

# Mekdes Hailu

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## Profile Summary

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Dynamic and detail-oriented Mechanical Engineer with a Master of Science in Mechanical Engineering. Currently working as a **Development Engineer** at Jinsol Turbo Machinery, I am responsible for the design and development of advanced **cooling jackets** for high-speed motors and **compact heat exchangers** for refrigeration cycles. My role encompasses conceptualization, design, and execution, including the development of software to size and rate compact heat exchangers. I have successfully completed two major projects, including designing specialized cooling systems for high-speed motors to improve system efficiency and reliability. Additionally, I provide freelance **CAD engineering** services focused on 3D modeling, 2D drafting, and dynamic simulations for various industrial clients.

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## WORK & LEADERSHIP EXPERIENCE

### Jinsol Turbo Machinery

*Development Engineer – Fulltime*

**Daejeon, Korea**

*June. 2023 - Present*

- Designed a cooling system for the Perigee Electric Pump, focusing on cooling the electric motor. Introduced a spiral fin design to maintain the base temperature at 75 degrees Celsius.
- Developed a cooling system for the Unastella electric motor, 150KW, ensuring compliance with pressure drop and temperature specifications.
- Currently in progress: Developing a software tool for sizing and rating of offset-strip fin and wavy fin compact heat exchangers. Utilized Python for numerical simulation and software development.
- Currently in progress: Designed intercooler, recuperator, and sub cooler for a Brayton cycle, focusing on efficiency and performance optimization.

### MADECA

*Engineer – Part-time – Remote*

**Germany**

- Currently designing advanced harvesting nets for macro algae using **Autodesk Inventor** to enhance efficiency and sustainability.
- Preparing a research funding application, which involves strategic planning and developing a business model to secure project financing.

### Korea Testing

*Motion Analysis Engineer - Parttime*

**Daejeon, Korea**

*May 2023 - Present*

- Conduct motion analysis for industrial objects using **Autodesk Inventor** and mathematical models to optimize movement and performance.
- Create virtual models and executes simulations to analyze industrial systems, objects, and processes for performance optimization.
- Apply **computational fluid dynamics** (CFD) to simulate and optimize fluid flow, heat transfer, and related phenomena in industrial applications

### Karlsruher Institute of Technology

*Apprenticeship – Joint project with a fellow researcher*

**Karlsruhe, Germany**

*April 2023 – Present*

- Assembling and integrating robots onto a carrier to create a functional system where the movements of the robots are analyzed and optimized for improved performance. **Autodesk Inventor**
- Design a spring locking mechanisms and trays for BOSCH electric motor parts, assembling and configuring stations, and extracting 3D models from 2D drawings.

### KAIST – Research Assistance, MEMS Fabrication

*Master's Thesis*

**Daejeon, Korea**

*January 2021 – Feb 2023*

- I presented research findings at the KSME conference on Near-field thermal radiation between two parallel MgF<sub>2</sub> dielectric plates.
- Designing** and testing a new **experimental setup**, it was possible to overcome the limitations of the previous setup and gain three additional degrees of freedom, as well as improved control vacuum nano-gap distance.
- Experienced in various **MEMS** fabrication techniques such as **E-beam deposition**, **Double-side alignment**, **RIE**, **Spin-coating**, **Dicing**, **Wet etching**, **SEM**, **Alpha scanning**, **AFM**, and **FT-IR**.

### Horizon Academy

*Teaching Assistance – Parttime*

**Daejeon, South Korea**

*April 2021 – June 2023*

- Enhanced school visibility by effectively promoting the institution to attract more students and identifying new business opportunities for growth.
- Conducted market research, developed, and managed the English course website, ensuring continual updates to content and technical features.
- Provided English instruction to a diverse student group, including elementary, middle, high school, and adult learners.
- Specialized in teaching IELTS and TOEFL examination preparation courses, equipping students with the skills necessary to succeed in these assessments.

### KAIST – Mechanical Engineers International Student Organization (MEISO)

*Leading Committee*

**Daejeon, South Korea**

*Mar 2022 – Present*

- I managed the organization of an Alma Mater Program, overseeing the allocation of a **20 million KRW** budget to cover program costs.
- Establishing MEISO, including website launch, publishing manual, organizing social events, Q&A sessions, to foster relationships among international students in KAIST.
- Welcomed new students and organized events specifically designed for mechanical engineering students to enhance community engagement and learning opportunities.

#### **KAIST - ISSS Student Representative**

**Daejeon, South Korea**

*Parttime*

*Sep 2020 – Sep 2021*

- Served as a student representative, addressing and resolving complaints and issues on behalf of students.
- Represented students in various meetings and seminars, effectively voicing collective concerns and contributions.

#### **KAIST – Student Mentor**

**Daejeon, South Korea**

*Parttime*

*Mar 2021 – Dec 2022*

- I provided mentoring and guidance to new students at KAIST, assisting with coursework, consulting on campus life, and leading campus tours

#### **East Africa Bottling Share Company - Coca-Cola**

**Addis Ababa, Ethiopia**

*Internship*

*Mar 2018 – July 2019*

- Collecting and analyzing customer data to develop insights and inform business decisions, such as product development, marketing campaigns, and customer service initiatives.
- Maintenance of production line and machinery, including work with carbon dioxide and wastewater plants.
- Proposed and implemented a production line optimization solution, resulting in annual savings of approximately \$200,000.

### **EDUCATION**

#### **Korean Advanced Institute of Science and Technology (KAIST)**

**Daejeon, South Korea**

*Master of Science in Mechanical Engineering*

#### **Addis Ababa Institute of Technology (AAiT)**

**Addis Ababa, Ethiopia**

*Bachelor of Science in Mechanical Engineering*

#### **Scholarships:**

*Full Ride KAIST Scholarship, Aklilu Lemma Foundation, XCMG scholarship*

#### **Publications:**

MGF<sup>2</sup> 박막 유전체 피복된 SiO<sub>2</sub> 사이의 근접장 복사 열전달. Mekdes Hailu<sup>\*, \*\*, †</sup>, Jihye Han, Jaeman Song, Minwoo Choi and BongJae Lee. 2022 KSME conference

#### **Other Affiliations:**

KAIST Ethiopian Community President (Mar 2020 – March 2021), Young African Leaders Initiative Network (Oct 2019 – Present), Volunteering at Jilchiul Small library as an English tutor (September 2021 – May 2023), AAiT student council (Sep 2014 – July 2019), Batch Representative, Director of Ethiopian Mechanical Engineers Student Association (July 2014 – July 2019)

### **SKILLS**

*Languages:*

**English:** Full professional proficiency, **Amharic:** Fluent proficiency, **Korean:** Elementary Proficiency, German: Elementary Proficiency

*Computer:*

**ANSYS Fluent, Solid Works, Inventor:** Advanced Proficiency, **MATLAB, Python, C++:** Intermediate Proficiency,