

Fatih ONAY, Ph.D.

Signal Processing | Biomedical Data Applications | Computational Neuroscience

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Dr. Research Assistant, Bursa Technical University

Professional Summary

I am digital signal processing researcher specializing in the analysis of complex dynamic systems using signal processing, statistical modeling, pattern recognition, and machine learning techniques. I also gained experience in multi-channel EEG analysis, developing robust pipelines for artifact handling, feature extraction, and identification of neural biomarkers in clinical and cognitive neuroscience applications.

Core Skills

- **Biomedical Signals:** EEG/EMG biomarkers and neural applications
- **Signal Processing:** Adaptive filtering, time-frequency analysis, wavelets, spectral estimation
- **Programming:** MATLAB, Python
- **Machine Learning:** Pattern recognition, classification, feature extraction, statistical modeling
- **Information Theory:** Probabilistic inference, entropy, mutual information

Research & Teaching Experience

Research Positions

Visiting Researcher

CIMEC, University of Trento, Italy

June–August 2026

- **Funding:** Bursa Technical University
- **Host:** Dr. Ingmar De Vries
- Predictive brain theory - processing MEG data - natural motion dynamics

Dr. Research Assistant (Full-Time)

Mechatronics Engineering Department, Bursa Technical University, Turkey

2025–Present

- Supervise students in neural signal processing and BCI applications

Visiting Researcher

GIPSA-Lab, Université Grenoble Alpes, France

October–November 2024

- **Funding:** French Embassy Research Grant
- **Host:** Prof. Marco Congedo
- Riemannian geometry-based methods for co-registration of EEG signals across different subjects.

Research Assistant

Electrical and Electronics Engineering, Izmir Institute of Technology, Turkey

2020–2025

Research Assistant

Mechatronics Engineering, Bursa Technical University, Turkey

2017–2019

Courses Taught

Course Instructor – Probability and Statistics

Bursa Technical University, Undergraduate Program

Fall, 2026

- Designed lectures on probability theory, random variables, distributions, estimation, and hypothesis testing

Course Instructor – Introduction to Computational Neuroscience

Spring 2026

Bursa Technical University, Undergraduate Program

- Designed and delivered comprehensive undergraduate course covering neural modeling, EEG analysis, and brain-computer interfaces

Education

Ph.D. in Electrical and Electronics Engineering

2019–2025

Izmir Institute of Technology, Turkey

Thesis: “A computational brain connectivity framework for evaluating alterations in brain function using electroencephalography”

Focus: Computational Neuroscience, EEG Connectivity, Advanced Statistical Signal Processing

M.Sc. in Mechatronics Engineering

2017–2019

Bursa Technical University, Turkey

Thesis: “Multivariate Empirical Mode Decomposition Analysis of EMG Signals for Intelligent Hand Prosthesis Control”

Erasmus Exchange

2013–2014

Universidade do Minho, Portugal – Mechanical Engineering

B.Sc. in Electrical and Electronics Engineering

2012–2016

Erciyes University, Turkey – **Double Major** with Mechatronics Engineering

B.Sc. in Mechatronics Engineering

2012–2016

Erciyes University, Turkey

Selected Publications

Journal Articles (Peer-Reviewed)

1. **F. Onay** and B. Karaçalı, “Task-specific dynamical entropy variations in EEG as a biomarker for Parkinson’s disease progression”, *GeroScience*, vol. 48, no. 2, pp. 2773–2795, 2026.
2. **F. Onay**, A. Karatay, and E. Ataç, “High-Sensitivity Thickness Measurement of Transparent Optical Thin Films via EEMD-Based Fresnel Phase Diffraction”, *IEEE Transactions on Instrumentation and Measurement*, 2026.
3. E. Ataç, **F. Onay**, and A. Karatay, “Papercraft doppler radar measurements based on covariance eigenvalue spectrum-assisted empirical mode decomposition”, *IEEE Transactions on Instrumentation and Measurement*, 2025.
4. B.O. Olcay, **F. Onay**, G.A. Öztürk, et al., “Using chemosensory-induced EEG signals to identify patients with de novo Parkinson’s disease”, *Biomedical Signal Processing and Control*, vol. 87, p. 105438, 2024.
5. **F. Onay** and A. Mert, “Phasor represented EMG feature extraction against varying contraction level of prosthetic control”, *Biomedical Signal Processing and Control*, vol. 59, p. 101881, 2020.
6. **F. Onay** and A. Mert, “Değişken Kuvvetli EMG Sinyallerinin Çok Değişkenli Görgül Kip Ayırışımı ile Analizi ve Sınıflandırılması”, *International Journal of Advances in Engineering and Pure Sciences*, vol. 32, no. 3, pp. 229–238, 2020.

Conference Proceedings

1. **F. Onay**, A. Karatay, and E. Ataç, “Power Law Characterization of Age Related Cortical Information Decay”, *2026 IEEE Workshop on Complexity in Engineering*, 2026 (Oral Presentation/Paper Accepted)
2. **F. Onay** and B. Karacali, “Parkinson’s disease related alterations in common spatial patterns of EEG signals”, *15th Medical Informatics Congress*, Trabzon, Turkey, 2024 (Oral Presentation)
3. **O. Fatih** and B. Karacali, “Accelerometer-based timing analysis for Parkinson’s disease classification”, *IEEE 31st Signal Processing and Communications Applications Conference (SIU)*, 2023 (Oral Presentation)

Awards and Grants

- EEG101 Conference Grant, COST Action CA24148, 2026.
- FENS Art & Science Initiative – *Neural Resonance: Visualizing Alpha Oscillations through Digital Particle Dynamics* selected among 10 featured projects for the FENS website and Forum 2026.
- French Embassy Research Grant, 2024.

Professional Affiliations

- Member, Federation of European Neuroscience Society (FENS)
- Stake Holder Mapper, COST Association CA24148 - EEG101 European Cooperation in Science and Technology