# Temesgen Mehari

 tmehari
 Google Scholar
 mehari@hey.com

## Professional Experience

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|---|---|
| 01/2019 - 04/2020 | **Machine Learning Research Associate (Student)**<br>Fraunhofer Heinrich-Hertz Institute, Berlin<br>• Assist in scientific research in the field of Efficient Deep Learning |
| 05/2020 - 12/2020 | **Machine Learning Research Associate**<br>Fraunhofer Heinrich-Hertz Institute, Berlin<br>Working on Deep Learning for ECG data |
| 01/2021 - current | **Machine Learning Research Associate/PhD Student**<br>Physikalisch-Technische Bundesanstalt, Berlin<br>Scientific research in the field of Machine Learning for Electrocardiography data analysis: Self-supervised learning from 12-lead ECG data, Explainable AI for Deep ECG models, Robustness against physiological noise, Structured State Space Models for ECG, Publishing of an ECG Feature Dataset |

## Teaching Experience

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| 04/2015 - 09/2015 | **Teaching Assistant in the Lecture "Foundations of Computer Science II"**<br>Conduction of oral exams the students had to pass to be admitted for the exam; correction of exams |
| 10/2014 - 03/2015 | **Teaching Assistant in the Lecture "Mathematics I for Computer Scientists"**<br>Supervision of weekly practical learning sessions to help the students put the theoretical topics into practice; one office hour per week |

## Education

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| 01/2021 - Current | **Ph.D., Computer Science**<br>Technical University Berlin, Germany. |
| 04/2018 - 04/2020 | **M.Sc., Computer Science**<br>Technical University Berlin, Germany.<br>Major: *Cognitive Systems*<br>*Thesis: Towards efficient Backpropagation using dither and low-bit Quantizations* |
| 09/2017 - 03/2018 | **Erasmus+ Exchange:**<br>École Centrale de Lyon, France. |
| 09/2015 - 06/2016 | **Erasmus+ Exchange:**<br>Universidad Politécnica de Madrid, Spain. |
| 10/2013 - 04/2017 | **B.Sc., Computer Science**<br>Technical University Darmstadt, Germany.<br>*Thesis: Automatic Detection and Correction of Anomalies in Business Processes using Long short-term memory neural networks* |

## Languages and Skills

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| Languages | **German** (native), **Tigrinya** (native), English (Fluent), Spanish (Fluent), French (Fluent) |
| Skills & Interests | Numpy, Pandas, PyTorch, Tensorflow, Singularity, Efficient Deep Learning, Self-Supervised Learning, Explainable AI and Fairness in AI, Robust Machine Learning, Computer Vision, Time Series Classification |

# List of publications

[1] Philip J Aston et al. "Multi-Class ECG Feature Importance Rankings: Cardiologists vs Algorithms". In: *2022 Computing in Cardiology (CinC)*. Vol. 498. IEEE. 2022, pp. 1–4. DOI: 10.22489/CinC.2022.087. URL: https://ieeexplore.ieee.org/abstract/document/10081737.

[2] Temesgen Mehari and Nils Strodthoff. "Advancing the state-of-the-art for ECG analysis through structured state space models". In: *arXiv preprint arXiv:2211.07579* (2022). URL: https://arxiv.org/pdf/2211.07579.pdf.

[3] Temesgen Mehari and Nils Strodthoff. "Self-supervised representation learning from 12-lead ECG data". In: *Computers in biology and medicine* 141 (2022), pp. 105–114. DOI: 10.1016/j.compbiomed.2021.105114. URL: https://www.sciencedirect.com/science/article/pii/S0010482521009082.

[4] Temesgen Mehari and Nils Strodthoff. "Towards quantitative precision for ECG analysis: Leveraging state space models, self-supervision and patient metadata". In: *IEEE Journal of Biomedical and Health Informatics* 27.11 (2023), pp. 5326–5334. DOI: 10.1109/JBHI.2023.3310989. URL: https://ieeexplore.ieee.org/abstract/document/10237242.

[5] Temesgen Mehari et al. "ECG feature importance rankings: Cardiologists vs. algorithms". In: *IEEE Journal of Biomedical and Health Informatics* (2024), pp. 1–11. DOI: 10.1109/JBHI.2024.3354301. URL: https://ieeexplore.ieee.org/abstract/document/10400809.

[6] Nils Strodthoff et al. "PTB-XL+, a comprehensive electrocardiographic feature dataset". In: *Scientific data* 10.1 (2023), p. 279. DOI: 10.1038/s41597-023-02153-8. URL: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10183020/.

[7] Patrick Wagner et al. "Explaining deep learning for ecg analysis: Building blocks for auditing and knowledge discovery". In: *Computers in Biology and Medicine* (2024), p. 108525. DOI: 10.1016/j.compbiomed.2024.108525. URL: https://www.sciencedirect.com/science/article/pii/S0010482524006097.

[8] Simon Wiedemann et al. "Dithered backprop: A sparse and quantized backpropagation algorithm for more efficient deep neural network training. 2020 IEEE". In: *CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*. 2020, pp. 3096–3104.