OMER BURAK DEMIREL

2021 6th Street S.E., Minneapolis, MN, 55455, USA
+1 612-475-6188 ◇ demir035@umn.edu ◇ https://demirel.umn.edu

RESEARCH INTEREST

Image processing, accelerated imaging, image reconstruction and deep learning applications to MRI

EDUCATION

University of Minnesota, Minneapolis, MN, USA *2017 - Present*
Ph.D. in Electrical and Computer Engineering
Advisor: Prof. Mehmet Akçakaya

Bilkent University, Ankara, Turkey *2015 - 2017*
M.Sc. in Electrical and Electronics Engineering
Advisor: Prof. Emine Ulku Saritas
Thesis: Safety Limits & Rapid Scanning Methods in Magnetic Particle Imaging

Bilkent University, Ankara, Turkey *2010 - 2015*
B.Sc. in Electrical and Electronics Engineering

HONORS & AWARDS

Predoctoral Fellowship *2020-2021*
American Heart Association (AHA) Predoctoral Fellowship, Percentile Rank: .12%
Student Travel Award *2021*
29th International Society for Magnetic Resonance in Medicine (ISMRM)
Student Travel Award *2020*
28th International Society for Magnetic Resonance in Medicine (ISMRM)
Student Travel Award *2020*
International Symposium on Biomedical Imaging (ISBI) 2020
Student Travel Award *2020*
ISMRM Workshop on Data Sampling & Image Reconstruction
NSF Travel Award *2019*
27th European Signal Processing Conference (EUSIPCO)
Student Travel Award *2019*
27th International Society for Magnetic Resonance in Medicine (ISMRM)
Gary H. Glover Fellowship *2017-2018*
University of Minnesota
Bruce J. Bergman Graduate Fellowship *2017-2018*
University of Minnesota
High Honor Student *2011-2015*
Bilkent University, Merit Scholarship: 100%

PATENTS

1. M. Akçakaya, S. Moeller and **O. B. Demirel**, "Methods for Parallel Magnetic Resonance Imaging Reconstruction with Multiple k-space Interpolation Strategies", US Patent Pending

JOURNAL PUBLICATIONS

1. **O. B. Demirel**, Burhaneddin Yaman, Logan Dowdle, S. Moeller, Luca Vizioli, Essa Yacoub, John Strupp, Cheryl Olman, Kâmil Uğurbil and M. Akçakaya,"20-fold Accelerated 7T fMRI Using Referenceless Self-Supervised Deep Learning Reconstruction", arXiv:2105.05827
2. **O. B. Demirel**, Burhaneddin Yaman, Logan Dowdle, S. Moeller, Luca Vizioli, Essa Yacoub, John Strupp, Cheryl Olman, Kâmil Uğurbil and M. Akçakaya,"Improved Simultaneous Multi-Slice Functional MRI Using Self-supervised Deep Learning", arXiv:2105.04532
3. **O. B. Demirel**, S. Weingärtner, S. Moeller and M. Akçakaya, "Improved simultaneous multislice cardiac MRI using readout concatenated k-space SPIRiT" ,Magn. Reson. Med. 2021;85:3036–3048.
4. **O. B. Demirel**, S. Weingärtner, S. Moeller and M. Akçakaya, "Improved Simultaneous Multi-slice Myocardial T1 Mapping with Composition of k-Space Interpolations (SMS-COOKIE)," submitted.
5. **O. B. Demirel**, T. Kilic, T. Cukur, E.U. Saritas. "Anatomical Measurements Correlate with Individual Magnetostimulation Thresholds for kHz-range Homogeneous Magnetic Fields". Medical physics 47 (4), 1836-1844.
6. A.A. Ozaslan, A. Alacaoglu, **O. B. Demirel**, T. Cukur, E.U. Saritas. "Fully Automated Gridding Reconstruction for Non-Cartesian X-Space Magnetic Particle Imaging". Phys Med Biol, 64(16):165018, 2019.
7. Y. Muslu,M. Utkur, **O. B. Demirel**, E.U. Saritas. "Calibration-Free Relaxation-Based Multi-Color Magnetic Particle Imaging" IEEE Transactions on Medical Imaging. 37.8 (2018): 1920-1931.
8. **O. B. Demirel**, E. U. Saritas. "Effects of Duty Cycle on Magnetostimulation Thresholds in MPI", International Journal on Magnetic Particle Imaging, 3(1):1703010, 2017.

