E. Kartal
Dynamics of Micro and Nano Systems
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## Research profile

I completed my BSc and MSc at Bilkent University Mechanical Engineering in Ankara, Turkiye. I did my MSc with Prof. M. Selim Hanay, focusing mainly on the application of NEMS devices. My thesis was about using NEMS devices in their nonlinear regime to mimic a physical neural network, namely a “reservoir”, to perform classification tasks faster and less energy-consuming than the conventional methods.
I am now doing my PhD in PME with Prof. Farbod Alijani. The research I am conducting in NCANTO aims to investigate the effect of different nonlinear conditions on the frequency stability of 2D nanomechanical oscilators.

## Qualifications

Master's degree, Reservoir computing model using a single nonlinear nanoelectromechanical resonator at atmospheric conditions, Bilkent University
31 Aug 2021 → 22 Aug 2024
Award Date: 22 Aug 2024

Bachelor's degree, Bilkent University
18 Aug 2016 → 18 Jun 2021
Award Date: 18 Jun 2021

## Employment

**Delft University of Technology**

Dynamics of Micro and Nano Systems

Delft University of Technology

1 Oct 2024 → 31 Mar 2026

## Research outputs

Nanomechanical Systems for Reservoir Computing Applications
Kartal, E., Selcuk, Y., Ahmed, H., Kaynak, B. E., Yildiz, M. T., Erdogan, R. T., Yanik, C. & Hanay, M. S., 2025, In: Advanced Intelligent Systems. 11 p., 2400971.

Simultaneous mass and capacitance change measurement for defining nanoparticles such as nanoplastic, virus, by determining their size and material properties at the particle level
Hanay, M. S., Kaynak, B. E., Alkhaled, M., Erdogan, R. T., Tefek, U., Kucukoglu, B., Alhmoud, H., Kelleci, M., Alatas, Y. C. & Kartal, E., 2025, United States Patent and Trademark Office/Department of Commerce, Patent No. US 2025/0172482 A1, 9 Feb 2022, Priority date 3 Feb 2023, Priority No. US18/837,247

**Reservoir Computing Model Using a Single Nonlinear Nanoelectromechanical Resonator at Atmospheric Conditions**
Kartal, E., Jul 2024

Ultrafast Reservoir Computing based on Nonlinear Nanomechanical Resonators at Ambient Conditions
Kartal, E., Selcuk, Y., Kaynak, B. E., Yildiz, M. T., Yanik, C. & Hanay, M. S., 2024.

Atmospheric-pressure mass spectrometry by single-mode nanoelectromechanical systems
Kaynak, B. E., Alkhaled, M., Kartal, E., Yanik, C. & Hanay, M. S., 2023, In: Nano Letters. 23, 18, p. 8553-8559 7 p.

Graphene and carbon nanotubes interfaced electrochemical nanobiosensors for the detection of SARS-CoV-2 (COVID-19) and other respiratory viral infections: A review
Ozmen, E. N., Kartal, E., Turan, M. B., Yazicioglu, A., Niazi, J. H. & Qureshi, A., 2021, In: Materials Science and Engineering C. 129, 112356.