

MOSTAFA BABAEI

PhD Candidate

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Professional Summary

Dynamic Research Assistant and PhD candidate specializing in thermodynamic modeling, renewable energy systems, and industrial decarbonization. With extensive expertise in process integration and high-temperature heat pump design, I have successfully contributed to optimizing energy solutions and publishing impactful research in leading journals. Experienced in interdisciplinary collaboration, mentorship, and teaching advanced energy concepts, I am committed to driving innovation, fostering teamwork, and delivering practical, sustainable energy technologies.

Skills

- Energy Systems Optimization
 - Coding (MATLAB, Python)
 - Research Writing & Communication
 - Teaching & Mentorship
 - Data Analysis
- Thermodynamic Modeling
 - Techno-Economic Analysis
 - Teamwork & Collaboration
 - Project Management
 - Microsoft Office

Work History

Research Assistant

08/2022 to Current

University Of Geneva – Geneva, Switzerland

- Conducted literature reviews to identify research gaps and support energy system development.
- Designed and optimized simulations for high-temperature heat pumps and process integration.
- Collaborated with teams on publications and technical presentations.
- Managed project timelines to deliver high-quality results under deadlines.

Teaching Assistant

08/2022 to Current

University Of Geneva – Geneva, Switzerland

- Teaching the *Pinch Analysis* course, designing materials and assignments while providing constructive feedback.
- Guiding students in field-based courses like *Environnement Alpin et Sociétés*, focusing on practical applications.
- Supporting student learning by clarifying complex concepts and offering tailored explanations.

Research Assistant

02/2019 to 05/2022

K.N. Toosi University of Technology – Tehran, Iran

- Led projects on multi-generating plants with renewable energy and storage systems.
- Supervised research on energy optimization and system integration.
- Conducted feasibility studies for CCHP plants with renewable and storage technologies.
- Developed sustainable energy configurations and applied machine learning for optimization.

Intern

06/2018 to 03/2020

Niroo Research Institute – Tehran, Iran

- Researched hybrid energy systems and thermal energy storage for hydrogen applications.
- Improved refrigeration efficiency using hybrid cycles and nanoparticle enhancements.
- Supported staff, analyzed problems, and contributed to innovative solutions.
- Applied knowledge to industry projects and presentations.

Education

Ph.D.: Environmental Science 08/2022 to Current

University of Geneva - Geneva, Switzerland

- Conducting research under the **SWEET DeCarbCH** project (*Decarbonizing Heating and Cooling in Switzerland*), funded by the **Swiss Federal Office of Energy (SFOE)**.
- Focusing on **decarbonizing the Swiss industry** through process integration methods and assessing novel, energy-efficient heating and cooling technologies.

M.Sc.: Mechanical Engineering (Energy Systems) 09/2019 to 05/2022

K.N. Toosi University of Technology - Tehran, Iran

- **Thesis:** Thermodynamic analysis of an innovative hybrid multi-generating liquid air energy storage system. Awarded a perfect thesis mark: **20.00/20.00** .
Overall GPA: **18.73/20** (4.0/4.0).
- **Key Achievements:**
Ranked **1st** among students in the Energy Systems Faculty, Department of Mechanical Engineering (Summer 2021).

B.Sc.: Mechanical Engineering 09/2014 to 02/2019

K.N. Toosi University of Technology - Tehran, Iran

- **Thesis:** Scrutinizing the effect of nanoparticle addition to a novel absorption-recompression refrigeration system. Awarded a thesis mark of **19.00/20.00** (4.0/4.0).
- **Key Achievements:** Ranked in the **top 2%** among ~300,000 applicants in the Nationwide Universities Entrance Exam for Undergraduate Studies (Konkoor) (Summer 2014).

Publications

1. *Quantifying the effect of nanoparticle addition to a hybrid refrigeration cycle.* (*Journal of Cleaner Production*, 2020)
2. *Thermodynamic analysis and optimization of a hybrid LAES system.* (*Journal of Energy Storage*, 2021)
3. *Comprehensive analysis of a biomass-driven CHP plant with CAES.* (*Energy Conversion and Management*, 2022)
4. **Under Review:** *Optimizing Energy Use in the Pulp and Paper Industry.*
5. **Ready for Submission:** *Deep Decarbonization of Pulp and Paper Production.*

Languages

English	Persian
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Bilingual or Proficient (C2)	Bilingual or Proficient (C2)
French	German
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Elementary (A2)	Beginner (A1)