

# Keivan Rahmanihezaki

Chemical Engineer (Process and Innovation)

(ML, Data Analytics, Process, Modeling, P&ID)

[keivanrahmanihezaki@gmail.com](mailto:keivanrahmanihezaki@gmail.com) - [LinkedIn Profile](#)

(+39) 3518151676- Rome, Italy, ON (willing to relocate)



europass

## SUMMARY OF QUALIFICATIONS

---

Recently graduated with a Master's in Chemical Engineering from Sapienza University of Rome, focusing on sustainability, process control, Data Analytics, and Algorithm Development. I am passionate about applying my academic knowledge industrially to build a better society. I collaborated with Technip Energies during my Master's thesis to develop a physics-informed algorithm for CO<sub>2</sub> adsorption prediction, aiming to reduce net CO<sub>2</sub> emissions. I also worked as a research assistant for two years in Carbon Capture (CCU and CCS) methods. I am proficient in applying ML techniques using Excel, Aspen Plus, MATLAB, Python, COMSOL, ML, and Tableau for chemical engineering and data analysis. I am eager to learn and develop new skills while exploring new experiences and perspectives.

## WORK EXPERIENCE

---

### Collaboration in Master's Thesis with Technip Energies Company

Sept 2024 – May 2025

- Machine Learning for Estimation of Vapor-Liquid Equilibrium of Amine Mixtures
- Collected and built a dataset of over 82,000 data points, consisting of 7,517 rows and 11 columns, covering 33 different amines from experimental literature, and developed a stacked model using a physics-informed Artificial Neural Network and a Random Forest model. K-fold cross-validation was applied in Python to improve model accuracy for predicting CO<sub>2</sub> loading in amine solvents (accuracy in Real test: 96.4%)
- Utilized MATLAB and Python for data cleaning and outlier detection, and employed Aspen Plus ThermoData Engine to extract thermodynamic properties of amines for feature engineering in model development.
- Conducted in collaboration with Technip Energies Company, with regular progress reviews as part of a competitive inter-university project
- Manuscript currently in preparation for submission to an Elsevier journal

### Research Assistant

Sept 2019 – Jun 2021

- Analyzed CO<sub>2</sub> sequestration performance, including data gathering and environmental impact assessments.
- Conducted process modeling and mineral carbonation research using AspenPlus and Aspen HYSYS
- Published Q1 paper: A review of mineral carbonation by alkaline solid waste in International Journal of Greenhouse gases and Control (DOI: <https://doi.org/10.1016/j.ijggc.2022.103798>)

## Selected Projects

---

### Performance and Energy Analysis of a Solid Oxide Electrolyzer for Hydrogen Production

Oct 2023 – Jan 2024

- Analyzed electrolyzer performance by evaluating hydrogen production rates, calculating make-up water demand, assessing external heat requirements, and comparing the efficiency of two recovery system designs (Simulated by PROII)

### Double-Pipe Heat Exchanger Analysis

May 2023 – Dec 2024

- Developed a MATLAB simulation using the finite-volume method to analyze heat transfer in parallel and counterflow configurations. Applied momentum and energy balances, adimensionalization, and numerical discretization to study the effects of design and operating parameters on temperature distribution and system efficiency

### Two CSTRs in Series Analysis

May 2023 – Dec 2024

- Modeled and analyzed two CSTRs performing first-order reactions, deriving equilibrium points and stability behavior. Used MATLAB to simulate system dynamics and visualize phase-space responses under varying input conditions

### Computational Methods for Chemical and Biochemical Reactor Dynamics

Jan 2024 – Oct 2024

- Numerical Calculation of the Consumption of Two Biochemical Species inside a Bioreactor modeled as a system of nonlinear ODEs by Fortran

## EDUCATION

---

### **Master of Chemical Engineering (Process and Innovation)**

University of Sapienza, Rome (GPA: 9.09/10)

Sept 2022 - May 2025

**The Master's program was entirely conducted in English**

### **Bachelor of Chemical Engineering**

Azad University, Science and Research Branch (GPA: 16.54/20)

Sept 2017 - March 2021

## **Professional Training & Summer School (Denmark Technical University)**

---

### **International Summer School on Underground Hydrogen Storage (UHS) DTU**

July 2025

- Participated in a focused program covering key scientific and engineering challenges in underground hydrogen storage. Topics included leakage risk assessment, reservoir monitoring, microbial activity, and H<sub>2</sub>-water-mineral interactions.

## **VOLUNTEER EXPERIENCE**

---

### **Academic Writing Support Volunteer**

Assisted undergraduate students with thesis writing and research article preparation, focusing on structure, referencing, and academic clarity

### **Library Assistant (Volunteer)**

Helped reorganize the university library's inventory and compiled a list of high-demand, unavailable books based on student requests

## **Language Skills**

---

- English: Fluent (C1) | Italian: Intermediate (B1) | Deutsch: Intermediate (B1) | Persian: Native

