MELIH KARA

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Quantitative researcher with a Ph.D. in Astroparticle Physics, specializing in data analysis, statistical modeling, and simulation. Experienced in building reproducible, scalable analysis frameworks for structured and unstructured data. Proficient in Python, with a strong foundation in machine learning, time series analysis, and computational problem solving. Currently extending my experience into finance and consulting, aiming to apply analytical skills to real-world decision-making and strategy.

EXPERIENCE

POST-DOCTORAL RESEARCHER **01/2025 – 04/2025**

Karlsruhe Institute of Technology | Karlsruhe

- Extended the statistical analysis from Ph.D. research, increased detection efficiency to nearly 100%
- Refined the complex scientific results and drafted a peer-reviewed article

PHD RESEARCHER **03/2021 – 01/2025**

Karlsruhe Institute of Technology | Karlsruhe

- Developed and deployed real-time alert software for the SuperNova Early Warning System (SNEWS)
- Applied statistical modeling and time series analysis to large-scale detector datasets
- Built scalable data pipelines for signal detection using peak finding and trigger logic
- Developed ML-based filters (XGBoost, CNNs) for post-trigger refinement and event classification
- Achieved ~100% detection efficiency at ROI via optimized selection and simulation-based calibration

STUDENT ASSISTANT **09/2022 – 11/2023**

Karlsruhe Institute of Technology | Karlsruhe

- Tutored a high-energy physics laboratory course; guided students through experimental setup and data analysis (Numpy, Scipy, ROOT)
- Supported students in applying statistical methods to real-world physics problems (Hypothesis Testing)

STUDENT ASSISTANT **03/2020 – 08/2020**

Argelander Institute for Astronomy, Uni-Bonn | Bonn

- Assisted in teaching "Programming in Physics and Astronomy (C++/Python)" for master's students
- Supervised coding sessions and provided feedback on assignments, improving students' coding proficiency and problem-solving skills.

EDUCATION

KARLSRUHE INSTITUTE OF TECHNOLOGY **03/2021 – 01/2025**

Astroparticle Physics, Doktors der Naturwissenschaften (**Dr. rer. Nat**.)

(**1.00/5.00**, German Grading System, Magna Cum Laude)

UNIVERSITY OF BONN **10/2017 – 11/2020**

Astrophysics, Master of Science (**M. Sc.**)

(**2.1/5.00**, German Grading System)

ISTANBUL TECHNICAL UNIVERSITY **09/2012 – 08/2017**

Physics Engineering, Bachelor of Science (**B. Sc.**)

(**3.25/4.00**, American Grading System)

VOLUNTEERING

GRAD SCHOOL REP **04/22023 – 04/2024**

KSETA

Organized social events and the annual Ph.D. workshop. Represented the member by voicing their demands and concerns to the KSETA board.

TEACHING **10/2021 – 10/2021**

Kodluyoruz, "Data Science for Public Good Bootcamp"

Assisted participants during hands-on sessions and projects. Delivered additional lectures on object-oriented programming in Python.

LANGUAGES: **English (Business Fluent), Turkish (Native), German (Conversational)**

SKILLS

Programming & Tools

Python, GitHub, PyCharm, VS Code, LaTeX, Linux, Microsoft Excel, PowerPoint, SQL, React, Plotly Dash

Data & Analysis

Data Analysis, Statistical Analysis, Data Modeling, Data Visualization, Data Engineering, Physics Computing, Machine Learning

Software & Development

Software Engineering, Agile Methods, Object-Oriented Programming, API integration, CI/CD, PyPi

Core Competencies

Problem Solving, Critical Thinking, Communication, Leadership, Team Collaboration, Time Management, Presentation

CERTIFICATES

The Equities Trader Online

Financial Edge 04/2025 (link)

Markets Quantitative Analysis Job Simulation

Forage 01/2025 (link)

Algorithmic Trading and Stock Essentials

Linkedin Learning 12/2024 (link)

Financial Foundations

Linkedin Learning 11/2024 (link)

Physics Computing, Software Engineering and Data Technologies

CERN 08/2022

PUBLICATIONS *(selected)*

The SNEWS 2.0 Alert Software for the Coincident Detection of Neutrinos from Core-Collapse Supernovae
Journal of Instrumentation [link]
Co-developed and deployed two core software packages: one for real-time communication of detector data, and another for coincidence detection and alert distribution using Kafka-based protocols.

The eROSITA Final Equatorial-Depth Survey (eFEDS): A machine learning approach to inferring galaxy cluster masses from eROSITA X-ray images
Astronomy & Astrophysics [link]
Built the analysis pipeline for simulated and real data; designed and benchmarked CNN architectures and hyperparameters. Supervised and supported the lead author in model development and result interpretation.

The Abell 3391/95 Galaxy Cluster System
Astronomy & Astrophysics [link]
Processed and analyzed optical survey images; identified astrophysical structures and matched optical and X-ray counterparts, contributing to the discovery of an intercluster filament.