Can Deniz Bezek

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Education

Ph.D. in Information Technology November 2021 – Present
Uppsala University Uppsala, Sweden

- Development of novel analytical and model-based deep learning reconstruction algorithms for speed-of-sound imaging using ultrasound waves
- Application of the developed algorithms to various clinical applications, e.g., breast cancer detection, breast density classification, and liver fat quantification
- Supervisor: Prof. Orcun Göksel

M.Sc. in Electrical and Electronics Engineering (CGPA:4.00/4.00) 2019 – 2021
Middle East Technical University (METU) Ankara, Türkiye

- Development of deep learning-based reconstruction methods for multi-spectral and compressive spectral imaging
- Supervisor: Assoc. Prof. Figen S. Oktem

B.Sc. in Electrical and Electronics Engineering (CGPA:3.88/4.00) 2015 – 2019
Middle East Technical University Ankara, Türkiye

Research Interests

Ultrasound Imaging, Computational Imaging, Inverse Problems, Deep Learning, Signal Processing

Teaching and Professional Experience

Teaching Assistant
Uppsala University November 2021 – Present, Uppsala, Sweden

- Teaching assistant at Medical Informatics course
- Mentor for new Ph.D. students
- Website and X (formerly Twitter) responsible at the Centre for Image Analysis

Middle East Technical University February 2020 – November 2021, Ankara, Türkiye

- Teaching assistant at Vector Space Methods in Signal Processing, Probability and Random Variables, and Real-Time Applications of Digital Signal Processing courses

Visiting Researcher June 2024– August 2024
Robotics and Control Laboratory, The University of British Columbia Vancouver, Canada

- Development of speed-of-sound imaging with conventional ultrasound transducers using laser diode photoacoustic
- Development of speed-of-sound imaging pipeline for *ex vivo* prostate cancer study

Research Intern June 2018– September 2018
Medizinische Informationstechnik (MedIT) Aachen, Germany

- Development of capacitive electrocardiogram (ECG) mock-up prototype
- Simulating and analyzing ballistocardiographic coupling into capacitive ECG

Project Assistant November 2018– June 2019
Arcelik A.S. Ankara, Türkiye

- Development of multicast DNS implementation on a microcontroller for Internet of Things applications of household appliances

Awards, Certificates & Honors

Anna Maria Lundins Scholarship 2025
Awarded travel grant to attend and present at IEEE International Ultrasonics Symposium (IUS)

IFMBE-MTF Best Poster Award 2024
Best poster award at Medicinteknikdagarna 2024

Liljewalch Travel Scholarships 2024
Scholarship for research visit to The University of British Columbia

IEEE IUS Student Travel Grant 2023
Awarded to selected authors on a competitive basis at the 2022 IEEE IUS

METU Course Performance Award 2020
Awarded to the graduate student with the highest CGPA in Electrical and Electronics Engineering Department

KAIST Travel and Accommodation Award 2019
Travel and accomadation award to join Korea Advanced Institute of Science and Technology (KAIST) EE Camp

Bulent Kerim Altay Award 2018-2019
Awarded the Bulent Kerim Altay Prize three times for achieving a 4.00/4.00 GPA

TUBITAK (Scientific and Technical Research Council of Türkiye) 2019-2021
Scholarship for M.Sc. studies

METU 2015-2019
Listed in Dean's High Honor Roll for all semesters

Deutsches Sprachdiplom (DSDII) 2019
German proficiency at level C1 (except listening B2)

IELTS 2019
Overall score 7.5

Journal Publications

1. **C. D. Bezek***, M. Farkas*, D. Schweizer, R. A. Kubik-Huch, and O. Goksel, "Breast Density Assessment via Quantitative Sound-Speed Measurement Using Conventional Ultrasound Transducers", **European Radiology**, 2025. (link)

2. S. Laguna, L. Zhang, **C. D. Bezek**, M. Farkas, D. Schweizer, R. A. Kubik-Huch, and O. Goksel, "Uncertainty estimation for trust attribution to speed-of-sound reconstruction with variational networks", **International Journal of Computer Assisted Radiology and Surgery**, 2025. (link)

3. D. Schweizer, M. Farkas, **C. D. Bezek**, Anna Potempa, Cornelia Leo, R. A. Kubik-Huch, and O. Goksel, "Pulse-Echo Imaging of Breast Speed-of-Sound as a Potential Biomarker for Breast Cancer", **under review**, 2025.

