

# OKYANUS ORAL

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## Education

### Middle East Technical University (METU)

**MSc** in Electrical and Electronics Engineering **CGPA: 4.00/4.00** 10.2021 - Present  
Thesis: Three-Dimensional Near-Field MIMO Array Radar Imaging using Physics-Based Deep Neural Networks (Advisor: Figen S. Oktem).

**BSc** in Electrical and Electronics Engineering **CGPA: 3.80/4.00** 11.2017 - 09.2021  
Completed all semesters with High Honors (Graduation Ranking: 10<sup>th</sup> out of 350.)  
Senior year specializations in Signal Processing & Control Areas

## Research Interests

- Inverse Problems
- Optimization
- Deep Learning
- Computational Imaging
- Statistical Signal Processing
- Machine Learning

### Relevant Coursework :

- Theory of Remote Image Formation
- Advanced Statistical Signal Processing
- Statistical Signal Processing and Modeling
- Vector Space Methods in Signal Processing
- Linear Systems Theory I
- Machine Vision
- Optimization
- Pattern Recognition
- Computational Intelligence
- Digital Signal Processing

## Publications - Under Review / Submitted

1. **O. Oral** and F. S. Oktem, "Plug-and-Play Regularization on Magnitude with Deep Priors for 3D Near-Field MIMO Imaging" in *IEEE Transactions on Computational Imaging*, 2023 (Under Review).
2. I. Manisali, **O. Oral** and F. S. Oktem, "Efficient Physics-Based Learned Reconstruction Method for 3D Near-Field MIMO Radar Imaging" *Digital Signal Processing*, 2023 (Under Review).
3. **O. Oral**, M Kiran and BM Ozyildirim, "HPS-RL: A Library for Evolutionary Search for Hyperparameter Search for Optimum Deep Reinforcement Applications" *Neural Networks*, 2022 (Under Review).

## Publications - Accepted / Published

1. **O. Oral** and F. S. Oktem, "Plug-and-Play Reconstruction with 3D Deep Prior for Complex-Valued Near-Field MIMO Imaging." *2023 31th European Signal Processing Conference (EUSIPCO)*, Helsinki, Finland, 2023.
2. **O. Oral**, E. L. Oral, and M. S. Andaç, "Comparison of the Performance of K-Nearest Neighbours and Generalized Neural Network in Construction Crew Productivity Prediction," *Çukurova Üniversitesi Mühendislik Fakültesi Dergisi*, vol. 36, no. 1, pp. 131-140, 2021. doi: 10.21605/cukurovaumfd.933867.

## Experience

### Research & Teaching Assistant, METU - Department of EEE

02.2022 - Present

- Courses: Vector Space Methods in Signal Processing, Digital Signal Processing, Introduction to Logic Design, Summer Practice I & II.

### Researcher, Scientific & Technological Research Council of Turkey

11.2021 - Present

- Research on "Development of Deep Learning-based Approaches for Solving Inverse Problems in Imaging and Comparative Performance Evaluation" (Project: 120E505. PI: Assoc. Prof. Figen S. Oktem)

**Intern, ROKETSAN - Directorate of Space Systems** [↗](#)

08.2021 - 09.2021

- Conducted spectral analysis on launch vehicle liftoff vibroacoustics for acoustic protection systems.
- Prepared a review report of inertial measurement units, onboard computers, and actuators for the Micro-Satellite launch vehicle system that was in development.

**Voluntary Work, Berkeley Lab Computing Sciences - ESnet** [↗](#)

04.2021 - 07.2021

- Implemented Levenberg-Marquardt Algorithm with map-reduce for least squares problems and Vector Free Low Memory Broyden-Fletcher-Goldfarb-Shanno (VLBFGS) algorithm with map-reduce as a PyTorch-Optimizers.
- Implemented a scalable genetic algorithm working on multiple CPUs for hyperparameter search of reinforcement learning models (Contributed to HPS-RL library [↗](#)).

**Intern, HAVELSAN - R & D, Signal Processing Products Development Team** [↗](#)

08.2020 - 09.2020

- Implemented MUSIC algorithm, conventional beam-forming method, and used CNNs for the direction of arrival estimation with  $2 \times 2$  uniform rectangular arrays.

## Skills

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### Programming Languages and Frameworks:

- Python (PyTorch, NumPy, SciPy, Matplotlib, scikit-learn, Tensorflow & Keras)
- MATLAB & Simulink (Signal Processing, Computer Vision, and Control System Toolboxes)
- C, C++ (LabVIEW, Arduino, ESP32), C# (Unity3D), Quartus-II, LTspice XVII, Siemens NX.

### Languages:

English (TOEFL iBT, score 107/120) [↗](#), Turkish (Native), Norwegian (A1), German (A1), Russian (A1)

## Awards, Certificates & Achievements

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### Bülent Kerim Altay Award for Spring 2019-2020 & Spring 2020-2021

[↗](#)

BKA award is presented by the Department of Electrical and Electronics Engineering, METU, biannually based on academic performance.

### Certificates from Coursera:

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|------------------------------------------------------------------------|----------------------------|---------|
| • Convolutional Neural Networks <a href="#">↗</a>                      | by deeplearning.ai         | 08.2020 |
| • Structuring Machine Learning Projects <a href="#">↗</a>              | by deeplearning.ai         | 10.2019 |
| • Improving Deep Neural Networks <a href="#">↗</a>                     | by deeplearning.ai         | 10.2019 |
| • Neural Networks and Deep Learning <a href="#">↗</a>                  | by deeplearning.ai         | 09.2019 |
| • Fundamentals of Digital Image and Video Processing <a href="#">↗</a> | by Northwestern University | 08.2019 |
| • Machine Learning <a href="#">↗</a>                                   | by Stanford University     | 08.2019 |

### IEEEExtreme 12.0 Programming Competition

10.2018

Global Ranking: 563rd out of 9500 groups - Ranking in Turkey: 11th out of 73 groups [↗](#).

## Sample Term Projects [↗](#)

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- Prediction of S&P500 index prices using nonlinear Bayesian estimation (**Adv. Stat. Signal Proc.**)
- Comparison of Meta-Optimizers on Optimization of Substitution Permutations for Integer Wavelet Transformation based Image Steganography (**Optimization**)
- Review of Self-Organizing Map Oversampling for Imbalanced Dataset Learning (**Pattern Recog.**)
- Self Monitoring COVID-19 Symptoms: as a member of the capstone team, designed and implemented the cough detection sub-system. (**Engineering Design I & II**)
- Range & Speed Estimation of a Constant Speed Vehicle (**Digital Signal Processing**)

## Extra-Cirrucular

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**Worldbuilding:** I have been working on my constructed language since 2019.

**Sports:** Running, Archery (I am a previous member of ONOK Archery Club, with a 40lb recurve bow).