Merve Begum TERZI, *Ph.D.*

CONTACT INFORMATION

Postdoctoral Research Fellow   *E-mail*: merveterzi@bilkent.edu.tr
National Magnetic Resonance Research Center (UMRAM)
Department of Electrical & Electronics Engineering   *Tel*: +90 (539) 776 19 69
Bilkent University, Ankara, Turkey

RESEARCH INTERESTS

Signal Processing, Image Processing, Image Reconstruction, Big Data Analytics, Machine and Deep Learning, Unsupervised and Self-Supervised Learning, Feature Representation Learning, Computer Vision, Pattern Recognition, Federated Learning, Medical Imaging, Inverse Problems, Magnetic Particle Imaging (MPI), Magnetic Resonance Imaging (MRI)

EDUCATION

Bilkent University, Ankara, Turkey

***Ph.D.*, Electrical & Electronics Engineering**   [2015 – 2023]

Dissertation Title: Artificial Intelligence-based Hybrid Anomaly Detection and Clinical Decision Support Techniques for Automated Detection of Cardiovascular Diseases and COVID-19

Advisor: Prof. Orhan Arikan

Bilkent University, Ankara, Turkey

***M.S.*, Electrical & Electronics Engineering**   [2012 – 2015]

Thesis Title: Early Diagnosis of Acute Coronary Syndromes Automatically by using Features of ECG Recordings

Advisor: Prof. Orhan Arikan

Baskent University, Ankara, Turkey

***B.S.*, Electrical & Electronics Engineering**   [2008 – 2012]

Undergraduate Senior Design Project: Ora-Nasal Airflow Measurement System Design and Ora-Nasal Respiratory Index Measurement

Advisor: Prof. Osman Erogul

ACADEMIC EXPERIENCE

Bilkent University, Department of Electrical & Electronics Engineering, and National Magnetic Resonance Research Center (UMRAM), Ankara, Turkey

Postdoctoral Research Fellow, SARITAS Research Lab.   [2024 – Present]

Advisor: Prof. Emine Ulku Saritas

Bilkent University, Electrical & Electronics Engineering Department, Ankara, Turkey

Graduate Research Assistant, ARIKAN Research Lab.   [2012 – 2023]

Graduate Teaching Assistant   [2012 – 2023]

Teaching Assistant Performance was formally evaluated as "Exceptional" Five times by course instructors.

EEE 525 Advanced Signal Processing, EEE-520 Multirate Signal Processing & Wavelet Theory, EEE-501

Linear System Theory, EEE-443/543 Neural Networks, EEE-442/542 Nonlinear Systems, EEE-431 Digital Communications, EEE-424 Digital Signal Processing, EEE-351 Engineering Electromagnetics, EEE-342 Feedback Control Systems, EEE-321 Signals and Systems, EEE-313 Electronic Circuit Design, EEE-212 Microcontrollers and Embedded Systems, EEE-211 Analog Electronics, EEE-201/202 Circuit Theory

PROFESSIONAL EXPERIENCE

- **Siemens Healthineers**, Istanbul, Turkey   June 2011 – September 2011
  Internship

  Contributed to signal processing pipelines for medical imaging systems, with exposure to image acquisition and reconstruction workflows.

- **Toshiba Medical Systems** (Canon Medical Systems), Istanbul, Turkey   June 2012 – September 2012
  Internship

  Involved in system-level evaluation of medical imaging devices, focusing on performance analysis and quality assessment of imaging outputs.

OTHER ACADEMIC DUTIES

Treasurer of Signal Processing Society (SPS), IEEE Turkey Chapter, since 2024.

HONORS AND AWARDS

- Recipient of the "TUBITAK BIDEB 2250 Performance-based Scholarship Program for PhD and Post-Doctoral Scholars", awarded based on research performance and active contribution to TUBITAK-supported projects, 2024/2.

- Recipient of the "TUBITAK BIDEB 2250 Performance-based Scholarship Program for PhD and Post-Doctoral Scholars", awarded based on research performance and active contribution to TUBITAK-supported projects, 2024/1.

