Mert Dil
M.Sc. Physics Student | Student Assistant | Physics Engineer
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My Academic Portfolio

Education

Technical University of Munich (TUM) Munich, DE
Master of Science in Physics (Applied and Engineering Physics) 10/2024 to Current

- Relevant Coursework: Computational Methods in Many-Body-Physics, Concepts of Modern Statistics and Data Analytics in Particle Physics, Gravitational Lenses, High Resolution Astronomy , Plasma Physics
- Research Focus: Open to computational and data-driven research in physics ranging from modeling, simulation, analysis

Istanbul Technical University (ITU) Istanbul, TR
Bachelor of Science in Physics Engineering 09/2018 to 03/2023
CGPA 3.1 (Equivalent to 2.4 in the German Grading System)

- Bachelor Thesis: Simulated missing kinematic properties in ttbar events via GANs to improve MET identification accuracy using CMS MC Root datasets. (MET Identification in TTbar Events)
- Statistical Physics Course Project: Developed LSTM models for solar wind forecasting using NASA Goddard datasets. (Space Environment Forecast with Deep Learning)
- Relevant Coursework: Astrophysics, Statistical Learning from Data, Probability and Statistics, Python Programming, Computational Physics (Fortran & C++), Mathematical Methods in Physics (MatLab), OptoElectronics, Electronics

Research Experience

Istanbul Technical University, CERN - CMS Research Group (Onsite) Istanbul, TR
Undergraduate Research Assistant, Bachelor Thesis Student 03/2022 to 01/2023
Advisor: Prof. Dr. Altan Çakır
Bachelor Thesis: MET Identification in TTbar Events

- Particle Physics Detection Methods: Developed a proof-of-concept WGAN-GP to approximate ROOT-based $t\bar{t}$ Monte Carlo simulations, aiming to cut computational load in statistics regimes for indirect dark matter detection.
- Particle Simulation: Integrated detector signal reconstruction with dark matter kinematics to optimise multi-lepton event identification under EM-interference and limited experimental precision.

Sabanci University, Materials Science ve Nano Engineering (Remote) Istanbul, TR
Undergraduate Research Assistant, PURE 2020 Summer Program 06/2020 to 10/2020
Advisor: Prof. Dr. Emre Erdem
Capstone Poster: Investigated of defect structures in metal oxides via experimental data techniques

- Spectroscopy Simulation: Simulated Electron Paramagnetic Resonance spectra of ZnO via EasySpin (MATLAB) to characterize defect-driven semi conductivity, correlating spectroscopy outcomes with X-ray diffraction data.
- Research Results: Presented findings at PURE 2020 Colloquium (audience of 20+ research groups) and published poster on ZnO electrochemical properties.

Istanbul Technical University, Liquid Crystal Lab (Onsite) Istanbul, TR
Undergraduate Research Assistant 06/2019 to 03/2020
Advisor: Prof. Dr. Sevtap Yıldız Özbek

- Light Diffraction: Designed and executed laser-based diffraction experiments on organic liquid crystal systems, linking optical phenomena to molecular alignment.
- Simulation Analysis: Applied LabView & Python for real-time data acquisition and analytical modeling, demonstrating strong interdisciplinary data-handling aptitude.

Employment

Max Planck Institute for Plasma Physics (IPP), Physics of the Plasma Edge Division (Hybrid) Garching, DE
Student Assistant,Working Student (20 hrs/week) 10/2025 to Current

- Joined the team to contribute to machine learning support for ion cyclotron resonance heating (ICRH), focusing on integrating physics-based understanding with data-driven approaches.
- Beginning work on Feedforward Neural Network (FNN) algorithm development for plasma parameter estimation and potential deployment in heating control frameworks.
- Engaged in initial research support tasks, learning experimental workflows and model integration strategies for plasma heating diagnostics.

German Aerospace Center (DLR), Institute of Vehicle Concept (Remote) Stuttgart, DE
Student Assistant, Working Student (15hrs/week) 04/2025 to 09/2025

- Hybrid Modeling of Battery Degradation: Co-developed hybrid degradation models for Li-ion, Na-ion, and solid-state batteries using LSTM and KAN architectures integrated with first-principles constraints.
- Simulation Data Integration: Integrated experimental and simulation datasets for estimation of State of Health/Charge (SoH/SoC) under chemical and thermal variability, supporting long-term battery forecasting.
- Research Support: Conducted uncertainty quantification and aligned model frameworks with current literature to support sustainable energy research.

TFI Tab Food Investments (Remote) Istanbul, TR
Analytics Specialist, Data Analyst (40hrs/week) 06/2023 to 03/2025

- Data Analysis: Led cross-company data research across 12 firms, building PowerBI & Qlik Sense pipelines for finance/HR that delivered actionable insights for revenue forecasting and workforce analytics.
- Research & Development: Built and evaluated predictive models for salary optimization and workforce turnover, reducing new hire attrition by 40% across 5 case studies.

Dogus Technology (Hybrid) Istanbul, TR
Advanced Analytics, Data Analyst (40hrs/week) 07/2022 to 06/2023

- Research & Development: Spearheaded research-oriented ML projects across automotive and construction domains; deployed supervised learning methods to enhance safety prediction accuracy by 85%.
- IoT Sensing Data & Computer Vision: Designed and implemented vision-based image classification systems for vehicle recognition tasks (16K+ images), combining IoT and perception pipelines.

Dogus Technology (Remote) Istanbul, TR
Intern, Data Analyst (20hrs/week) 08/2021 to 09/2021

- Automotive Sales Analysis: Analyzed multi-year automotive sales trends using SQL and Python, generating real-time insights for strategic planning.
- Logistic Regression Research: Developed logistic regression models for service-level failure prediction, linking operational variables to customer retention patterns

Core Competencies

Scientific Computing & Programming:

- Python (advanced),
- SQL (advanced),
- MATLAB (upper intermediate),
- C++ (intermediate),
- Fortran (basic)

Physics Toolkits & ML (Intermediate):

- Computational Physics and Applications: MC Simulations, Root, Uproot, Apache Spark
- ML Techniques (Upper Intermediate): Supervised & Unsupervised Learning, Neural Networks (RNN, LSTM, GAN)

Languages & Certifications

Languages:

- **Turkish**: Native Speaker - C2
- **English:** Professional Working Proficiency - C1,
- **French**: Intermediate - B1,
- **German**: Everyday conversation - A2 (Improving)