Merve Kaftan

merve.kaftan@std.bogazici.edu.tr +90 5385042185
mervekaftan01@hotmail.com

Computational Science and Engineering master student specializing in computational methods, physics, and machine learning.

Education

Bogazici University Sep. 2019 - June 2024
Majors in Physics, GPA: 3.15 *Istanbul, Turkey*

Bogazici University Sep. 2024 - Present
Master's Degree in Computational Science and Engineering, GPA: 3.94 *Istanbul, Turkey*

Research Experience

Inversion relation in integrable lattice spin models 2022-Present
Supervisor: Asst. Prof. Ilmar Gahramanov, Boğaziçi University *Istanbul,Turkey*

- Inversion relation is a simple relation as a star-triangle relation (a special form of the Yang-Baxter equation) within the framework of integrable lattice spin models of statistical mechanics. For some trigonometric solutions of the star-triangle relation, we obtain the corresponding inversion relation.
- I studied hyperbolic hypergeometric integrals since the Boltzmann weights of the statistical model are described in terms of these functions.

Possible Integrability Properties of Various Combinatorial Structures 2021- Fall 2022
Supervisor: Asst. Prof. Ilmar Gahramanov, Boğaziçi University *Istanbul, Turkey*

- We investigated integrability conditions of many different very well known and some other integer sequences by considering their corresponding polynomials as integrals of motions.
- I implemented a simple algebraic system in Mathematica to tackle intense computations of checking integrability conditions for more complicated integrals of motions.

Detecting and Analysing Soft Unclustered Energy Patterns Process 2021- Fall 2022
Supervisor: Doc. Bora Akgün, Boğaziçi University *Istanbul, Turkey*

- Proton-proton collisions generate Z bosons, leading to Higgs boson emission and subsequent deceleration. Z boson detection involves two regions and processes. For low-energy Z bosons decaying into lepton pairs, ECAL or muon detectors are used. However, Soft Unclustered Energy Patterns (SUEP) from Z boson decay, having extremely low energy, are detected using a tracker
- The data received from CERN was processed and analyzed through the utilization of Python.

Molecular Level Analysis of Capacitive Deionization 2024 - Fall 2025
Supervisor: PhD candidate Ayşe Saliha Korkut, Boğaziçi University *Istanbul, Turkey*

- We investigated molecular mechanisms of boron removal in capacitive deionization with functionalized carbon materials.
- We performed molecular dynamics simulations via LAMMPS and analysis were carried out by Python-based code modules.

Data-driven Forecasting of Supercapacitor Charging Profiles with LSTM June 2025 - Present
Supervisor: Assoc. Prof. Dr. Betül Uralcan, Boğaziçi University *Istanbul, Turkey*

- Supercapacitor charging profiles obtained from MD simulations are analyzed using Python.
- We study deep learning and try to establish an LSTM model to predict time-dependent charging data utilizing the package Tensorflow.

Programs and Workshops

SCALE FinGeo Summer School (Participant) July 2022
SCALE organizing committee *Istanbul*
- Two week-course on mathematics.

QTurkey (Participant) July 2023
QTurkey *Online*
- 1 week webinar about learning basics of qiskit, python and linear algebra.

Physics Department Seminar(Participant) July 2023
Şeyda İpek *Bogazici University*
- 2 days seminar about standard cosmological model,Lambda-CDM Model and Friedmann equation.

Data Science and Artificial Intelligence Summer School(Participant, Certificated) July 2025
Coderspace *Online*
- 4 weeks webinar about machine learning and data science with a focus on statistical foundations.

Teaching Experience

PHYS311: Modern Physics Fall 2023
Boğaziçi University
- Assisted problem sessions and student projects.

Scholarships & Honors

TUBITAK 2205
Merit-based scholarship to support undergraduate students in science. *January 2020 - July 2024*

TUBITAK 2210-E
A graduate-level scholarship awarded as a continuation of the TUBITAK 2205 program. *December 2024 - Present*

Specialized Skills

Languages: Turkish (Native), English (Fluent)
Computing: Python (NumPy, SciPy, Matplotlib, Tensorflow, Pandas), Mathematica