- Recipient of the "TUBITAK BIDEB 2237-A Grant Program for Scientific Training", awarded to support scientific training activities in science and technology and to promote advancement in these fields.

- Recipient of the "TUBITAK BIDEB 2224-A Grant Program for Participation in Scientific Meetings Abroad", awarded to support participation in an international scientific conference, 2020.

- Recipient of the "TUBITAK BIDEB 2224-B Grant Program for Participation in Scientific Meetings within the Country", awarded to support participation in a national scientific conference, 2018.

- Recipient of the "TUBITAK BIDEB 2211-C National PhD Scholarship Program for Priority Research Areas in Science and Technology", awarded to support my PhD dissertation research, 2017 - 2018.

- First in class out of about 300 students in Class of 2012 in the entire School of Engineering, Baskent University, Ankara, Turkey, 2012.

- Full scholarship for graduate education (M.S. and Ph.D.) in the top engineering school in Turkey, Bilkent University, Ankara, Turkey, 2012 - 2023.

- Awarded funding and a scholarship by TUBITAK BIDEB through the "2209-A Research Projects Support Program for Undergraduate Students", for Undergraduate Senior Design Project, 2011–2012.

- Full scholarship for undergraduate education (B.S.) in one of the best engineering school in Turkey, Baskent University, Ankara, Turkey, 2012 - 2023.

- First Prize Winner at the Interactive Computer Competition of the NATO Science Exhibition "Bringing Scientists Together for the Advancement of Science", organized by NATO in Brussels, Belgium, 2002.

- During my PhD studies, I was recognized five times for "Exceptional" Teaching Assistant Performance based on formal faculty evaluations. These recognitions were accompanied by departmental appreciation and partial financial support for academic conference and publication-related expenses.

RESEARCH PROJECTS

- "A Neurotechnological Solutions Platform for Challenges Threatening Human Function", Postdoctoral Researcher, TUBITAK ARDEB 1004 Project, 23AG005, 2024 - 2027. (Principal Investigator: Prof. Ergin Atalar, Bilkent University).

- "Focused Hyperthermia and Simultaneous Temperature Monitoring with Magnetic Particle Imaging", Postdoctoral Researcher, TUBITAK ARDEB 1001 Project, 122E162, 2024 - 2025. (Principal Investigator: Prof. Emine Ulku Saritas, Bilkent University).

- "Nanoparticle Fingerprinting for Cancer Imaging with Magnetic Particle Imaging", Postdoctoral Researcher, TUBITAK ARDEB 1001 Project, 120E208, 2023 - 2024. (Principal Investigator: Prof. Emine Ulku Saritas, Bilkent University).

- "Ensemble Learning–based Hybrid Clinical Decision Support Technique for Automated Detection of COVID-19 using RT-PCR Curves, Thorax Computed Tomography Images and Clinical-Laboratory Data", Ph.D. Thesis Project, Health Institutes of Turkiye (TUSEB) Strategic Research and Development Project Support Program – COVID-19 Strategic R&D Project Call, 2020-CV01-9081, 2020 - 2022. (Principal Investigator: Prof. Ozlem Ozdemir Kumbasar, Ankara University).

- "Deep Learning–based Automated Early Detection of Cardiac Diseases from Sympathetic Nerve Activity Signals", Ph.D. Thesis Project, TUBITAK Project, 2018-2020. (Principal Investigator: Prof. Adnan Abaci, Gazi University).

- "Modeling the Structural Characteristics of Anomalies and Irregularities in the Turkish Ionosphere using Machine Learning Techniques", Ph.D. Thesis Project, TUBITAK ARDEB 1001 Project, 114E541, 2015-2017. (Principal Investigator: Prof. Feza Arıkan, Hacettepe University).

- "Machine Learning– and Signal Processing–based Automated ECG Analysis for Early and Robust Detection of Cardiovascular Diseases", M.S. Thesis Project, TUBITAK ARDEB 1001 Project, 113E174, 2013 - 2015. (Principal Investigator: Prof. Adnan Abaci, Gazi University).

