator; research task leadership.

Scientific coordination, proposal development, research collaboration and supervision of three postdoctoral researchers in communications, sensing and signal processing.

Teaching and supervision

Four years of university teaching across undergraduate and graduate courses, including course coordination, lectures, laboratory supervision and assessment. Courses include Electrical Circuits, Electronics, Compressed Sensing, and Convex and Non-Convex Optimization.

Teaching assistance and learning materials in Compressed Sensing, Optimization Theory, Blind Source Separation and Numerical Optimization. Student research supervision and co-supervision in continuous super-resolution, matrix recovery, radar inference and distributed computing.

Research methods and software

Estimation and detection; array and channel signal processing; blind deconvolution and demixing; convex and non-convex optimization; atomic norms; sparse and low-rank recovery; distributed sensing and multiuser fusion; quantum-assisted inference. Scientific computing: MATLAB, Python, C/C++, Git, CVX, SDPT3 and LaTeX.

Academic service and collaboration

Peer review for journals including *Information and Inference*, *IEEE Transactions on Information Theory*, *IEEE Transactions on Signal Processing*, *IEEE Journal of Selected Topics in Signal Processing*, *IEEE Signal Processing Letters*, *Signal Processing* and *Journal of Computational and Applied Mathematics*. Research appointments in Sweden, France and Iran; collaboration with industry and European research consortia.

