

Rafael Bischof

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Education

Eidgenössische Technische Hochschule Zürich - ETHZ

DOCTORAL CANDIDATE

2024 - present

Eidgenössische Technische Hochschule Zürich - ETHZ

M.Sc. COMPUTER SCIENCE - FOCUS ON DATA SCIENCE

2019 - 2022

École Polytechnique Fédérale de Lausanne - EPFL

B.Sc. COMPUTER SCIENCE

2016 - 2019

Experience

Postfinance

DEVOPS ENGINEER

Sep 2023 - Feb 2024

- Database and application pipeline optimization, focusing on the implementation of innovative solutions to enhance efficiency, reliability, and collaboration in software development and database management.

M&M Network-ING UG

CONSULTING MACHINE LEARNING ENGINEER

2021 - present

- *Temp-AI-Estimator* with SICCC Coatings GmbH and Abu Dhabi Ports - Conception, implementation, and publication of a DL project towards a domain-informed DL model to predict interior temperatures in buildings and containers. [Demo] [Publication]
- *StrengthLabAI* with Kuraray Europe GmbH - Conception, implementation, and publication of a custom Mixture-of-Experts DL model for predicting structural responses of glass structures under loads.

IBM Research

MACHINE LEARNING ENGINEER INTERNSHIP

Mar 2023 - Aug 2023

- Autonomous visual inspection and monitoring of civil infrastructure: Developing, implementing, and optimising cutting-edge algorithms and machine learning models for real-time monitoring and assessment of infrastructure health.

Swiss Data Science Center (SDSC)

DATA SCIENTIST

Apr 2022 - Feb 2023

- Develop and deploy data science and machine learning solutions in collaboration with researchers from various academic disciplines of the ETH Domain.

Research in Orthopedic Computer Science - Balgrist University Hospital

RESEARCH ASSISTANT

Dec 2021 - Apr 2022

- Development of computer-aided, simulation-based planning tools as well as the use of Machine Learning and Augmented Reality to support surgeons during the operation.

Institute of Structural Engineering - ETHZ

RESEARCH ASSISTANT

Aug 2021 - Dec 2021

- Study applications of Machine Learning for problems in Civil Engineering, i.e. Physics-Informed Neural Networks, Generative Adversarial Networks for Beam and Bridge Design, Finite Elements - AI Hybrids for faster inference.

Selected Publications

Temp-AI-Estimator: Interior Temperature Prediction using Domain-Informed Deep Learning [PDF][Demo]

R. BISCHOF, M. SPRENGER, H. RIEDEL, M. BUMANN ET AL.

2023

- Published in Energy and Buildings

Design Space Exploration via Conditional Variational Autoencoders for Meta-model-based Conceptual Design of Pedestrian Bridges [PDF]

VERA M. BALMER, R. BISCHOF, SOPHIA V. KUHN, LUIS SALAMANCA, ET AL.

2022

- Submitted to Computational Intelligence For Engineering Solutions (IEEE CIES).

Mixture-of-Experts-Ensemble for Physics-Informed Neural Networks [PDF]

R. BISCHOF, M. A. KRAUS

2022

- Forum for Civil Engineering Informatics, Munich, 2022

Multi-Objective Loss Balancing for Physics-Informed Deep Learning [PDF][Code]

R. BISCHOF, M. A. KRAUS

2021

- GTC AI Developer Conference 2022
- Implemented in Modulus framework by NVIDIA

Conferences & Talks

Forum for Civil Engineering Informatics

MUNICH

September 2022

- Presentation of *Mixture-of-Experts-Ensemble Meta-Learning for Physics-Informed Neural Networks*

GTC AI developer conference

NVIDIA

March 2022

- Poster presentation of *Multi-Objective Loss Balancing for Physics-Informed Deep Learning*.

Machine Learning + X Seminars

BROWN UNIVERSITY

November 2021

- Presentation of and discussion about the publication *Multi-Objective Loss Balancing for Physics-Informed Deep Learning*.

Honors

German Innovation Award 2024

BERLIN

2024

- Awarded to the *Temp-AI-Estimator* project embedded in the *KI-Calculus* submission. [Award][PDF]

Extracurricular Experience

Webtrics GmbH

INTERNSHIP & FREELANCE

2017 - 2022

- Development and maintenance of web solutions for local- as well as international clients.
- Creation of multimedia for marketing purposes, i.e. text, images, videos or animations.

Swiss Football Association - SFV

REFEREE 2. DIVISION

2015 - 2023

- Ensure regular match operations with assistant referees, players, officials and spectators.

YouReport

VOLUNTEERING REPORTER & COACH FOR PRODUCTION OF VIDEOS

2016 - present

- Creation of promotional and documentary videos for charitable organisations or clubs in the region of Bern.
- Coaching of young newcomers by giving courses as well as hands-on in the field.