- "Magnetic Resonance Electrical Properties Tomography (MREPT)", M.S. Thesis Project, TUBITAK ARDEB 1001 Project, 11E090, 2012 - 2013. (Principal Investigator: Prof. Yusuf Ziya Ider, Bilkent University).

- "Ora-Nasal Airflow Measurement System Design and Ora-Nasal Respiratory Index Measurement", Undergraduate Senior Design Project, TUBITAK BIDEB 2209-A Project, 2011 - 2012. (Academic Advisor: Prof. Osman Erogul, Baskent University).

PUBLICATIONS

1. **MB Terzi**, O Arikan. "Machine learning based hybrid anomaly detection technique for automatic diagnosis of cardiovascular diseases using cardiac sympathetic nerve activity and electrocardiogram". *Biomedical Engineering / Biomedizinische Technik*, vol. 69, no. 1, 2024, pp. 79-109. https://doi.org/10.1515/bmt-2022-0406

2. **MB Terzi**, O Arikan. "Detection of Ischaemia using Nerve Activity, Artificial Neural Network, and Gaussian Mixture Model". *18th National Neuroscience Congress (USK)*, Ankara, Turkey, 2020, p. 200.

3. **MB Terzi**, O Arikan. "Detection of Cardiac Arrhythmia using Sympathetic Nerve Activity, Gaussian Mixture Model and Artificial Neural Network". *19th National Neuroscience Congress (USK)*, Ankara, Turkey, November 2021.

4. **MB Terzi**, O Arikan, "Detection of Cardiac Arrhythmia using Autonomic Nervous System, Gaussian Mixture Model, and Artificial Neural Network". *2020 Medical Technologies Congress (TIPTEKNO)*, Antalya, Turkey, 2020, pp. 1-4. DOI:10.1109/TIPTEKNO50054.2020.9299274.

5. EB Verdi, M Gok, DD Mülazimoglu, **MB Terzi**, AG Kaya, S Erol, O İsik, OU Guvendik, C Uzun, AH Elhan, ZC Karahan, A Azap, A Kaya, O Arikan, OO Kumbasar. "Deep Learning-based Hybrid Clinical Decision Support System Algorithm for COVID-19 Diagnosis via PCR Graphics and Thorax CT Images, Preliminary Data". *European Respiratory Journal*, vol. 60, suppl 66, September 2022. DOI:10.1183/13993003.congress-2022.1357 (ISSN: 0903-1936).

6. **MB Terzi**, O Arikan. "Detection of Acute Coronary Syndrome based on Support Vector Machines and ECG". *2019 27th Signal Processing and Communications Applications Conference (SIU)*, Sivas, Turkey, 2019, pp. 1-4. DOI:10.1109/SIU.2019.8806272.

7. **MB Terzi**, O Arikan. "Detection of Acute Myocardial Ischemia based on Support Vector Machines". *2018 26th Signal Processing and Communications Applications Conference (SIU)*, Izmir, Turkey, 2018, pp. 1-4. DOI: 10.1109/SIU.2018.8404733.

8. **MB Terzi**, F Arikan, O Arikan, S Karatay. "Classification of Regional Ionospheric Disturbances based on Support Vector Machines". *41st Committee on Space Research (COSPAR) Scientific Assembly*, Istanbul, Turkey, 2016, vol. 41, pp. C1-4.

9. **MB Terzi**, O Arikan. "Anomaly Detection Technique based on Sympathetic Nerve Activity for Detection of Cardiac Arrhythmia". *2020 28th Signal Processing and Communications Applications Conference (SIU)*, Gaziantep, Turkey, 2020, pp.1-4. DOI: 10.1109/SIU49456.2020.9302485.

