Michael Deistler

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Education

PhD candidate, University of Tübingen — Tübingen, Germany
International Max-Planck Research School for Intelligent Systems — 02/2020 – 12/2024 (expected)
Advisor: Prof. Jakob Macke

M.Sc., Technical University of Munich — Munich, Germany
Elite Master of Science in Neuroengineering — 2017 – 2020
Passed with High Distinction, with Honors, German Grade - 1.1, American GPA - 3.9

Research Excellence Certificate, Technical University of Munich — Munich, Germany
Awarded for additional research and course work during M.Sc. studies — 2017 – 2020

B.Sc., Technical University of Munich — Munich, Germany
Bachelor of Science in Electrical Engineering and Information Technology — 2013 – 2017
Passed with High Distinction, German Grade - 1.2, American GPA - 3.8

Exchange semester, KTH Royal Institute of Technology — Stockholm, Sweden
Erasmus, German Grade - 1.3, American GPA - 3.7 — 2017

Highschool, Gymnasium Landau a.d. Isar — Landau, Germany
German Grade - 1.1, American GPA - 3.9 — 2013

Research experience

Doctoral Researcher — Tübingen, Germany
Supervised by Prof Jakob Macke, Machine Learning in Science — 02/2020 – 12/2024 (expected)
Bayesian inference; Probabilistic machine learning; Computational neuroscience

Research Intern — Zurich, Switzerland
Google, Youtube Trust and Safety, with Dr Ehsan Kazemi — four months, 2023
Out-of-distribution generalization; Active learning

Master's student — Munich, Germany
Technical University of Munich, with Prof Jakob Macke — six months, 2019
Identifying compensation mechanisms in neuroscience using simulation-based inference

Research Intern — Frankfurt, Germany
Max-Planck-Institute for Brain Research, with Prof Julijana Gjorgjieva — nine weeks, 2018

Research Intern — Edinburgh, UK
Institute for Adaptive and Neural Computation, with Dr Matthias H. Hennig — six weeks, 2018

Student Researcher (10h/week) — Munich, Germany
Brainlab AG, Research and Development — 2017 – 2018

Research Intern — Munich, Germany
BMW, Research Center for Autonomous Driving — Six months, 2016

Bachelor's student — Munich, Germany
Technical University of Munich, with Prof Eckehard Steinbach — Twelve weeks, 2016
Temporal Interpolation of Grayscale Frames using Event Data from the DAVIS240

Research Intern — Munich, Germany
German Aerospace Center, Research Center for Communication and Navigation — Eleven weeks, 2015

Publications

Peer-reviewed articles

Sebastian Bischoff, Alana Darcher, **Michael Deistler**,... (2024), A Practical Guide to Statistical Distances for Evaluating Generative Models in Science, *TMLR*

Manuel Gloeckler, **Michael Deistler**, Christian Weilbach, Frank Wood, Jakob H Macke (2024), All-in-one simulation-based inference, *ICML (oral)*

Jonas Beck, Nathanael Bosch, **Michael Deistler**, Kyra L Kadhim, Jakob H Macke, Philipp Hennig, Philipp Berens (2024), Diffusion Tempering Improves Parameter Estimation with Probabilistic Integrators for Ordinary Differential Equations, *ICML*

Mila Gorecki, Jakob H. Macke, **Michael Deistler** (2024), Amortized Bayesian Decision Making for simulation-based models, *TMLR*

Richard Gao*, **Michael Deistler***, Jakob H Macke (2023), Generalized Bayesian Inference for Scientific Simulators via Amortized Cost Estimation, *NeurIPS*

Manuel Gloeckler, **Michael Deistler**, Jakob H Macke (2023), Adversarial robustness of amortized Bayesian inference, *ICML*

Michael Deistler, Pedro J Gonçalves*, Jakob H Macke* (2022), Truncated proposals for scalable and hassle-free simulation-based inference, *NeurIPS*

Michael Deistler, Jakob H. Macke*, Pedro J. Gonçalves* (2022), Energy efficient network activity from disparate circuit parameters, *PNAS*

Jonas Beck, **Michael Deistler**, Yves Bernaerts, Jakob H. Macke, Philipp Berens (2022), Efficient identification of informative features in simulation-based inference, *NeurIPS*

Manuel Gloeckler, **Michael Deistler**, Jakob H. Macke (2022), Variational methods for simulation-based inference, *ICLR (spotlight)*

Maximilian Dax, Stephen R. Green, Jonathan Gair, **Michael Deistler**, Bernhard Schölkopf, Jakob H. Macke (2022), Group-equivariant neural posterior estimation, *ICLR*

Álvaro Tejero-Cantero*, Jan F. Boelts*, **Michael Deistler***, Jan-Matthis Lueckmann*, Conor Durkan*, Pedro J. Gonçalves, David S. Greenberg, Jakob H. Macke (2020), sbi—a toolbox for simulation-based inference, *Journal of Open Source Software*

Pedro J. Gonçalves*, Jan-Matthis Lueckmann*, **Michael Deistler***, Marcel Nonnenmacher, Kaan Öcal, Giacomo Bassetto, Chaitanya Chintaluri, William F. Podlaski, Tim P. Vogels, David S. Greenberg, Jakob H. Macke (2020), Training deep neural density estimators to identify mechanistic models of neural dynamics, *Elife*

Michael Deistler*, Yağmur Yener*, Florian Bergner, Pablo Lanillos, Gordon Cheng (2019), Tactile Hallucinations on Artificial Skin Induced by Homeostasis in a Deep Boltzmann Machine, *IEEE Conference on Cyborg and Bionic Systems*

