

Marius P. Furter

Curriculum Vitae

University of Zurich
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Personal Data

Full Name Marius Paul Furter
Date of Birth 6 November 1994
Nationalities Switzerland / United States of America
Languages Native English and German speaker.

Education

2022–present **PhD Mathematics**, *University of Zurich*
Compositional dynamic modeling of biosystems
Advisor: Prof. Alberto Cattaneo
2019–2022 **BSc Mathematics**, *University of Zurich*
Single Major
2017–2019 **MSc Interdisciplinary Sciences**, *ETH Zurich*
Major: Biology and Chemistry
Master Thesis: *Engineering Myoglobin Towards Halogenase Activity*
Supervisor: Prof. Donald Hilvert
2012–2017 **BSc Interdisciplinary Sciences Bio-Chem.**, *ETH Zurich*
2006–2012 **Bilinguale (D/E) Maturität**, *Freies Gymnasium Zürich*

Teaching

Lecture Courses

Spring 2023/2025 **MAT605 Logic and Foundations in Haskell**, *University of Zurich*
I taught this course on logic and foundations for mathematics bachelor's students. The course used the functional programming language Haskell to implement concepts as they were introduced.

Supervised Theses

Fall 2024 **Bachelor Thesis**, *Luisa Stückelberger*, Sample-Efficient and Interpretable Bayesian Model-Based Reinforcement Learning
Thompson sampling in an environment modeling sepsis treatment.
Spring 2024 **Semester Thesis**, *Justin Bollhalder*, Categorical Constructions in the Field of Logic
Basic topos theory and its applications in logic.
Spring 2024 **Master Thesis**, *Mattia Bottoni*, Teaching with LEAN
Co-supervised with Elif Sacikara.
Fall 2023 **Semester Thesis**, *Anna Stoll-Bickel*, Relations and Relationships: A Mathematical Approach to Kinship and Marriage Systems
Mathematical modeling of kinship and marriage systems using relations.

Online Lecturing

2020-present **YouTube Channel**, www.youtube.com/@mariusfurter

I have published over 80 math video lectures. The channel has over 4'000 subscribers and receives 900 hours of watch-time per month. It includes series on

- Topology
- Category Theory
- Mathematical Logic
- Graph Theory

Student Seminars

Spring 2024 **MAT676 Nonstandard Analysis**, *University of Zurich*

Fall 2022 **MAT746 Euclidean Geometry**, *University of Zurich*

Teaching Assistant

Fall 2023 **MAT701 Topology**, *University of Zurich*

Held tutorial sessions, wrote exercise sheets, graded exercises and wrote the exam for the course.

Fall 2022 **MAT182 Analysis for for Natural Scientists**, *University of Zurich*

Supervised the course forum.

Spring 2022 **MAT183 Probability and Statistics for Natural Scientists**, *University of Zurich*

Supervised the course forum.

Fall 2021 **MAT182 Analysis for Natural Scientists**, *University of Zurich*

Held tutorial sessions and corrected exercise sheets.

Fall 2021 **MAT101 Programming**, *University of Zurich*

Held tutorial sessions and wrote exercise sheets on Python programming.

Spring 2021 **Applied Compositional Thinking for Engineers**, *ETH Zurich*

Volunteering

2020–present **Tutor at 'incluso LERNstudio'**, *Caritas Zurich*

Every week I help displaced persons who are pursuing an apprenticeship with their homework.

Publications

- [1] Puca E, Schmitt-Koopmann C, Furter M, Murer P, Probst P, Dühr M, Bajic D, and Neri D. The targeted delivery of interleukin-12 to the carcinoembryonic antigen increases the intratumoral density of NK and CD8⁺ T cell in an immunocompetent mouse model of colorectal cancer. *Journal of gastrointestinal oncology*, 08 2020.

Posters

2023 **Probabilistic Signaling Networks**, *Presented at Applied Category Theory conference*.

Describes an approach for mechanistic modeling of cellular signaling networks in Markov categories.

Grants

2022–2026 **PhD Excellence Program Scholarship**, *Digital Society Initiative*, University of Zurich

I was awarded this scholarship for my PhD project proposal '*Compositional dynamic modeling of biosystems*'. Participation in the PhD Excellence program included taking 12 ECTS of courses that focused on the societal effects of digitalization. The program fostered interaction between participants from various backgrounds including political sciences, media sciences, computer sciences, philosophy and law.

Visiting Positions

Fall 2024 **Visiting Student**, Prof. Gieole Zardini, Massachusetts Institute of Technology

In this 4-month research stay, I worked on integrating probabilistic uncertainty into the monotone co-design framework.

Computer skills

	Level	Skill	Active Years	Comment
Programming	■■■□□	Julia	2	<i>Probabilistic programming in Turing and Gen. ODE modeling with Modeling-Toolkit and Catalyst. Data science with DataFrames, JuliaStats and Makie.</i>
	■■■□□	R	6	<i>Working with tidyverse. Bayesian statistics with rstanarm. Web applications in shiny.</i>
	■■■□□	Python	5	<i>Numpy, matplotlib, PyTorch.</i>
	■■□□□	Haskell	5	
	■□□□□	Lean	1	<i>Automated theorem proving.</i>
Web	■■□□□	HTML	1	
	■■□□□	JavaScript	1	
	■■□□□	React	1	<i>Built an interactive network editor.</i>
Typesetting	■■■□□	L ^A T _E X	6	<i>Used daily for most writing.</i>
Media	■■■□□	Premier Pro	5	<i>Edited over 100 hours of video footage.</i>
	■■□□□	Illustrator	5	<i>Logos and thumbnails.</i>
	■■□□□	Photoshop	5	
Office	■■■□□	Microsoft Office	20	<i>Word, Excel, PowerPoint.</i>
	■■■□□	Apple	4	<i>Pages, Keynote, Numbers.</i>

■□□□□	basic knowledge	■■■□□	extensive project experience
■■□□□	intermediate knowledge with some project experience	■■■□□	deepened expert knowledge
		■■■□□	expert / specialist

Laboratory skills

I am well versed in standard laboratory techniques in the fields of Molecular Biology, Biochemistry and Organic Chemistry.

Last updated: February 9, 2025.