







# Jérôme Sieber

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## Personal information

Year of birth: **1993**

Citizenship: **Swiss**

Languages: **English, German**

## Personal statement

I am currently a postdoctoral researcher at ETH Zurich specializing in artificial intelligence, control theory, and robotics, having recently completed my Ph.D. in these fields. Throughout my research career, I have been a strong advocate for interdisciplinary collaboration, successfully leading projects that applied control theory to various robotics applications. Towards the end of my Ph.D., I expanded this approach to deep learning models, resulting in two publications in top-tier conferences including NeurIPS and ICLR. My current research focuses on enhancing the robustness and interpretability of deep learning models, working to address critical challenges in AI safety and reliability. I am now seeking opportunities to build upon this foundation, particularly focusing on projects that advance the theoretical understanding of deep generative models for real-world applications.

## EXPERIENCE

### Postdoctoral Researcher at ETH ZURICH

Current

Theoretical foundations of deep sequence models

- Researching the theoretical underpinnings of deep generative models, focusing on transformers and state space models (SSMs)

### Doctoral Researcher at ETH ZURICH

Jan. 2020 – Nov. 2024

Control Theory and Artificial Intelligence with Prof. Dr. Melanie N. Zeilinger

*Thesis:* A System Level Robust Model Predictive Control Framework with Asynchronous Computations

*Committee:* Prof. Dr. Melanie N. Zeilinger (*ETH Zurich*)  
Prof. Dr. Eric C. Kerrigan (*Imperial College London*)  
Dr. David Sanchez de la Llana (*European Space Agency*)

- Developed new optimization-based predictive control algorithms for robust control of uncertain dynamical systems
- Designed a new asynchronous computation scheme for real-time application of the developed control algorithms
- Built a small-scale electric model rocket for experimental validation, including the software stack based on ROS (C++/Python)
- Leveraged system and control theoretic tools to analyze deep state space models (Mamba), transformers, and recurrent neural networks (RNNs)
- Proposed new or improved architectural components for deep sequence models using previous theoretical analyses
- Supervised and mentored several student projects, including two student teams, four master theses, and ten other projects

### Research Assistant at ETH ZURICH

Fall 2019

Co-lead for building an autonomous racing platform from scratch

- Co-developed a software stack for autonomous racing – including a numerical simulator, an estimation pipeline, and a control framework – in ROS (C++/Python)
- Designed an automated deployment and development environment for the platform using Docker and Bash scripts
- Established guidelines for further development and maintenance of the platform, including a CI/CD pipeline
- A limited version of the platform is available on [GitLab](#) and the accompanying paper is available on [arXiv](#)

### Student Researcher at SENSIRION

Sep. 2017 – Jul. 2018

Software Engineering

- Developed drivers for humidity and temperature sensors in C/C++
- Performed data analyses for different application engineering teams to evaluate their prototypes and proof-of-concept experiments

### Intern at SENSIRION

Fall 2016

Application Engineering

- Developed a wearable prototype for perspiration sensing using two humidity sensors
- Designed a proof-of-concept study to evaluate the prototype in real-world scenarios

## AWARDS

### Excellence Scholarship & Opportunity Award

2017

Awarded to the best applicants of an ETH master programme.

### Outstanding D-MAVT Bachelor Award

2014

Awarded to the top five students in first-year examinations.

## Skills

### Legend

- ● ● Proficient
- ● ○ Intermediate
- ○ ○ Beginner

### Programming Languages

- Python ● ● ●
- C/C++ ● ● ○
- Bash ● ● ○
- MATLAB ● ● ○
- HTML/CSS ● ○ ○
- Triton ● ○ ○

### Programming Frameworks

- PyTorch ● ● ●
- JAX ● ● ○
- TensorFlow ● ● ○
- ROS ● ● ○
- OpenAI Gym ● ● ○
- OpenAI Baselines ● ● ○

### Optimization Frameworks

- CVXPY ● ● ●
- YALMIP ● ● ●
- CasADi ● ● ○
- Acados ● ● ○
- MPT3 ● ● ○

### General Tools

- Linux ● ● ●
- Latex ● ● ●
- Git ● ● ●
- CI/CD ● ● ○
- Docker ● ● ○

## EDUCATION

- Dr. sc. in *Control Theory & Artificial Intelligence* from ETH ZURICH 2020 – 2024
- MSc in *Robotics, Systems, and Control (RSC)* from ETH ZURICH 2017 – 2019  
GPA: 5.77/ 6.0 (with distinction)
- Thesis:* Safe Multi-Agent Reinforcement Learning  
*Research Project:* Computer vision based feature extraction for activity recognition in simulated surgical scenarios
- Exchange semester at the UNIVERSITY OF PENNSYLVANIA Spring 2017  
GPA: 3.93/ 4.0
- BSc in *Mechanical Engineering* from ETH ZURICH 2013 – 2016  
GPA: 5.66/ 6.0
- Thesis:* Towards Predictive Vehicle Stability Control

## SELECTED PUBLICATIONS

- A full list of my publications is available on [Google Scholar](#).
- Understanding the Differences in Foundation Models: Attention, State Space Models, and Recurrent Neural Networks.* NeurIPS (arXiv:2405.15731), 2024.  
**J. Sieber**, C. Amo Alonso, A. Didier, M. N. Zeilinger, A. Orvieto.
- Lambda-Skip Connections: the Architectural Component that prevents Rank Collapse.* submitted to ICLR (arXiv:2410.10609), 2024.  
F. Arangath Joseph, **J. Sieber**, M. N. Zeilinger, C. Amo Alonso.
- Computationally Efficient System Level Tube-MPC for Uncertain Systems.* submitted to Automatica (arXiv:2406.12573), 2024.  
**J. Sieber**, A. Didier, M. N. Zeilinger.

## TEACHING

- Teaching Assistant** at ETH ZURICH 2020 – 2023  
Subject: Advanced Model Predictive Control
- Co-developed recitation material from scratch, including slides, problem sets, and Python programming exercises to teach advanced predictive control concepts
  - Held weekly recitations and some lectures for a class of 40 students
- Summer School Instructor** at ETH ZURICH 2021 – 2023  
Subject: Various Topics in Control Theory
- Taught a block course on signal processing at Ashesi University in Ghana
  - Co-developed and taught an online block course on automatic control held at ETH Zurich, at the University of Grenoble, and at the Data Science Summer School (DS3)

## ACADEMIC ACTIVITIES

- Co-Organizer** of the third L4DC in Zurich/Virtual 2021  
Learning for Dynamics and Control Conference
- Reviewer** 2020 – present
- Journals: Automatica (Elsevier), Transactions on Automatic Control (IEEE), Control Systems Letters (IEEE), Journal of Robust and Nonlinear Control (Wiley)
  - Conferences: NeurIPS, ICLR, ICML, L4DC, CDC, IFAC World Congress