Preprints

Michael Deistler, Kyra L Kadhim, Jonas Beck, Matthijs Pals, Ziwei Huang, Manuel Gloeckler, Janne K Lappalainen, Cornelius Schröder, Philipp Berens, Pedro J Gonçalves, Jakob H Macke (2024), Differentiable simulation enables large-scale training of detailed biophysical models of neural dynamics, *bioRxiv*

Richard Gao, **Michael Deistler**, Auguste Schulz, Pedro J Gonçalves, Jakob H Macke (2024), Deep inverse modeling reveals dynamic-dependent invariances in neural circuit mechanisms, *bioRxiv*

Yves Bernaerts, **Michael Deistler**, Pedro J Goncalves, Jonas Beck, Marcel Stimberg, Federico Scala, Andreas S

Tolias, Jakob H Macke, Dmitry Kobak, Philipp Berens (2023), Combined statistical-mechanistic modeling links ion channel genes to physiology of cortical neuron types, *bioRxiv*

Michael Deistler*, Martino Sorbaro*, Michael Rule, Matthias H Hennig (2018), Local learning rules to attenuate forgetting in neural networks, *arxiv*

Selected peer-reviewed abstracts

Michael Deistler, Pedro J Gonçalves, Jakob H Macke (2024), Training networks of biophysical neurons with thousands of parameters, *Computational and Systems Neuroscience, CoSyNe*

Michael Deistler, Jakob H Macke*, Pedro J Gonçalves* (2021), Disparate energy consumption despite similar network activity, *Computational and Systems Neuroscience, CoSyNe*

* indicates equal contribution

Software packages

sbi: Toolkit for simulation-based inference in PyTorch
- Role: Maintainer, since 2020
- Stats: Affiliated with NumFocus, 579 stars on Github, 150 daily downloads on PyPI, 233 citations

Jaxley: Differentiable simulator for partial differential equations in biophysics in JAX
- Role: Maintainer, since 2024
- Stats: 42 stars on Github

pyknos: PyTorch toolbox for conditional density estimation
- Role: Contributor, since 2020
- Stats: 25 stars on Github

Invited Talks

Tolias lab & Enigma Project, *Stanford University, California*	2024
Linderman lab, *Wu Tsai Institute, California*	2024
Max Planck Institute for Brain Research, *Frankfurt am Main, Germany*	2024
Deep Skies Lab, *University of Chicago & Fermilab*	2024
NERF, *Leuven, Belgium*	2023
Google Marketing, *Google London*	2023
Workshop 'Exploring synergies: Machine Learning meets Physics & Optimization', *Zuse Institute Berlin*	2023
Workshop 'Building population models for large-scale neural recordings', *University of Edinburgh*	2022
Workshop 'Simulation-based inference for scientific discovery', *University of Tübingen*	2021

Mentorship

Manuel Glöckler, Ph.D. thesis	2022-2024
Bálint Mucsányi, Lab rotation (now PhD student at University of Tübingen)	2022
Mila Gorecki, M.Sc. thesis (now PhD student at Max-Planck Institute for Intelligent Systems)	2022
Florian Schönleitner, M.Sc. thesis (now PhD student at ETH Zürich)	2021
Jonas Beck, M.Sc. thesis (now PhD student at University Hospital Tübingen)	2021
Manuel Glöckler, M.Sc. thesis (now PhD student at University of Tübingen)	2021

Teaching

Teaching Assistant, Uni. of Tübingen, *Probabilistic Machine Learning*, Jakob Macke	2024
Teaching Assistant, Uni. of Tübingen, *Data Literacy*, Jakob Macke	2023

Assistant Lecturer, Uni. of Tübingen, *Probabilistic Machine Learning*, Jakob Macke 2022
Teaching Assistant, Uni. of Tübingen, *Probabilistic Machine Learning*, Jakob Macke 2022
Lead Teaching Assistant, Uni. of Tübingen, *Seminar: ML for scientific discovery*, Jakob Macke 2020
Teaching Assistant, Technical Uni. of Munich, *Mathematics for Neuroengineers*, Jakob Macke 2019
Teaching Assistant, Technical Uni. of Munich, *Stochastic signals*, Wolfgang Utschick 2015-2019
Teaching Assistant, Technical Uni. of Munich, *Signal representation*, Gerhard Rigoll 2015
Teaching Assistant, Technical Uni. of Munich, *Digital Design*, Andreas Herkersdorf 2014

Review services

International conference on Learning Representations (ICLR) 2023,2024
Machine Learning for the Physical Sciences Workshop, NeurIPS 2022,2023,2024
International conference on Neural Information Processing Systems (NeurIPS) 2023
Syns and ML Workshop, ICML 2023
International Conference on Artificial Intelligence and Statistics (AISTATS) 2022

Community service & outreach

Simulation-based inference hackathon, Organiser University of Tübingen 2024
KI macht Schule, Tübingen group member Tübingen 2020-2023
ELLIS Doctoral Symposium, Co-organiser University of Tübingen 2021
Simulation-based inference workshop, Co-organiser University of Tübingen 2021

Awards

NeurIPS 2022 Scholar Award 2022
Travel-grant for the Bernstein Conference on Computational Neuroscience 2019
Member of the Elite-Network of Bavaria 2017-2020
Erasmus+ EU Grant 2017
Was offered the Fastlane scholarship of BMW (declined) 2017
'Lichtinger Preis' for an outstanding highschool degree in Natural Sciences 2013

Languages

German: native language
English: C2 (proficient, TOEFL score 115)
French: A2 (elementary)
Russian: A1 (elementary)

References

Jakob H Macke, Professor in Machine Learning for Science at University of Tübingen (Germany)
jakob.macke@uni-tuebingen.de

Pedro J Gonçalves, Group leader in Computational Neuroscience and Machine Learning at NERF (Belgium)
pedro.goncalves@nerf.be