

# KAI RUTH

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<https://github.com/Kai360-dot>

## TECHNICAL SKILLS

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**Programming  
Software & Tools  
Skills**

C++, Python, HTML/CSS, Bash, Unix, GAMS  
Aspen Plus, OpenFOAM, Autodesk Inventor/Fusion360, ORCA  
CFD, CAD, PFDs & P&IDs, systems modeling,  
mathematical programming, process optimization,  
embedded systems, additive manufacturing, laser cutting

## EXPERIENCE

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### Industry internship

March 2025 - June 2025

*Internship at F. Hoffmann-La Roche, Basel: evaluated DSC thermal methods, implemented model-free kinetics in Python, and developed multiphysics/CFD models to predict pressure evolution in thermal safety tests*

### Research project

September 2023 - June 2024

*Membrane-less alkaline electrolysis prototypes via additive manufacturing (plate and tubular): designed and tested 3D-printed cells, investigated sealing, gas separation and ohmic losses, and issued design guidelines — Stark-Group (ICB, ETH Zurich)*

### Semester Project

September 2025 - December 2025

*Developed novel surrogate-based algorithms for solving high-dimensional recycle loops in process simulators. Implemented Gaussian Process surrogates and a Surrogate Fixed Point (SFP) acquisition strategy that successfully converged 48-dimensional flowsheet problems where state-of-the-art Bayesian optimization methods failed — SUPERLab, Group of Prof. Gonzalo Guillén-Gosálbez (ICB, ETH Zurich)*

### Teaching Assistant

September 2022 - Present

Inorganic Chemistry (529-0012-02L)

General Chemistry (529-2001-02L)

### Tutor

2020 - 2024

*Teaching Math, Physics and Chemistry to high-school and university students*

## EDUCATION

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### ETH Zurich, Switzerland

Chemical Engineering BSc.

September 2021 - September 2024

Process Engineering MSc.

September 2024 - Present

### Ferdinand Porsche High School, Germany

High School Degree

July 2020

## AWARDS

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### Mathematics Award (top of graduating class)

July 2020

### Chemistry Award (top of graduating class)

July 2020

### Sustainability Award

July 2020

## LANGUAGES

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**German, English**

Fluent

**French, Russian**

Basic

## EXTRA-CURRICULAR

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Member of ETH Zurich's Student Biolab, supporting student-led research and organizing hackathons  
Prototyped projects and supported fellow students at ETH Zurich's Student Project House

Last Update: December 11, 2025