CONFERENCE PUBLICATIONS

1. **O. B. Demirel**, S. Moeller, L. Vizioli, B. Yaman, L. Dowdle, E. Yacoub, K. Uğurbil and M. Akçakaya,"High-Quality 0.5mm Isotropic Functional MRI Using a Synergistic Combination of NORDIC Denoising and Deep Learning Reconstruction" Proc. 30th Meeting of ISMRM, May 2022.
2. **O. B. Demirel**, B. Yaman, S. Moeller, S. Weingärtner, and M. Akçakaya."Highly Accelerated Myocardial Perfusion Using Physics-guided Deep Learning With Structure-encoded Coil Maps" Proc. 30th Meeting of ISMRM, May 2022.
3. **O. B. Demirel**, B. Yaman, L. Dowdle, S. Moeller, L. Vizioli, E. Yacoub, J. Strupp, C. Olman, K. Uğurbil and M. Akçakaya,"20-fold Accelerated 7T fMRI Using Referenceless Self-Supervised Deep Learning Reconstruction" Proc. 43rd IEEE EMBC, Virtual Conference, November 2021.
4. **O. B. Demirel**, B. Yaman, L. Dowdle, S. Moeller, L. Vizioli, E. Yacoub, J. Strupp, C. Olman, K. Uğurbil and M. Akçakaya,"Improved Simultaneous Multi-Slice Functional MRI Using Self-supervised Deep Learning", Proc. IEEE Asilomar, Virtual Conference, November 2021.
5. **O. B. Demirel**, B. Yaman, S. Moeller, L. Dowdle, L. Vizioli, K. Kay, E. Yacoub, J. Strupp, C. Olman, K. Uğurbil and M. Akçakaya."Improved Accelerated fMRI Reconstruction using Self-supervised Deep Learning" Proc. 29th Meeting of ISMRM, Virtual Conference, May 2021, **Summa Cum Laude**
6. **O. B. Demirel**, S. Weingärtner, S. Moeller and M. Akçakaya."Improved SMS Reconstruction using ReadOut-Concatenated K-space SPIRiT (ROCK-SPIRiT)" Proc. 28th Meeting of ISMRM, Virtual Conference, August 2020, **Summa Cum Laude**

7. **O. B. Demirel**, T. Kilic, T. Cukur, E.U. Saritas. "Simple Anatomical Measures Correlate with Individual PNS Thresholds for kHz-range Homogeneous Magnetic Fields" Proc. 28th Meeting of ISMRM, Virtual Conference, August 2020, **Magna Cum Laude**
8. **O. B. Demirel**, S. Weingärtner, S. Moeller and M. Akçakaya."Readout-Concatenated k-Space SPIRIT (ROCK-SPIRIT): Regularized Reconstruction for Improved SMS Imaging" Proc. ISMRM Workshop on Data Sampling & Image Reconstruction, Sedona, AZ, USA, January 2020
9. **O. B. Demirel**, S. Weingärtner, S. Moeller and M. Akçakaya. "Improved Regularized Reconstruction for Simultaneous Multi-Slice Cardiac MRI T1 Mapping" Proc. 27th EUSIPCO , A Coruña, Spain, September 2019
10. S. Weingärtner, **O.B. Demirel**, C. Shenoy, F. Wenson, L. R. Schad, J. Schulz-Menger and M. Akçakaya. "Functional LGE Imaging: Cardiac Phase-Resolved Assessment of Focal Fibrosis" Proc. 41st EMBC , Berlin, Germany, July 2019
11. **O. B. Demirel**, S. Weingärtner, S. Moeller and M. Akçakaya."Multi-Band SPIRiT Strategies for Improved Simultaneous Multi-slice Myocardial T_1 Mapping" Proc. 27th Meeting of ISMRM, Montreal, QC, Canada, May 2019
12. **O. B. Demirel**, D .Sarica and E. U. Saritas. "Rapid Scanning in X-Space MPI: Impacts on Image Quality" Proc. of the 6th International Workshop on Magnetic Particle Imaging, Lubeck, Germany, March 2016.
13. D. Sarica, **O. B. Demirel**, Y. Muslu and E. U. Saritas. DC Shift Imaging for XSpace MPI Reconstructio", Proc. of the 6th International Workshop on Magnetic Particle Imaging, Lubeck, Germany, March 2016.
14. G. Onuker, **O.B. Demirel**, D. Sarica, Y. Muslu and E. U. Saritas. "Deconvolving Relaxation Effects in Multi-Diomensional X-space M", Proc. of the 6th International Workshop on Magnetic Particle Imaging, Lubeck, Germany, March 2016.
15. E. Bozkurt, **O. B. Demirel**, D. Sarica, Y. Muslu and E. U. Saritas."Effects of Safety Limits on Image Quality in MP", Proc. of the 6th International Workshop on Magnetic Particle Imaging, Lubeck, Germany, March 2016.
16. Y. Muslu, M. Utkur, **O. B. Demirel** and E. U. Saritas. "Calibration-Free Color MP", Proc. of the 6th International Workshop on Magnetic Particle Imaging, Lubeck, Germany, March 2016.
17. A. Alacaoglu, A. A. Ozaslan, **O. B. Demirel** and E. U. Saritas. "Nonlinear Scanning in X-Space MPI", Proc. of the 6th International Workshop on Magnetic Particle Imaging, Lubeck, Germany, March 2016.

