Husam Elnager

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Education

MASSACHUSETTS INSTITUTE OF TECHNOLOGY **Sep 2023 – Dec 2026**
B.S. in Chemical Engineering and B.S. in History GPA: 4.6/5.0 *CAMBRIDGE, MA*

Coursework

- Separation Processes
- Polymer Lab
- Transport Processes
- Kinetics and Reactors
- Fluid Mechanics
- Thermodynamics
- Organic Chemistry
- Intro Process Engineering

Experience

PHILLIPS 66 **June 2025 – August 2025**
Midstream Engineering Intern *HOUSTON, TX*

- Supported commissioning efforts and early operations of a new $450M+ gas plant, contributing to pipeline flow assurance, compression optimization, and equipment testing.
- Analyzed fluid transport data to identify inefficiencies and recommended pipeline routing and control valve adjustments, reducing pressure drop by 12% and enhancing flow reliability.
- Collaborated with operations and engineering teams to implement safety and environmental compliance protocols during plant startup and early-stage operations.

MIT ELECTROCHEMICAL ENERGY LAB **Feb 2024 – May 2025**
Researcher *CAMBRIDGE, MA*

- Led a project on the electrocatalytic conversion of sludge to ammonia achieving a 20% increase in yield compared to baseline
- Tested novel anode-cathode complexes that improved battery cycle efficiency by 15%.

PROTIUM TECHNOLOGIES **Jan 2025 – Feb 2025**
Research and Development Engineer Intern *DUBAI, UAE*

- Developed super-absorbent polymer for flood relief, capable of absorbing 300x its weight in water, protecting sensitive sites.
- Enhanced material performance and scalability of existing absorbent polymer technology while reducing production cost by 13%.

PETRA ENGINEERING **Jun 2024 – Aug 2024**
Refrigeration Engineer Intern *AMMAN, JORDAN*

- Designed refrigeration systems for custom industrial HVAC units for the U.S. market.
- Tested the implementation of recently developed environmentally friendly refrigerants to comply with new Department of Energy requirements on CO2 emissions.

Projects

Gravity-Driven Water Filtration System

- Engineered a passive water filtration system that removes heavy metals and bacteria from contaminated water.
- Designed and tested a layered filtration approach, combining activated carbon, ion-exchange resins, and biological filtration techniques.
- Achieved significant contaminant reduction, making the system suitable for low-resource environments.

First Tech Challenge "Freight Frenzy" Competition

- Served as the Lead Programmer for the autonomous and teleoperated control components. Assisted with the mechanical design of step motor modules.
- Part of the 1st Place Winning Alliance at the Roboplex Texas "Freight Frenzy" competition.

Carbon Capture System

- Designed and built a carbon capture system that utilizes potassium hydroxide (KOH) and a vacuum mechanism to extract CO2 from the air.
- Developed a process for regenerating KOH for repeated use, improving the system's efficiency and sustainability.

Leadership / Extracurricular

MIT STUDENT CULTURAL ASSOCIATION **Sep 2023 – Current**
President and Committee Chair *CAMBRIDGE, MA*

- Planned and managed large-scale events and meetings for an organization with over 200 members.
- Managed funding for the $90,000 annual budget of the association