

Batu Ozturkler

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EDUCATION

Stanford University

Sep 2019 – present

Ph.D. candidate in Electrical Engineering; GPA: 3.99/4.00

Stanford, CA

- Advisor: Prof. John Pauly and Prof. Mert Pilanci
- Focus Areas: Deep Learning, Optimization, Inverse Problems, Medical/Computational Imaging
- Expected Graduation Date: 12/2023

Stanford University

Sep 2019 – June 2021

Master of Science in Electrical Engineering; GPA: 3.99/4.00

Stanford, CA

Middle East Technical University (METU)

Aug 2015 – June 2019

Bachelor of Science in Electrical Engineering; GPA: 3.96/4.00

Ankara, Turkey

Rank: **3/413**

EXPERIENCE

Research Assistant

Sep 2019 – Present

Magnetic Resonance Systems Research Laboratory at Stanford University (MRSRL)

Stanford, CA

- Developed memory-efficient learning techniques for high-dimensional compressed-sensing MRI reconstruction with unrolled neural networks
- Worked on equivalent convex formulations to non-convex neural networks to enable robustness, interpretability, and convergence guarantees
- Developed a semi-supervised physics-driven augmentation framework for MRI reconstruction that improves robustness to signal-to-noise ratio change and motion corruption during acquisition

Undergraduate Researcher

June 2017 – Sep. 2019

Imaging and Computational Neuroscience Laboratory (ICON Lab) at Bilkent University

Ankara, Turkey

- Worked on active learning using Determinantal Point Processes for improved image reconstruction and synthesis in multi-contrast MRI with conditional GANs
- Evaluated task-related activations in fMRI, dynamic causal modelling to assess connectivity between different brain regions
- Integrated motion-correction to a compressed sensing reconstruction method across coils and acquisitions and to simultaneous-multi-slice (SMS) acquisition for bSSFP imaging under the supervision of Prof. Tolga Cukur

Undergraduate Researcher

March 2018 – June 2019

STAR Research Program, Middle East Technical University

Ankara, Turkey

- Worked on deep-learning based high-quality microwave imaging under the supervision of Prof. Figen Oktem

Research Intern

July 2018 – August 2018

Computer Vision Laboratory at ETH Zurich

Zurich, Switzerland

- Compared beamforming and displacement tracking methods for imaging speed-of-sound with pulse-echo ultrasound under the supervision of Prof. Orcun Goksel
- Gave a poster presentation on this work at Amgen Scholars European Symposium, at Cambridge University, UK

JOURNAL PUBLICATIONS

1. Desai, A. D.*, **Ozturkler, B. M.***, Sandino, C. M., Vasanaawala, S., Hargreaves, B. A., Re, C. M., Pauly, J.M and Chaudhari, A. S. (* equal contribution) Noise2Recon: A Semi-Supervised Framework for Joint MRI Reconstruction and Denoising, preprint, IEEE Transactions on Medical Imaging (in submission) [Online] Available: <https://arxiv.org/abs/2110.00075>, 2021
2. Tokgoz, S., Aydogdu, D., Ilhan, B., Sahin, Y., Bariseri, N., **Ozturkler, B.M.** and Çukur, T, 2020. Musical mirror-symmetrical movement tasks: comparison of rhythm versus melody-playing. *NeuroReport*, 31(7), pp.523-529.

