Moritz Schäfer

curriculum vitæ

Personal data

Date of birth	06th of January 1992
Place of birth	Tübingen, Germany
Nationality	german

Studies/Titles

Postdoctoral Studies

2022-02 to now	at MedUni Vienna & CeMM
Advisor	Christoph Bock

Doctor of Sciences (Dr. sc. ETH Zürich)

2018-09 to 2022-02	Doctoral studies
University	ETH Zurich
Department	Biology
PhD program	Systems Biology
Supervisor	Prof. Dr. Constance Ciaudo
2021-11-05	PhD thesis defense
2022-04-13	PhD awarded
Title	One layer at a time disentangling canonical and noncanonical roles of the RNAi pathway in embryonic stem cells

Master of Science (M. Sc.)

2015-09 to 2018-05	at Technical University Berlin
Subject	Computer Science
Grade	1.1
2018-05-10	Master's thesis
Title	*PAVOOC - An AI integrated web-app for CRISPR target recommendation*
Grade	1.0
Supervisor	Prof. Dr. Manfred Opper
Assistant Supervisor	Dr. Andreas Steffen

Bachelor of Science (B. Sc.)

2012-09 to 2016-08	at Technical University Berlin
Subject	Computer Science
Grade	1.9
2013-09 to 2014-02	at University of La Laguna, Spain
2015-09 to 2016-05	at Jiao Tong University Shanghai

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2016-05-17 Bachelor's thesis at Jiao Tong University

Title *Intercultural comparison of emotion recognition with EEG - A first attempt*

Grade 1.3

Supervisor Prof. Dr. Bao Liang Lu (SJTU Shanghai)

Prof. Dr. Benjamin Blankertz (TU Berlin)

Education

2008-09 to 2011-06 at Gewerbliche Schule Tübingen, Germany

2011-06-07 German Abitur with honors

Grade 1.2

Publications

2024 **Moritz Schaefer**, Stephan Reichl, Rob ter Horst, Adele M. Nicolas, Thomas Krausgruber, Francesco Piras, Peter Stepper, Christoph Bock, and Matthias Samwald. GPT-4 as a biomedical simulator. *Computers in Biology and Medicine*, volume 178, page 108796, 2024.

2024 **Moritz Schaefer**, Peter Peneder, Daniel Malzl, Anna Hakobyan, Varun S. Sharma, Thomas Krausgruber, Jörg Menche, Eleni Tomazou, and Christoph Bock. Joint embedding of transcriptomes and text enables interactive single-cell RNA-seq data exploration via natural language. In *ICLR 2024 Workshop on Machine Learning for Genomics Explorations*, 2024.

2022 Madlen Müller*, **Moritz Schaefer***, Tara Fäh, Daniel Spies, Victoria Hermes, Richard Patryk Ngondo, Rodrigo Peña-Hernández, Raffaella Santoro, and Constance Ciaudo. Argonaute proteins regulate a specific network of genes through klf4 in mouse embryonic stem cells. *Stem Cell Reports*, volume 17, pages 1070–1080, 2022.

2022 Madlen Müller, Tara Fäh, **Moritz Schaefer**, Victoria Hermes, Janina Luitz, Patrick Stalder, Rajika Arora, Richard Patryk Ngondo, and Constance Ciaudo. Ago1 regulates pericentromeric regions in mouse embryonic stem cells. *Life Science Alliance*, volume 5, page e202101277, 2022.

2022 Marco Grodzki, Andrew P. Bluhm, **Moritz Schaefer**, Abderrahmane Tagmount, Max Russo, Amin Sobh, Roya Rafiee, Chris D. Vulpe, Stephanie M. Karst, and Michael H. Norris. Genome-scale CRISPR screens identify host factors that promote human coronavirus infection. *Genome Medicine*, volume 14, page 10, 2022.

2021 **Moritz Schaefer**, Amena Nabih, Daniel Spies, Maxime Bodak, Harry Wischnewski, Patrick Stalder, Richard Patryk Ngondo, Luz Angelica Liechti, Tatjana Sajic, Ruedi Aebersold, David Gatfield, and Constance Ciaudo. Integrative Analysis Allows a Global and Precise Identification of Functional miRNA Target Genes in mESCs. *bioRxiv (in revision)*, 2021.

2020 **Moritz Schaefer** and Constance Ciaudo. Prediction of the miRNA Interactome - Established Methods and Upcoming Perspectives. *Computational and Structural Biotechnology Journal*, volume 18, pages 548–557, 2020.

2018 **Moritz Schaefer**, Djork-Arne Clevert, Bertram Weiss, and Andreas Steffen. PAVOOC: Designing CRISPR sgRNAs using 3D Protein Structures and Functional Domain Annotations. *Bioinformatics*, 2018.