TALKS

1. "High-Quality 0.5mm Isotropic Functional MRI Using a Synergistic Combination of NORDIC Denoising and Deep Learning Reconstruction" Proc. 30th Meeting of ISMRM, May 2022.
2. "Highly Accelerated Myocardial Perfusion Using Physics-guided Deep Learning With Structure-encoded Coil Maps" Proc. 30th Meeting of ISMRM, May 2022.
3. "20-fold Accelerated 7T fMRI Using Referenceless Self-Supervised Deep Learning Reconstruction" Proc. 43rd IEEE EMBC, Virtual Conference, November 2021.
4. "Improved Simultaneous Multi-Slice Functional MRI Using Self-supervised Deep Learning", Proc. IEEE Asilomar, Virtual Conference, November 2021.
5. "Improved Accelerated fMRI Reconstruction using Self-supervised Deep Learning" Proc. 29th Meeting of ISMRM, Virtual Conference, May 2021, **Summa Cum Laude**

6. "Improved SMS Reconstruction using ReadOut-Concatenated K-space SPIRiT (ROCK-SPIRiT)", Proc. 28th Meeting of ISMRM, Virtual Conference, August 2020, **Summa Cum Laude**
7. "Simple Anatomical Measures Correlate with Individual PNS Thresholds for kHz-range Homogeneous Magnetic Fields", Proc. 28th Meeting of ISMRM, Virtual Conference, August 2020, **Magna Cum Laude**
8. "Readout-Concatenated k-Space SPIRIT (ROCK-SPIRIT): Regularized Reconstruction for Improved SMS Imaging", ISMRM Workshop on Data Sampling & Image Reconstruction Sedona, AZ, USA, January 2020
9. "Improved Regularized Reconstruction for Simultaneous Multi-Slice Cardiac MRI T_1 Mapping", 27th EUSIPCO, A Coruña, Spain, September 2019
10. "Effects of Duty Cycle on Magnetostimulation Thresholds in MPI", 7th International Workshop on Magnetic Particle Imaging, Prague, Czech Republic, March 2017.

POSTER PRESENTATION

1. "Multi-Band SPIRiT Strategies for Improved Simultaneous Multi-slice Myocardial T_1 Mapping" Proc. 27th Meeting of ISMRM, Montreal, QC, Canada, May 2019
2. "Magnetostimulation Thresholds in Magnetic Particle Imaging (MPI)", Proc of the Graduate Research Conference, Bilkent University, Turkey, March 2017.
3. "Rapid Scanning in X-Spiace MPI: Impacts on Image Quality", Proc of the 6th International Workshop on Magnetic Particle Imaging, Lubeck, Germany, March 2016.
4. "Maintaining Image Quality During Rapid Scanning in Magnetic Particle Imaging (MPI)",Proc of the Graduate Research Conference, Bilkent University, Turkey, March 2016.

TECHNICAL STRENGTHS

Software	MATLAB, Python, PyTorch, TensorFlow, Siemens IDEA, JAVA, VHDL
Tools	Adobe Illustrator, HFSS, Synopsys, 5Spice, LTSPice

WORK EXPERIENCE

Center for Magnetic Resonance Research (CMRR) *2017 - Present*
Research Assistant *University of Minnesota*

Signals and Systems *2020 - 2020*
Teaching Assistant *University of Minnesota*

National Magnetic Resonance Research Center (UMRAM) *2012 - 2017*
Research Assistant *Bilkent University*

Analog Electronics *2016 - 2017*
Teaching Assistant *Bilkent University*

FRAUNHOFER IIS *2014*
Summer Internship *Dresden, Germany*

EXTRA-CIRRUCULAR

Information Office for Prospective Students *2013 - 2016*
Student Guide *Bilkent University*

Morey's Piers Amusement Park *2011*
Work and Travel Program, Ride Operator *Wildwood, NJ, USA*

PERSONAL TRAITS

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Turkish (Native), English (Fluent), German & Spanish (Beginner)

Interests

Bouldering, Swing Dance, Clarinet