Journal articles

23 articles · reverse chronological order

01. **S. Daei**, G. Fodor and M. Skoglund. “Exploiting Spatial and Temporal Correlations in Massive MIMO Systems Operating Over Non-Stationary Aging Channels.” IEEE Transactions on Wireless Communications, vol. 25, pp. 8308–8325, 2026.
02. R. Takbiri, **S. Daei**, M. Skoglund and G. Fodor. “Measuring Less, Recovering More: Distribution-Aware Weighted $\ell 1$ Analysis.” Signal Processing, vol. 247, article 110673, 2026.
03. **S. Daei**, S. Razavikia, M. Skoglund, G. Fodor and C. Fischione. “Timely and Painless Breakups: Off-the-Grid Blind Message Recovery and Users’ Demixing.” IEEE Transactions on Information Theory, vol. 71, no. 7, pp. 5226–5257, 2025.
04. **S. Daei**, G. Fodor, M. Skoglund and M. Telek. “Toward Optimal Pilot Spacing and Power Control in Multi-Antenna Systems Operating Over Non-Stationary Rician Aging Channels.” IEEE Transactions on Communications, vol. 73, no. 6, pp. 3761–3777, 2025.
05. **S. Daei** and M. Kountouris. “Blind Goal-Oriented Massive Access for Future Wireless Networks.” IEEE Transactions on Signal Processing, vol. 71, pp. 901–916, 2023.
06. A. Afshar, V. T. Vakili and **S. Daei**. “A Novel Blind Spatial-Based Random Access to Pilots (BSB-RAP) in Overloaded Massive MIMO Systems.” Physical Communication, vol. 57, article 101999, 2023.
07. H. Maskan, **S. Daei** and M. H. Kahaei. “Demixing Sines and Spikes Using Multiple Measurement Vectors.” Signal Processing, vol. 203, article 108786, 2023.
08. H. S. Fazael Ardakani, **S. Daei** and F. Haddadi. “Multi-Weight Nuclear Norm Minimization for Low-Rank Matrix Recovery in Presence of Subspace Prior Information.” IEEE Transactions on Signal Processing, vol. 70, pp. 3000–3010, 2022.
09. M. Seidi, S. Razavikia, **S. Daei** and J. Oberhammer. “A Novel Demixing Algorithm for Joint Target Detection and Impulsive Noise Suppression.” IEEE Communications Letters, vol. 26, no. 11, pp. 2750–2754, 2022.
10. A. Afshar, V. T. Vakili and **S. Daei**. “Active User Detection and Channel Estimation for Spatial-Based Random Access in Crowded Massive MIMO Systems via Blind Super-Resolution.” IEEE Signal Processing Letters, vol. 29, pp. 1072–1076, 2022.
11. H. Beheshti, **S. Daei** and F. Haddadi. “Adaptive Recovery of Dictionary-Sparse Signals Using Binary Measurements.” EURASIP Journal on Advances in Signal Processing, vol. 2022, article 49, 2022.
12. M. Safari, **S. Daei** and F. Haddadi. “Off-the-Grid Recovery of Time and Frequency Shifts with Multiple Measurement Vectors.” Signal Processing, vol. 183, article 108016, 2021.
13. S. Bayat and **S. Daei**. “Separating Radar Signals from Impulsive Noise Using Atomic Norm Minimization.” IEEE Transactions on Circuits and Systems II: Express Briefs, vol. 68, no. 6, pp. 2212–2216, 2021.
14. S. Sayyari, **S. Daei** and F. Haddadi. “Blind Two-Dimensional Super-Resolution in Multiple-Input Single-Output Linear Systems.” IEEE Signal Processing Letters, vol. 28, pp. 583–587, 2021.
15. **S. Daei**, F. Haddadi and A. Amini. “Living Near the Edge: A Lower-Bound on the Phase Transition of Total Variation Minimization.” IEEE Transactions on Information Theory, vol. 66, no. 5, pp. 3261–3267, 2020.
16. S. Razavikia, A. Amini and **S. Daei**. “Reconstruction of Binary Shapes from Blurred Images via Hankel-Structured Low-Rank Matrix Recovery.” IEEE Transactions on Image Processing, vol. 29, pp. 2452–2462, 2020.
17. S. Bayat and **S. Daei**. “An Optimal Hybrid Nuclear Norm Regularization for Matrix Sensing with Subspace Prior Information.” IEEE Access, vol. 8, pp. 130937–130946, 2020.
18. **S. Daei**, F. Haddadi, A. Amini and M. Lotz. “On the Error in Phase Transition Computations for Compressed Sensing.” IEEE Transactions on Information Theory, vol. 65, no. 10, pp. 6620–6632, 2019.
19. I. Valiulahi, **S. Daei**, F. Haddadi and F. Parvaresh. “Two-Dimensional Super-Resolution via Convex Relaxation.” IEEE Transactions on Signal Processing, vol. 67, no. 13, pp. 3372–3382, 2019.
20. **S. Daei**, F. Haddadi and A. Amini. “Exploiting Prior Information in Block-Sparse Signals.” IEEE Transactions on Signal Processing, vol. 67, no. 19, pp. 5093–5102, 2019.
21. **S. Daei**, F. Haddadi and A. Amini. “Distribution-Aware Block-Sparse Recovery via Convex Optimization.” IEEE Signal Processing Letters, vol. 26, no. 4, pp. 528–532, 2019.
22. **S. Daei**, F. Haddadi and A. Amini. “Improved Recovery of Analysis Sparse Vectors in Presence of Prior Information.” IEEE Signal Processing Letters, vol. 26, no. 2, pp. 222–226, 2019.
23. **S. Daei**, F. Haddadi and A. Amini. “Sample Complexity of Total Variation Minimization.” IEEE Signal Processing Letters, vol. 25, no. 8, pp. 1151–1155, 2018.