2017 Si-Yuan Wu, **Moritz Schaefer**, Wei-Long Zheng, Bao-Liang Lu, and Hiroshi Yokoi. Neural patterns between Chinese and Germans for EEG-based emotion recognition. *8th International IEEE/EMBS Conference on Neural Engineering (NER)*, 2017.

Conference contributions

2024-08-30 Invited Talk @ AstraZeneca Applied Data Science Seminar

2024-07-08 Invited Talk @ Virtual workshop on Cell Perturbation Modeling

2024-05-11 Poster "You can talk to cells now" (spotlight) @ ICLR 2024 MLGenX workshop

2024-04-26 Invited Talk @ EU-LIFE Utopia Conference

2024-04-16 Talk @ Postdoc Networking day Vienna

2023-02-27 Invited Talk "Diffusion Models for Targeted Antibody Design" @ C'est la Wien PhD workshop

2023-01-26 "Applying Diffusion Models to Protein Design" @ 47th Deep Learning Vienna meetup

2022-03 to today MedUni AI Institute seminar chair

2022-09-09 CeMM research institute seminar chair

2022-04-26 "Design of arbitrary binding domains for versatile chimeric antigen receptors" Talk @ Postdoc Networking day Vienna

2020-11-24 "Scientists and Society - let's talk!" Panel discussion moderation at OILS Zurich

2019-01-25 "Uncovering the roles of RNA interference proteins in mouse embryonic stem cells" Poster at Swiss RNA workshop in Bern

Research projects (undergrad)

2016-10 to 2017-02 Generation of arbitrary-sized fragments for *ab initio* protein structure prediction in Rosetta

2014-10 to 2015-05 Development of a reliable multi-channel RSS measurement tool for Wireless Sensor Networks

2010-09 to 2011-04 GPGPU-accelerated ray tracing with OpenCL at "Jugend forscht"

2009-09 to 2010-04 Development of an ultrasonic range analyzer for 3D localization at "Jugend forscht"

Scholarships

2016-10 to 2018-06 Deutschlandstipendium supported by General Electrics Germany

2015-10 to 2016-10 Deutschlandstipendium supported by Carmeq GmbH

Collaborations & grant writing

2023 WWTF 23 call "Integrating Experimental and Computational Binding Screens with Deep Learning to Predict and Design pH-sensitive Protein-Protein Interactions" (round 2 pending

2022 MSCA doctoral network grant "AI in Inflammatory Research" (85.8%, not funded)

2022-07 to today "Deep Learning-driven antibody design" collaboration with Technical University Berlin

2020-03 to 2022-01	"SARS-CoV2 CRISPR screens" collaboration with University of Florida

Supervision & Teaching

2022-06 to 2023-01	Master thesis "Deep Learning-driven antibody design"
2022-04 to 2024-06	Lectures and seminars in "Molecular Precision Medicine" master program

Further Qualifications

Computer skills

Bioinformatics	OMICs, Data Integration, Python/Pandas, Snakemake
Machine/Deep Learning	pytorch, scikit-learn
Operating Systems	Linux/Emacs, (Windows, macOS)
Web	React, Flask
Software	LaTeX, Inkscape/Adobe Illustrator, MS Office

Wetlab skills

(s)RNA	extraction, handling, RT-qPCR, NGS
DNA	extraction, design, cloning, PCR/screening

Teaching

Lectures	Machine Learning
Seminars	Machine Learning and Bioinformatics
Student teaching	Wet Lab teaching for lab rotation students
Course teaching	Teaching Jupyter Notebooks, sRNA-seq analysis and data integration via Zoom

Language skills

German	native language
English	fluent
Spanish	fluent
Chinese	notions, HSK3

Social & representative commitment

2024-xx to today	EU-LIFE Postdoc Working Group
2023-03 to today	Postdoc representative (CeMM)
2022-03 to today	MedUni AI Institute seminar coordinator
2022 & 2024	Long Night of Research Vienna - CeMM representation

AMB (academic staff representation at ETH)

2020-03 to today	Treasurer
2019-10 to 2020-09	Representative at Departments Conference (ETH Biology)
2019-02 to 2020-03	Event Manager

OILS (Open Innovation in Life Sciences)

2020-10 to 2021-03 Organization of panel discussions

- Scientists and Society - let's talk! - A panel discussion about science communication
- Open up for Open Science - A panel discussion about the state of Open Science in Zürich

Others

2019-10 to 2021-10 Organization of Systems Biology PhD program retreat

2014 to today Contribution to various open source software projects

2011-08 to 2012-09 Volunteering at school/nursery in Bolivia