CONFERENCE PUBLICATIONS AND WORKSHOP PROCEEDINGS

1. Sahiner, A.*, Ergen, T.*, **Ozturkler, B.M.**, Bartan, B., Pauly, J., Mardani, M. and Pilanci, M. (* equal contribution) Hidden Convexity of Wasserstein GANs: Interpretable Generative Models with Closed-Form Solutions. ICLR 2022. Available: <https://arxiv.org/abs/2107.05680>
2. Ergen, T.*, Sahiner, A.*, **Ozturkler, B. M.**, Pauly, J. , Mardani, M.,Pilanci, M. (* equal contribution), Demystifying Batch Normalization in ReLU Networks: Equivalent Convex Optimization Models and Implicit Regularization, ICLR 2022. Available: <https://arxiv.org/abs/2103.01499>
3. Sahiner, A., Ergen, T., **Ozturkler, B.M.**, Pauly, J., Mardani, M. and Pilanci, M. Unraveling Attention via Convex Duality: Analysis and Interpretations of Vision Transformers (in submission, under double-blind review)
4. Yurt, M.*, **Ozturkler, B.M.***, Yesiloglu, R., Pauly, J.M., Setsompop, K., Chaudhari, A.S. Conditional Diffusion Models for Inverse MR Image Recovery, ISBI 2022 (1-page abstract) (* equal contribution)
5. **Ozturkler, B.M.**, Sahiner, A., Ergen, T., Desai, A.D., Sandino, C. M., Vasanaawala, S., Pauly, J., Mardani, M., Pilanci, M. Parallel Greedy Learning for Accelerating Cardiac Cine MRI, ISMRM 2022
6. Oscanoa, J. A., **Ozturkler, B.M.**, Iyer, S.S., Li, Z., Pilanci, M., Ennis, D.B., Vasanaawala, S. Coil-sketched unrolled networks for computationally-efficient deep MRI reconstruction, ISMRM 2022
7. Beg, H.*, Gunel, B.*, **Ozturkler, B.M.***, Sandino, C. M., Pauly, J.M, Vasanaawala, S.,Chaudhari, A.S.,Desai, A.D. (* equal contribution) Motion2Recon: A Motion-Robust Semi-Supervised Framework for MR Reconstruction, ISMRM 2022
8. Desai, A.D.*, Gunel, B.*, **Ozturkler, B.M.**, Beg, H., Vasanaawala, S., Hargreaves, B.A., Ré, C., Pauly, J.M. and Chaudhari, A.S. (* equal contribution) VORTEX: Physics-Driven Data Augmentations for Consistency Training for Robust Accelerated MRI Reconstruction. preprint, MIDL 2022 (in submission). [Online] Available: <https://arxiv.org/abs/2111.02549>, 2021
9. **Ozturkler, B.M.**, Sahiner, A., Ergen, T., Desai, A.D., Pauly, J.M., Vasanaawala, S., Mardani, M. and Pilanci, M. Greedy Learning for Large-Scale Neural MRI Reconstruction. NeurIPS 2021 Workshop on Deep Learning and Inverse Problems, **oral presentation**. Available: <https://openreview.net/forum?id=tKeEIFvmENy>
10. **Ozturkler, B. M.**, Sahiner, A., Pilanci, M., Vasanaawala, S., Pauly, J., Mardani, M. Scalable and Interpretable Neural MRI Reconstruction via Layer-Wise Training, ISMRM 2021
11. Desai, A.*, **Ozturkler, B. M.***, Sandino, C. S., Hargreaves, B., Pauly, J.*, Chaudhari, A.* (* equal contribution), Noise2Recon: A Semi-Supervised Framework for Joint MRI Reconstruction and Denoising using Limited Data ISMRM 2021. **Magna Cum Laude (Awarded to top 15% of all works)**
12. Sahiner, A., Mardani, M., **Ozturkler, B. M.**, Pilanci, M., Pauly, J. Convex Regularization Behind Neural Reconstruction, ICLR 2021. Available: <https://arxiv.org/abs/2012.05169>
13. Rau, R., Ozkan, E., **Ozturkler, B. M.**, Gastli, L., Goksel, O., Displacement Estimation Methods for Speed-of-Sound Imaging in Pulse-Echo, 2020 IEEE International Ultrasonics Symposium (IUS), Las Vegas, NV, USA, 2020, pp. 1-4, doi: 10.1109/IUS46767.2020.9251781.

TECHNICAL SKILLS

Languages: Python, MATLAB, R, C/C++

Deep Learning Libraries: PyTorch, TensorFlow, Jax

Other: Git, L^AT_EX, Docker, Google Cloud Platform, Microsoft Azure, Statistical Parametric Mapping (SPM), LABVIEW, Field-II, Key Creator, Lt Spice, Agilent Vee, Quartus 2, Verilog

AWARDS AND HONOURS

- National Science Foundation, Graduate Research Fellowship (2021): Three years of financial support and a cost of education allowance to the institution.
- Stanford University Electrical Engineering Departmental Fellowship (2019-2020): Full tuition waiver & stipend during the first year of the Ph.D. program.
- Three times a winner of the Bulent Kerim Altay Prize-METU: Awarded to students with a GPA of 4.00/4.00 per semester

- Awarded the AdimODTU undergraduate research project financial support for our work on deep-learning based high-quality microwave imaging
- Admitted to Amgen Scholars European Program 2018: Full financial support for research internships at ETH Zurich
- Ranked 3rd in the Hult Prize METU 2017 competition
- Ranked 197th nationally in the University Entrance Examination in Turkey among 2 million participants

PROFESSIONAL ACTIVITIES

- Reviewer:
 - IEEE Transactions on Medical Imaging
- Talks:
 - Greedy Learning for Large-Scale Neural MRI Reconstruction, NeurIPS 2021 Workshop on Deep Learning and Inverse Problems

OTHER INTERESTS

- Published a news feature on COVID-19 testing in SIAM News:
Donoho, D., Lotfi, M., **Ozturkler, B. M.**, “The Mathematics of Mass Testing for COVID-19”, SIAM News, July/August 2020. <https://sinews.siam.org/Details-Page/the-mathematics-of-mass-testing-for-covid-19>