

# MICHAEL MOOR

## PERSONAL INFORMATION

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## WORK EXPERIENCE

- 2018-Present      PhD in Machine Learning; Prof. Dr. K. Borgwardt, Machine Learning and Computational Biology Lab, Departement of Biosystems Science and Engineering, ETH Zurich.
- 2019                Teaching assistant for *Data Mining II*, ETH Zurich.
- 2016-2018        MD: Fully-Automatic Tumor Segmentation and Analysis in Computed Tomography of Non-small-cell Lung Cancer; PD. Dr. T. Heye, Departement of Radiology, University Hospital Basel
- 2014-2015        Master Thesis: Pre- and Postoperative Quantification of Visceral and Subcutaneous Adipose Tissue in Morbidly Obese Patients applying Statistical Shape Models; Prof. Dr. O. Bieri, Division of Radiological Physics, Departement of Radiology, University Hospital Basel

## EDUCATION

- 2018-present      Doctoral Studies: Lectures in Data Mining and Machine Learning, ETH Zurich.
- 2011-2017        Medical studies (BSc and MSc) including supplementary classes in Biology, Chemistry and Statistics (in total 421 ECTS), University of Basel

## PUBLICATIONS

*The 'dagger' symbol, i.e. †, indicates equal contribution. The 'double dagger' symbol, i.e. ‡, is listed for authors that jointly directed said work.*

- 2020
1. **Michael Moor**<sup>†</sup>, Bastian Rieck<sup>†</sup>, Max Horn, Catherine R Jutzeler<sup>‡</sup>, and Karsten Borgwardt<sup>‡</sup>. *Early Prediction of Sepsis in the ICU using Machine Learning: A Systematic Review*. Preprint, medRxiv:2020.08.31.20185207v1, 2020.
  2. Christian Bock<sup>†</sup>, **Michael Moor**<sup>†</sup>, Catherine R Jutzeler, and Karsten Borgwardt. *Machine Learning for Biomedical Time Series Classification: From Shapelets to Deep Learning*. In *Artificial Neural Networks*, pp. 33-71. Humana, New York, NY.
  3. Thomas Gumbsch, Christian Bock, **Michael Moor**, Bastian Rieck, Karsten Borgwardt. *Enhancing Statistical Power in Temporal Biomarker Discovery through Representative Shapelet Mining*. Accepted for presentation at ECCB 2020.
  4. Zhiliang Wu, Yinchong Yang, Yunpu Ma, Yushan Liu, Rui Zhao, **Michael Moor**, and Volker Tresp. *Learning Individualized Treatment Rules with Estimated Translated Inverse Propensity Score*. Accepted for presentation at ICHI 2020.
  5. **Michael Moor**, Max Horn, Christian Bock, Karsten Borgwardt, and Bastian Rieck. *Path Imputation Strategies for Signature Models*. Accepted for presentation at the Workshop on the Art of Learning with Missing Values (Artemiss) at ICML 2020.
  6. **Michael Moor**<sup>†</sup>, Max Horn<sup>†</sup>, Bastian Rieck<sup>‡</sup>, Karsten Borgwardt<sup>‡</sup>. *Topological Autoencoders*. Accepted for presentation at ICML 2020.

7. Max Horn, **Michael Moor**, Christian Bock, Bastian Rieck, and Karsten Borgwardt. *Set Functions for Time Series*. Accepted for presentation at ICML 2020.
  8. **Michael Moor**, Max Horn, Christian Bock, Karsten Borgwardt, and Bastian Rieck. *Path Imputation Strategies for Signature Models of Irregular Time Series*. Preprint, arXiv:2005.12359, 2020.
  9. Stephanie L. Hyland<sup>†</sup>, Martin Faltys<sup>†</sup>, Matthias Hüser<sup>†</sup>, Xinrui Lyu<sup>†</sup>, Thomas Gumbsch<sup>‡</sup>, Cristóbal Esteban, Christian Bock, