

With my strong theoretical, experimental, and computational physics background, and a record of hands-on work with dynamical systems, I offer solutions to complex real-world problems through mathematical modeling, data analysis, and computation. Open to relocate for the right opportunity.

Education

MSc in Financial Mathematics , <i>Middle East Technical University</i>	2026 — Present
• Focused on probability theory and computational methods for financial modeling.	
PhD in Physics , <i>Middle East Technical University</i>	2024 — Present
• Thesis: $\gamma\gamma \rightarrow \mu^+\mu^-/e^+e^-$ Production in Proton-Proton Collisions at CMS	
MSc in Physics , <i>Middle East Technical University</i>	2021 — 2024
• Thesis: Solving Simple Quantum Systems Using Bootstrapping • TÜBİTAK BİDEB 2210-A Merit Scholarship	
BSc in Physics , <i>Middle East Technical University</i>	2014 — 2020
• Project: Study of Nonlinear Dynamics and Chaos in Double Pendulum System	

Experience

CERN <i>Doctoral Researcher</i>	2025 — Present Remote
• Developing data analysis tools to isolate $\gamma\gamma \rightarrow \ell^+\ell^-$ production from the dominant Drell-Yan background in proton-proton collision data at CMS	
Izmir University of Economics <i>Research Assistant</i>	2023 — 2024 Izmir, Turkey
• Conducted laboratory sessions and recitations for undergraduate physics courses	
METU Center for Space and Accelerator Technologies (İVMER) <i>Technical Leader — Scientific Project Specialist — Undergraduate Researcher</i>	2020 — 2023 Ankara, Turkey
• Developed and implemented an information entropy measure for N-dimensional data sets • Mathematically modeled and simulated nonlinear dynamical systems, performed chaotic analysis to determine optimal conditions for maximal unpredictability • Developed an entropy extraction algorithm using real-time image processing, exceeding project throughput requirements by x1080 and statistically validated through NIST SP 800-90B and SP 800-22 test suites • Designed and built high entropy nonlinear dynamical systems from material selection to production, achieving 97.5% of theoretical maximum entropy • Supervised 7 undergraduate researchers; co-authored 3 senior thesis projects	

Projects

Bootstrapping Quantum Systems
• Applied the bootstrap method to the Schrödinger equation to compute energy eigenvalues numerically using positivity constraints on moment sequences • Developed an iterative numerical approach to mitigate floating-point precision errors in the bootstrap algorithm • Validated against analytical and numerical solutions for the harmonic oscillator, anharmonic oscillator, and hydrogen atom, achieving high precision
Quantum Random Number Generator <i>1st Place, Quantum Technologies Hackathon (KTHack 2020) — Industrial & Technological Solutions</i>
• Built a hardware quantum random number generator using Am-241 alpha decay, a photodiode detector, and an Arduino • Implemented HotBits and Even-Odd bit extraction algorithms • Statistically validated through NIST-STS and Dieharder test suites, benchmarked against IBM-Q, ANU QRNG, and Mersenne Twister

Skills

Programming:	Python (NumPy, SciPy, Pandas, OpenCV), MATLAB, Mathematica, ROOT
Tools:	Git, Linux/Bash, LaTeX
Languages:	Turkish (Native), English (Fluent)