Conference papers

19 papers · reverse chronological order

01. **S. Daei**, G. Fodor and M. Skoglund. “Living Off the Grid: Continuous Range–Angle Super-Resolution for Near-Field XL-MIMO.” IEEE SPAWC, 2026. Best Paper Award.
02. **S. Daei**, G. Fodor and M. Skoglund. “Convexity Meets Curvature: Lifted Near-Field Super-Resolution.” EUSIPCO, pp. 2806–2810, 2026.
03. A. Zamani, **S. Daei** and M. Skoglund. “Realizable Joint Additive Design for Privacy-Constrained Semantic Communication.” IEEE SPAWC, 2026.
04. A. Zamani, **S. Daei**, P. Sadeghi and M. Skoglund. “Sparse Point-wise Privacy Leakage: Mechanism Design and Fundamental Limits.” IEEE ISIT, 2026, pp. 1–6.
05. A. Zamani, **S. Daei**, P. Sadeghi and M. Skoglund. “Sparse Discrete Laplace and Gaussian Mechanisms under Local Differential Privacy.” IEEE Information Theory Workshop (ITW), 2026. arXiv:2605.09561.
06. D. Yang, **S. Daei**, Y. Li and M. Shirvanimoghaddam. “Enabling Massive Connectivity of Stationary IoT Devices via 2D Blind Goal-Oriented Detection.” IEEE GLOBECOM, pp. 3031–3036, 2025.
07. **S. Daei**, G. Fodor and M. Skoglund. “When Near Becomes Far: From Rayleigh to Optimal Near-Field and Far-Field Boundaries.” IEEE GLOBECOM, pp. 3586–3592, 2025.
08. A. Zamani, **S. Daei**, A. Changizi and M. Skoglund. “A Unified Framework for Joint Semantic and Privacy Design Under Bounded Leakage.” IEEE SPAWC, 2025.
09. **S. Daei**, A. Zamani, S. Chatterjee, M. Skoglund and G. Fodor. “Near-Field ISAC in 6G: Addressing Phase Nonlinearity via Lifted Super-Resolution.” IEEE ICASSP, 2025.
10. **S. Daei**, G. Fodor and M. Skoglund. “One Target, Many Views: Multi-User Fusion for Collaborative Uplink ISAC.” WiOpt, pp. 53–60, 2025.
11. **S. Daei**, M. Skoglund and G. Fodor. “Improved Downlink Channel Estimation in Time-Varying FDD Massive MIMO Systems.” IEEE SPAWC, pp. 571–575, 2024.
12. **S. Daei**, G. Fodor and M. Skoglund. “Optimal Transmitter Design and Pilot Spacing in MIMO Non-Stationary Aging Channels.” EUSIPCO, pp. 2127–2131, 2024.
13. A. Zamani, **S. Daei**, T. J. Oechtering, D. Gündüz and M. Skoglund. “Semantic Communications with Privacy Constraints.” International Zurich Seminar on Information and Communication (IZS), 2024.
14. A. Zamani, **S. Daei**, T. J. Oechtering and M. Skoglund. “Multi-Task Private Semantic Communication.” IEEE ISIT, pp. 3480–3485, 2024.
15. S. Hussein, S. Razavikia, **S. Daei** and C. Fischione. “Communication-Efficient Distributed Computing via Matrix Factorization.” Asilomar Conference on Signals, Systems, and Computers, pp. 1453–1460, 2024.
16. **S. Daei**, S. Razavikia, M. Kountouris, M. Skoglund, G. Fodor and C. Fischione. “Blind Asynchronous Goal-Oriented Detection for Massive Connectivity.” WiOpt, pp. 167–174, 2023.
17. A. Khalesi, **S. Daei**, M. Kountouris and P. Elia. “Multi-User Distributed Computing via Compressed Sensing.” IEEE ITW, 2023.
18. S. Razavikia, **S. Daei**, M. Skoglund, G. Fodor and C. Fischione. “Off-the-Grid Blind Deconvolution and Demixing.” IEEE GLOBECOM, pp. 7604–7610, 2023.
19. **S. Daei**, M. Babaie-Zadeh and C. Jutten. “A MAP-Based Order Estimation Procedure for Sparse Channel Estimation.” International Conference on Latent Variable Analysis and Signal Separation, pp. 344–351, Springer, 2015.

Selected public preprints and manuscripts

01. **S. Daei**, G. Fodor and M. Skoglund. “A Mathematical Theory of Near-Field Super-Resolution.” Preprint, arXiv:2609.31299, 2026.
02. M. R. Laskar, **S. Daei**, G. Fodor and M. Skoglund. “Q-SPARSE: Quantum Subspace Projection for Near-Field Angle–Range Spectrum Estimation.” Preprint, arXiv:2609.38500, 2026.
03. M. R. Laskar, **S. Daei**, G. Fodor, M. Skoglund and F. Nori. “Operator Uncertainty and Cross-Domain Information in Quantum Signals: Second-Moment Bounds for Quantum Waveform Design.” Preprint, arXiv:2611.16049, 2026.
04. M. M. Omati, A. Amini and **S. Daei**. “Sparse Canonical Correlation Analysis via Smooth Non-Convex $\ell 0$ Surrogates and Iterative Minorization–Maximization.” Public manuscript, OpenReview: 3Zkyc6x6Uk, 2025; updated 2026.
05. H. S. Fazael Ardakani, **S. Daei**, A. Amini, M. Skoglund and G. Fodor. “Subspace-Informed Matrix Completion.” Preprint, arXiv:2405.07890, 2024.