10. **MB Terzi**, O Arikan, F Arikan, S Karatay, T Gulyaeva. "Classification of Regional Ionospheric Disturbance based on Machine Learning Techniques". *Living Planet Symposium (LPS), European Space Agency (ESA) Special Publication*, Prague, Czech Republic, vol. SP-740, 2016, p. 1-6. (ISSN: 0379-6566) (ISBN: 978-929221305-3).

11. **MB Terzi**, O Arikan, S. Karatay, and F. Arikan. "Classification of Regional Ionospheric Disturbances based on Support Vector Machines". *2017 25th Signal Processing and Communications Applications Conference (SIU)*, Antalya, Turkey, 2017, pp. 1-4.

12. **MB Terzi**, O Arikan, S Karatay, F Arikan, T Gulyaeva. "Classification of Regional Ionospheric Irregularities using Support Vector Machines". *Summer School on New Techniques in Machine Learning and Information Processing*, Ankara, 2016. https://yazokulu.bilimakademisi.org/yapayogrenme/2016/poster-oturumlari.html

13. **MB Terzi**, MK Korkmaz, O Arikan, S Topal, A Abaci. "Detection of Acute Myocardial Ischemia based on Artificial Neural Networks and Skin Sympathetic Nerve Activity". *II. International Conference and Exhibition on Digital Transformation and Smart Systems (DTSS)*, Ankara, Tureky, 2019, p. 69-72.

14. **MB Terzi**, O Arikan, A Abaci, M Candemir, M Dedoglu. "Early Diagnosis of Acute Coronary Syndromes with Automatic ST/T Classifier". *2014 18th National Biomedical Engineering Meeting*, Istanbul, Turkey, October 2014, pp. 1-4. DOI:10.1109/BIYOMUT.2014.7026388.

15. **MB Terzi**, T Celik, O Erogul. "Ora-Nasal Airflow Measurement System Design and Ora-Nasal Respiratory Index Measurement". *2011 Medical Technologies Congress (TIPTEKNO)*, Antalya, Turkey, October 2011, pp. 1-4.

16. **MB Terzi**, O Arikan. "Detection of Myocardial Ischaemia by using Sympathetic Nerve Activity, Artificial Neural Network and Gaussian Mixture Model". *Anatomy: An International Journal of Experimental and Clinical Anatomy*, vol. 14, 2020, p.S151. (ISSN: 1307-8798).

17. **MB Terzi**, O Arikan. "Detection of Cardiac Arrhythmia using Sympathetic Nerve Activity, Gaussian Mixture Model, and Artificial Neural Network". *Anatomy: International Journal of Experimental and Clinical Anatomy*, November 2021.

18. **MB Terzi**, O Arikan. "Deep Learning with Gated Recurrent Neural Networks for Anomaly Detection". *International Congress on Multidisciplinary Natural Sciences and Engineering (ICOMNAS)*, Ankara, Turkey, December 2021, p. 300-308. (ISBN: 978-605-71156-0-7).

19. **MB Terzi**, O Arikan, F Arikan, S Karatay, T Gulyaeva. "Classification of Regional Ionospheric Disturbances based on Support Vector Machines". *VIII. International Union of Radio Science (URSI) Scientific Congress*, Ankara, Turkey, September 2016, p. 1-4.

20. **MB Terzi**, O Arikan, S Karatay, F Arikan. "Classification of Regional Ionospheric Disturbances based on Machine Learning Techniques". *The Third Committee on Space Research (COSPAR) Symposium*, Jeju, South Korea, 2017, p. 1-4.

21. **MB Terzi**, O Arikan. "Deep Gated Recurrent Unit and Long Short Term Memory-based Anomaly Detection Technique". *International Congress on Multidisciplinary Natural Sciences and Engineering (ICOMNAS)*, Ankara, Turkey, December 2021, p. 149-157. (ISBN: 978-605-71156-0-7).

