Muhammed Hasan

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Education

Siirt University **Sep 2021 – May 2025**

Bachelor of Engineering in Mechanical Engineering *Siirt, Turkey*

- **Relevant Coursework:** Thermodynamics, Heat Transfer, Fluid Mechanics, CFD, Materials Science, Renewable Energy

Research Interests

Renewable Energy Systems | Green Hydrogen | Nuclear Energy Systems | Energy Storage & Sustainable Materials | Thermal Management Engineering | Computational Modeling (CFD, FEA) | AI Applications in Energy | Quantum Computing

Research Experience

TUBITAK 2209A Research Program **Mar. 2024 – Mar. 2025**

Undergraduate Researcher — Supervisor:Dr.M. Raşit ATELGE *Siirt, Turkey*

- Synthesized high-performance supercapacitor electrodes from agricultural waste via two-stage carbonization (600°C) and KOH chemical activation (800°C), **achieving 7.98 F/g** specific capacitance
- Executed **27 systematic electrochemical characterization experiments** CV, GCD, EIS across 0–1.0 V potential.
- Analyzed experimental data using **OriginPro** to optimize electrode morphology and electrochemical properties.

Clean Energy Laboratory **Jun. 2024 – Aug. 2024**

Research Intern *Siirt, Turkey*

- Engineered a six-nozzle spray cooling system reducing PV module temperatures by **15°C** (from 70°C to 55°C).
- This thermal improvement yielded a **30.7% efficiency improvement** and **26% power output increase** for 80W .
- Collaborated on a **research publication** focused on solar thermal management through spray-cooling experiments.

Presentations

- **Hasan, M., and Bayrak, F. (2025, May)**. Comparative assessment of photovoltaic cell temperature models and power output performance. 7th International Bogazici Scientific Research Congress, Istanbul, Turkey.
- **Hasan, M., and Bayrak, F. (2025, May)**. Impact of ambient temperatures and discharge rates on lithium-ion battery thermal performance. Sivas International Conference on Scientific and Innovation Research, Sivas, Turkey.
- **Hasan, M., and Atelge, M. R. (2024, Feb)**. Synthesis and Electrochemical Characterization of Food Waste-Derived Active Carbon for High-Performance Supercapacitor Electrodes. Batman University, Turkey.

Honors & Awards

- **TUBITAK 2209A Research Grant** (2024) – Competitive national grant for energy storage materials research.
- **Third Place, International YES Challenge** (2023) – Selected from 50+ teams (7 continents).
- **National Finalist (6th Place) , Teknofest Nuclear Energy Competition** (2024) – Ranked 6th of 100+ university teams for 135 MWe thorium molten salt reactor design
- **National Finalist, Teknofest Environment and Energy Competition** (2024) – Selected from 171+ university teams for hybrid battery cooling system.
- **Finalist (Top 10), Eksim Pulse Ideathon** (2025) – Selected from 50+ teams for AI-driven vertical farming proposal.
- **Semifinalist, 3T in Oncology AI Competition** (2025) – Led 5-member team on ML pipeline for lung cancer biomarker.
- **Semifinalist, Technological Applications in Psychology Competition** (2025) – Led 10-member team building assessment app with wearable sensor data.

Professional Experience

Deneyap Technology Workshops, T3 Vakfı **Mar. 2024 – Present**

Instructor Mentor *Siirt, Turkey*

- Mentor **20+** students in robotics, **Arduino programming (C++)**, and **CAD design (Fusion 360)**.
- Provide hands-on guidance and troubleshooting for student projects (**hardware, firmware, debugging**).

Technical Leadership & Competitions

Jet Engine Design Competition: Team Lead | *CFD (ANSYS), Additive Manufacturing* **Dec. 2024 – Apr. 2025**

- Led a nine-member team designing a jet combustion chamber for **1200°C** thermal conditions.
- Utilized **additive manufacturing** principles and **CFD optimization** for the final design.

Nuclear Energy Technologies Design Competition: Design Engineer | *Reactor Modeling,* **Jul. 2024 – Oct. 2024**

- Developed a comprehensive thermodynamic model of a **135 MWe** subcritical **Thorium Molten Salt Reactor**.
- Coupled reactor design with proton-beam subcritical assistance and a **supercritical CO2 Brayton cycle**.

Environment and Energy Technologies Competition: Team Lead | *Battery Cooling* **Nov. 2023 – Sep. 2024**

- Reduced battery temperatures by **31%** (from 55°C to 38°C) at 3C discharge using a **nanofluid-PCM-microchannel**
- Mitigated thermal runaway by maintaining cell-to-cell uniformity (within **±3°C**) during abuse-scenario testing.

Projects

Senior Design Project: Green Hydrogen Feasibility Study | *HOMER Pro, Modeling* **Feb. 2025 – Jun. 2025**

- Designed a grid-connected **PV-BESS system** with green hydrogen production for the Siirt University campus.
- Conducted technical-economic feasibility analysis using **HOMER Pro** to optimize LCOE and **LCOH**.

EcoRay.ai: QML Energy Forecasting | *Pennylane, Quantum ML* **GitHub**

- Implemented a **Quantum Neural Network Pennylane** to forecast renewable energy power output (solar and wind).
- Optimized a hybrid quantum-classical architecture to achieve a Mean Absolute Percentage Error **(MAPE) below 5%**.

Cognition X: NLP System | *PyTorch, BERT, SpaCy* **GitHub**

- Developed a **BERT-based** text classification system (**PyTorch**, **SpaCy**) achieving **89% accuracy** on datasets.
- Optimized model efficiency via quantization and pruning, **reducing inference latency by 35%** for edge devices.

Volunteer App (Backend) | *Node.js, MongoDB, Passport.js, Swagger* **GitHub**

- Led a small team through two sprints to build a web application connecting volunteers with social causes.
- Designed the backend architecture, database schema (**Mongoose**), and implemented a **REST API** with Swagger.
- Implemented **Passport.js** for robust authentication, supporting **JWT**, OAuth, and local strategies.

Technical Skills

Simulation & Modeling: ANSYS (CFD, Thermal), SolidWorks, Fusion 360, MATLAB/Simulink, HOMER Pro
AI & Data Science: Python, PyTorch, TensorFlow, Keras, Pennylane, scikit-learn, NLTK, SpaCy, Pandas, NumPy
Dev, Web & Lab Tools: Git, Docker, Linux, Node.js, Next.js, MySQL, MongoDB, Arduino, OriginPro, MS Office

Professional Development

Faradai Clean Technology Entrepreneurship Program | *Clean Tech, Business Models* **Mar 2025 – Jun 2025**

- Completed 12-week accelerator program in **clean technology innovation**, business model development, and commercialization.

Global Student Experience | *Schneider Electric — Power Systems, AI* **Jul 2023 – Aug 2023**

- Completed service track on power systems and presented analysis on the intersection of **green energy and AI**.

Nuclear Physics and Fusion Technology Program | *TÜBİTAK — Reactor Physics* **Sep 2024**

- Received advanced training in **reactor physics**, plasma confinement systems, and magnetic fusion engineering.

Industry 4.0 – PLM Event Program | *Ege University — Digital Manufacturing* **Sep 2024**

- Professional development in **digital manufacturing**, smart factory systems, and sustainable engineering practices.

Backend Development BootCamp | *Re:Coded — Backend Architecture* **Mar 2023 – Sep 2023**

- Comprehensive training in **backend architecture**, database management, and **RESTful API** development.

Languages

Kurdish (Native) | **Arabic** (Native) | **Turkish** (Fluent) | **English** (Fluent)