

# Kadir Murat Tastepe

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## PROFILE

M.Sc. Physics candidate specializing in computational high-energy physics, experienced in developing FPGA-based detector algorithms and real-time data processing systems. Passionate about understanding how the universe works and eager to develop new scientific skills to contribute to groundbreaking research in high-energy physics.

## EDUCATION

### Ruprecht-Karls-Universität Heidelberg

09.2025

*M.Sc. in Physics*

*Heidelberg, Germany*

- Master's Thesis: High-Level Synthesis-Based FPGA Implementation of the General Triplet Track Fit Algorithm for Real-Time Particle Tracking

### Hacettepe University

04.10.2021

*B.Sc. in Engineering Physics*

*Ankara, Turkey*

- Bachelor's Thesis: Monte Carlo Simulations in High Energy Physics.

### Universität Duisburg-Essen (Erasmus+)

05.10.2017 - 31.03.2018

*B.Sc. in Physics*

*Duisburg, Germany*

## WORK EXPERIENCE

### SAP SE

Walldorf, Germany

*Machine Learning Engineer / Working Student (On-site)*

*08.07.2024 – 08.07.2025*

- Developed end-to-end **Retrieval-Augmented Generation (RAG)** pipelines using **vector search** and **large language models** for intelligent question answering, and built **Flask APIs** to serve these features in **cloud-based applications**.
- Created **anonymized workflows** for model training, and **SlackBot** interactions.
- Explored the capabilities, limitations, and potential bottlenecks of both **Agentic AI** and **Generative AI models** to inform **model selection, optimization, and deployment strategies**.

*Big Data Analyst / Working Student (On-site)*

*15.06.2023 – 14.06.2024*

- Tracking several release-dependent adoption tasks for **Identity and Access Management (IAM)**.
- Monitored and created tickets for **Root Cause Analysis (RCA)** of the **cloud foundation software components**.
- Maintained **Wiki pages, JIRA dashboards, and custom filter queries** to enhance cross-functional transparency and alignment with key stakeholders.

### Paul Scherrer Institute (PSI)

Villigen, Switzerland

*Student Researcher (On-site)*

*01.10.2023 – 13.10.2023*

- Measured the **charged-pion lifetime** and **branching ratio to electrons vs. muons** including systematic and statistical uncertainties at the  **$\pi$ M1 beamline** using a detector setup of **scintillators**, a **degrader**, and a **calorimeter**.

### Physikalisches Institut Heidelberg

Heidelberg, Germany

*Scientific Assistant (On-site)*

*01.07.2022 – 30.09.2022*

- Investigated the impact of increased **magnetic field strength** and **sensor thickness** on the physics performance of the **Mu3e** experiment to guide the **optimization of detector design**.
- Simulated the spectrometer's **magnetic field** using **neodymium magnets** ( $\text{Nd}_2\text{Fe}_{14}\text{B}$ ) to separate **electrons** and **positrons**, implemented in **Mathematica**.

### The Scientific and Technological Research Council of Turkey

Ankara, Turkey

### High Performance and Grid Computing Center

*Internship (Remote)*

*15.03.2021 – 15.09.2021*

- Project: TRUBA2023 (Turkish Science e-Infrastructure)

**The Henryk Niewodniczański Institute of Nuclear Physics**  
**Polish Academy of Sciences(IFJ-PAN),**  
**Particle Physics Summer Student Programme**  
*Intern/Summer Student (On-site)*

Kraków, Poland

08.07.2019 – 22.08.2019

- Data analysis on **charged particle production** in **Xe-Xe collisions**.
- Simulated **laser light propagation** for the **Baikal-GVD** calibration system, implemented in **MATLAB** and **C++**.

## SCHOOLS

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**Max Planck IPP Summer University for Plasma Physics and Fusion Research**  
*Summer Student (On-site)*

Greifswald, Germany

12.09.2022 – 16.09.2022

**Wolfram Summer School**  
*Visitor (Remote)*

28.06.2021 – 16.07.2021

**Istanbul University Particle Physics Winter School (PFBU-2020)**  
*Winter Student (On-site)*

Istanbul, Turkey

03.02.2020 – 07.03.2020

## COMPUTING SKILLS

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**Operating Systems:** Mac OS, Linux, Windows

**Programming Languages:** C/C++, Python, Bash, L<sup>A</sup>T<sub>E</sub>X, MATLAB, Mathematica

**Simulation & Analysis:** ROOT, MadGraph, MadAnalysis, Pythia, Delphes, Geant4

**Tools:** Vitis HLS, Vivado, CUDA, Docker, Cloud Foundry, OpenSearch, Flask, OpenAI, LangChain, Microsoft Office

**Build Software:** Make

**Version Control:** Git, BitBucket

**Databases:** PostgreSQL

## POSTER PRESENTATIONS

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**Conference on Computing in High Energy Physics (CHEP)**  
*FPGA Implementation of the General Triplet Track Fit*

Kraków, Poland

23.10.2024

## CAMPUS ACTIVITIES

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**Hacettepe University Physics Society**  
*Founding Member*

Ankara, Turkey

13.11.2017 – 04.10.2021

- Initiated and organized interdisciplinary conferences, workshops, excursions, and public outreach events to promote physics and foster inclusive scientific engagement across diverse age groups and communities.

## LANGUAGE SKILLS

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**Turkish:** Native Language

**English:** C1 (CEFR)

**German:** B1 (CEFR)

**French:** A1 (CEFR)

## FIELD OF INTERESTS

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**High Energy Physics**

**Computational Science**

**Mathematical Methods in Physics**

**Machine Learning**

## HOBBIES

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Hiking, Backpacking, Cooking, Kayaking, Playing Electric Guitar, Birdwatching, Science Communication