22. EB Verdi, DD Mulazimoglu, **MB Terzi**, M Gok, AG Kaya, S Erol, O Isik, OU Guvendik, C Uzun, AH Elhan, ZC Karahan, A Azap, A Kaya, O Arikan, OO Kumbasar. "Deep Learning-based Hybrid Clinical Decision Support System Algorithm for COVID-19 Diagnosis via PCR Curves and Thorax CT Images, Preliminary Data". *25th Annual National Congress of Turkish Thoracic Society*, Antalya, Turkey, May 2022, p. 211-212.

23. **MB Terzi**. "Anomaly Detection with Deep Long Short Term Memory Networks". *2021 6th International Conference on Computer Science and Engineering (UBMK)*, Ankara, Turkey, 2021, pp. 129-132. DOI: 10.1109/UBMK52708.2021.9559034.

24. **MB Terzi**, O Arikan. "Detection of Myocardial Infarction using Autonomic Nervous System, Gaussian Mixture Model, and Artificial Neural Network". *2020 Medical Technologies Congress (TIPTEKNO)*, Antalya, Turkey, 2020, pp. 1-4. DOI: 10.1109/TIPTEKNO50054.2020.9299275.

25. **MB Terzi**, O Arikan. "Detection of Myocardial Ischaemia by using ECG, Artificial Neural Network and Gaussian Mixture Model". *2020 28th Signal Processing and Communications Applications Conference (SIU)*, Gaziantep, Turkey, 2020, pp. 1-4. DOI: 10.1109/SIU49456.2020.9302389.

26. **MB Terzi**, O Arikan. "Coronary Artery Disease Detection by using Support Vector Machines and Gaussian Mixture Model". *2019 Medical Technologies Congress (TIPTEKNO)*, Izmir, Turkey, 2019, pp. 1-4. DOI:10.1109/TIPTEKNO.2019.8894953.

27. EB Verdi, **MB Terzi**, DD Mülazimoğlu, M Gök, AG Kaya, S Erol, O Isik, OU Güvendik, C Uzun, AH Elhan, ZC Karahan, A Azap, A Kaya, O Arıkan, OO Ozdemir Kumbasar. "Artificial Intelligence-Based Hybrid System for COVID-19 Diagnosis Using RT-PCR, Thorax CT and Laboratory Data". https://ssrn.com/abstract=431684 http://dx.doi.org/10.2139/ssrn.4316848

28. **MB Terzi**, A Abaci, O Arikan, M Candemir, M Dedeoglu. "The GU-ECG Database: ECG Datasets for Detection and Classification of Acute Myocardial Ischaemia Through Machine Learning". *Mendeley Data, V1*. 2021. DOI:10.17632/zhr5zsngtg.1

29. **MB Terzi**, MK Korkmaz, O Arikan, S Topal, A Abaci. "Detection of myocardial ischaemia based on artificial neural networks and skin sympathetic nerve activity". *EasyChair*, 2019, (2165).

30. **MB Terzi**, T Celik, O Erogul. "Ora-Nasal Airflow Measurement System Design and Ora-Nasal Respiratory Index Measurement". *2011 16th National Biomedical Engineering Meeting (BIYOMUT)*, Antalya, Turkey, October 2011, pp. 1-4.

COURSES TAUGHT

GE-304 Technology Society and Professional Development Seminar

GRADUATE TEACHING ASSISTANTSHIPS

- EEE-525 Advanced Signal Processing
- EEE-520 Multirate Signal Processing and Wavelet Theory
- EEE-501 Linear System Theory
- EEE-443/543 Neural Networks
- EEE-442/542 Nonlinear Systems
- EEE-431 Digital Communications
- EEE-424 Digital Signal Processing
- EEE-351 Engineering Electromagnetics
- EEE-342 Feedback Control Systems
- EEE-321 Signals and Systems
- EEE-313 Electronic Circuit Design
- EEE-212 Microcontrollers and Embedded Systems
- EEE-211 Analog Electronics
- EEE-201/202 Circuit Theory

CONFERENCE ORGANIZATION

1. Organizing Committee Vice Chair, *33rd Graduate Research Conference*, Department of Electrical & Electronics Engineering, Bilkent University, Ankara, Turkey, 27 January 2023.
(website: `https://ieee.bilkent.edu.tr/grc/grc2023/index.html`)

