

Diego Renner

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 [DiegoRenner](#)

</> C++, Python, Rust

Date of Birth: 29.08.1995

Nationality: Swiss

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(Items relating to projects and papers are clickable.)



EDUCATION

■ ETH Zürich

M.Sc. Mathematics

Zurich, Switzerland

September 2021 - December 2023

- Degree completed with a thesis on differentiable haemodynamics solver in JAX (Python).

■ ETH Zürich

M.Sc. Computational Science and Engineering, Specialization Physics

Zurich, Switzerland

September 2018 - August 2021

- Degree completed with a thesis on solving the transmission scattering problem using BEM (C++).

■ Universität Basel

B.Sc. Computational Mathematics

Basel, Switzerland

September 2014 - Februar 2018

- Completed extracurricular courses on Computer Architecture, Operating Systems and Quantum Mechanics.

■ Gymnasium Bäumlihof

Matura, Specialization Biology & Chemistry

Basel, Switzerland

August 2009 - July 2014

PROJECTS & THESIS

- Parallelizing the Barnes-Hut Algorithm with MPI: Parallelized implementation of N-Body solver in C++ using the MPI framework. (Course Work)
- AiiDA Lab implementation of IR spectrum calculations for carbon based nanomaterials: An AiiDa workflow implemented in the Jupyter Notebooks based AiiDa lab interface. (Semesters Thesis, Computational Science)
- Near Resonances for Scattering Transmission Problems: A BEM based C++ solver for Scattering Transmission Problems, developed to investigate scatterer-dependent near resonances. (Master's Thesis, Computational Science)
- Detecting Near Resonances in Acoustic Scattering: Continued development of root finding algorithm from the Master's Thesis using empirical evidence and state of the art computation of singular values. (Published Paper)
- ML based game simulation in a finance setting: Agents trained to trade or hold a stock taking into account real historical data on cash returns. Policies are learned via reinforcement learning. (Course Work)

- On differentiable simulations of haemodynamic systems: A 1D-haemodynamics solver written in Python using JAX. The differentiability of the solver aims to aid in the development of personalised medicine. (Master's Thesis, Mathematics)

PUBLICATIONS

- Detecting Near Resonances in Acoustic Scattering: Continued development of root finding algorithm from the Master's Thesis using empirical evidence and state of the art computation of singular values. (Published)
- On differentiable simulations of haemodynamic systems: A 1D-haemodynamics solver written in Python using JAX. The differentiability of the solver aims to aid in the development of personalised medicine. (Work in Progress)
- Raman spectroscopy enabled automatic media release controlled by convolutional neural networks. (Work in Progress)

EXPERIENCE

- Novartis Pharma AG** Basel, Switzerland

MSc Student Proc Dev & New Technologies

June 2024 - December 2024

- o Developing ML/AI algorithms for classifying Raman spectroscopy data.

Technologies: imbalanced-learn, JAX, Matplotlib, NumPy, scikit-learn, SciPy, TensorFlow

Theory: (C)NN, DoE, GMM, PCA, SMOTE

- plantime** Basel, Switzerland

Software Engineer

January 2024 - Today

- o Developing ML/AI algorithms for optimizing shift scheduling.

Technologies: Rust

Theory: Evolutionary optimization algorithms

- ETH Zürich** Zurich, Switzerland

Teaching Assistant

Sepember 2021 - February 2022

- o Teaching Assistant for Lecture "Numerical Methods for Computer Science".

Technologies: C++

Theory: ODEs, PDEs and numerical algorithms to solve them

- ETH Zürich** Zurich, Switzerland

Research Assistant

September 2020 - June 2021

- o Hired for continued development of BEM code that was implemented in Master's Thesis.

Technologies: C++, CMake, Git

Theory: BEM, Resonances in Transmission Scattering Problems

- ETH Zürich** Zurich, Switzerland

Teaching Assistant

September 2020 - February 2021

- o Teaching Assistant for Lecture "Numerical Methods".

Technologies: C++, CMake

Theory: ODEs, PDEs and numerical algorithms to solve them

- CSCS Swiss National Supercomputing Center** Lugano, Switzerland

Internship

May 2018 - August 2018

- o Writing regression checks for Piz Daint, Cray XC40/XC50 production system.

Technologies: C, MPI, MySQL, Kibana, Grafana

CERTIFICATES & EXTRACURRICULARS

- **Ready, set, go! A short introduction for Student Teaching Assistants** (remote) Zurich
Education Development and Technology, ETH Zurich April 2020
 - Improving didactic skills
 - Setting goals for upcoming teaching activity

- **Effective High-Performance Computing & Data Analytics with GPU** (remote) Lugano, Switzerland
Summerschool, CSCS-USI July 2020
 - GPU: architecture & programming (CUDA, OpenACC)
 - JupyterLab
 - Python: Numpy, SciPy, Dask, Numba
 - ML: Rapids
 - Deep Learning: TensorFlow

- **International Consulting Network (ICON)** Shanghai, (remote) Belo Horizonte
Student Consulting Network March 2017 - Februar 2018
 - Market Research & Trend Analysis consulting for CREP (Real Estate, China) & Lalubema (Private Security, Brazil)

VOLUNTEERING

- **Mapathon@Novartis with the Swiss Red Cross** Basel
Tracing maps in underserved areas for risk reduction and disaster response. October-November 2024

- **Jugendsession** Bern
Formulating demands to be passed on to the Parliament: Neutrality in Media. November 2011

- **Jugendsession** Bern
Formulating demands to be passed on to the Parliament: Electronic Voting. November 2009

NAMED REFERENCES

- **Dr. Andreas Jocksch**
Senior Research Software Engineer
 - Phone: +41 91 610 82 32
 - Mail: andreas.jocksch@cscs.ch
Relation: Supervisor during internship at CSCS on writing regression checks for Piz Daint, Cray XC40/XC50 production system.

- **Prof. Dr. Ralf Hiptmair**
Full Professor and Deputy head of Dep. of Mathematics / Head of Seminar for Applied Mathematics at ETH Zürich
 - Phone: +41 44 632 34 04
 - Mail: ralf.hiptmair@sam.math.ethz.ch
Relation: Supervisor of Computational Science Master's Thesis on solving the transmission scattering problem using BEM (C++).

▪ **Prof. Dr. Siddhartha Mishra**

Full Professor at the Dep. of Mathematics / Deputy head of Seminar for Applied Mathematics at ETH Zürich

- Phone: +41 44 632 75 63
- Mail: siddhartha.mishra@sam.math.ethz.ch

Relation: Supervisor of Mathematics Master's Thesis on differentiable haemodynamics solver in JAX (Python).

▪ **Dr. Georgios Kissas**

Post Doctoral Fellow at ETH AI Center + BAUG + MAVT + SAM

- Phone: +41 78 969 95 77
- Mail: gkissas@ai.ethz.ch

Relation: Co-Supervisor of Mathematics Master's Thesis on differentiable haemodynamics solver in JAX (Python) and Supervisor of publication thereof.