4. **C. D. Bezek**, M. Haas, R. Rau, and O. Goksel, "Learning the Imaging Model of Speed-of-Sound Reconstruction via a Convolutional Formulation", **IEEE Transactions on Medical Imaging,** 2024. (link)

5. D. Schweizer, R. Rau, **C. D. Bezek**, R. A. Kubik-Huch, and O. Goksel, "Robust Imaging of Speed-of-Sound Using Virtual Source Transmission", **IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control**, 2023. (link)

6. **C. D. Bezek** and O. Goksel, "Analytical Estimation of Beamforming Speed-of-Sound Using Transmission Geometry", **Ultrasonics**, 2023. (link)

7. F. S. Oktem, O. F. Kar, **C. D. Bezek**, and F. Kamalabadi "High-resolution Multi-spectral Imaging with Diffractive Lenses and Learned Reconstruction", **IEEE Transactions on Computational Imaging**, 2021. (link)

Conference Proceedings

1. L. Zhu, **C. D. Bezek**, and O. Goksel, "FGGP: Fixed-Rate Gradient-First Gradual Pruning", **Scandinavian Conference on Image Analysis**, 2025. (*accepted*)
2. **C. D. Bezek***, H. Moradi*, R. Rohling, S. Salcudean, and O. Goksel, "Towards Speed-of-Sound Imaging with Conventional Ultrasound Transducers Using Laser Diode Photoacoustic", **SPIE Medical Imaging**, 2025. (link)
3. **C. D. Bezek** and O. Goksel, "Model-Based Speed-of-Sound Reconstruction via Interpretable Pruned Priors", **IEEE International Ultrasonics Symposium (IUS)**, 2024. (link)
4. **C. D. Bezek**, M. Bilgin, L. Zhang, and O. Goksel, "Global Speed-of-Sound Prediction Using Transmission Geometry", **IUS**, 2022. (link)
5. **C. D. Bezek** and F. S. Oktem, "Unrolling-Based Deep Reconstruction for Compressive Spectral Imaging", **Computational Optical Sensing and Imaging (COSI)**, 2021. (link)
6. D. U. Uguz, P. Weidener, **C. D. Bezek**, T. Wang, S. Leonhardt and C. H. Antink, "Ballistocardiographic Coupling of Triboelectric Charges into Capacitive ECG", **IEEE International Symposium on Medical Measurements and Applications (MeMeA)**, 2019. (link)
7. I. Manisali*, R. M. Cam*, **C. D. Bezek***, and F. S. Oktem, "Deep CNN Prior Based Image Reconstruction for Multispectral Imaging", **28th Signal Processing and Communications Applications Conference**, 2020 (in Turkish) (link)

Talks

1. "Pulse-echo speed-of-sound estimation and its applications", **The Artimino Conference on Medical Ultrasound Technology**, 2025.
2. "Ultrasound-Based Speed-of-Sound Measurement for Breast Density Characterization", **Centre for Image Analysis**, 2025.
3. "Reconstruction of Ultrasound-Speed Maps with a Learned Imaging Model", **Swedish Symposium on Image Analysis**, 2025.
4. "Speed-of-Sound as a Novel Tissue Characterization Method", **International Tissue Elasticity Conference**, 2024.
5. "Pulse-Echo Speed-of-Sound as Imaging Biomarker for Breast Density: Virtual Source Acquisitions for In-Vivo Application", **IEEE International Ultrasonics Symposium**, 2023.
6. "Speed-of-sound as a Novel Ultrasound Imaging Biomarker for Breast Cancer and Density", **Medicinteknikdagarna**, 2023.
7. "Model-based Deep Learning of Ultrasound Beamforming", **Swedish Symposium on Image Analysis (SSBA)**, 2023.
8. "Global Speed-of-Sound Prediction Using Transmission Geometry", **IEEE IUS**, 2022.
9. "Mean Speed-of-Sound Estimation Using Geometric Disparities", **Swedish Symposium on Image Analysis**, 2023.

Poster Presentations

1. "FGGP: Fixed-Rate Gradient-First Gradual Pruning", **Scandinavian Conference on Image Analysis**, 2025.
2. "Speed-of-Sound as a Novel Quantitative Imaging and Characterization Method", **Medicinteknikdagarna**,2024.
3. "Model-Based Speed-of-Sound Reconstruction via Interpretable Pruned Priors", **IEEE IUS**, 2024. (virtual)
4. "Motion Sensitivity of Transmit Sequences for Pulse-Echo Mapping of Sound Speed, based on Apparent Speckle Shifts", **IEEE International Ultrasonics Symposium**, 2023.
5. "Sound-Speed Reconstruction with Learned Kernels based on a Convolutional Formulation of Sound-Speed and Speckle-Shift Relation", **IEEE International Ultrasonics Symposium**, 2023.

Supervised Students

1. Zezheng Zhang, A Generalizable Deep Learning Method for Ultrasound Imaging, M.S., (ongoing).
2. Paul Koudelka, Interactive Speed of Sound Measurement with Ultrasound Using Computational Method, M.S., 2025.
3. Lingkai Zhu, Edge Pruning Strategies in Neural Networks, M.S., 2024.
4. Ema Duljkovic, Model-Based Deep Learning for Ultrasound Imaging of Sound Speed ,2024.

Volunteer Activities

IEEE METU Career Project Group Coordinator May 2016 – June 2017
IEEE METU is the student club of Institute of Electrical and Electronics Engineers at METU

Editor of tr.motorsport.com November 2015 – Februray 2016

Professional Service

Journal Reviewer: IEEE Transcations on Computational Imaging

Journal Reviewer: IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control

Skills

Languages: Turkish (Native), English (fluent), German (fluent), Swedish (intermediate)
Programming: MATLAB, C, Python, TensorFlow, LabVIEW ,LaTeX