2. Organizing Committee Vice Chair, *32nd Graduate Research Conference*, Department of Electrical & Electronics Engineering, Bilkent University, Ankara, Turkey, 27 January 2022.
(website: `https://ieee.bilkent.edu.tr/grc/grc2022/index.html`)

3. Organizing Committee Vice Chair, *31st Graduate Research Conference*, Department of Electrical & Electronics Engineering, Bilkent University, Ankara, Turkey, 20 January 2021.
(website: `https://ieee.bilkent.edu.tr/grc/grc2021/index.html`)

4. Organizing Committee Vice Chair, *31st Graduate Research Conference*, Department of Electrical & Electronics Engineering, Bilkent University, Ankara, Turkey, 8 May 2020.
(website: `https://ieee.bilkent.edu.tr/grc/grc2020/index.html`)

5. Organizing Committee Vice Chair, *30th Graduate Research Conference*, Department of Electrical & Electronics Engineering, Bilkent University, Ankara, Turkey, 22 March 2019.
(website: `https://ieee.bilkent.edu.tr/grc/grc2019/index.html`)

6. Organizing Committee Vice Chair, *29th Graduate Research Conference*, Department of Electrical & Electronics Engineering, Bilkent University, Ankara, Turkey, 6 April 2018.
(website: `https://ieee.bilkent.edu.tr/grc/grc2018/index.html`)

ACADEMIC JOURNAL REVIEWERSHIP

- The Lancet

- IEEE Transactions on Medical Imaging

- IEEE Transactions on Computational Imaging

- IEEE Transactions on Biomedical Engineering

- IEEE/ACM Transactions on Audio, Speech and Language Processing

- IEEE Transactions on Artificial Intelligence

- IEEE Journal of Biomedical and Health Informatics

- IEEE Internet of Things Journal

- American Journal of Physiology-Renal Physiology

- Medical Physics

- Physics in Medicine and Biology

- Signal, Image, and Video Processing (SIVP)

- European Journal of Medical Physics

- Biomedical Signal Processing and Control

- Digital Signal Processing

- Expert Systems with Applications

- Physical and Engineering Sciences in Medicine

- European Radiology

- Medical Hypotheses

- Computers in Biology and Medicine

- The British Journal of Radiology

- Canadian Journal of Electrical and Computer Engineering

- Australasian Physical and Engineering Sciences in Medicine

- Journal of Thoracic Imaging

- IEEE International Symposium on Biomedical Imaging (ISBI)

- European Journal of Clinical Microbiology & Infectious Diseases

- European Journal of Preventive Cardiology

- Frontiers in Cardiovascular Medicine

- CJC Pediatric and Congenital Heart Disease

- Journal of Medical Microbiology

- Access Microbiology

- Applied Intelligence

- Radiologia Medica

- Behavioral Neuroscience

- Data in Brief

- TUBITAK - Turkish Journal of Electrical Engineering and Computer Sciences

PROFESSIONAL MEMBERSHIPS

- COST Association - Action Working Group, since 2025.

- International Society of Magnetic Resonance in Medicine (ISMRM), since 2023.

- IEEE Women in Engineering (WIE), since 2012.

- Institute of Electrical & Electronics Engineering (IEEE), since 2012.

- Turkish Magnetic Resonance Society (Turk Manyetik Rezonans Dernegi), since 2023.

- Turkish Society for Brain Research and Neuroscience (TUBAS), since 2023.

TECHNICAL SKILLS

- **Programming Languages:** Python, MATLAB, Julia, C, C++, CUDA (GPU Computing)

- **Machine & Deep Learning Frameworks:** PyTorch, TensorFlow, Keras, scikit-learn, MONAI

- **Scientific Computing & Simulation:** Simulink, COMSOL, LTSpice

- **Technical & Research Tools:** LaTeX, Overleaf, Linux, Git

LAST UPDATED: January 7, 2026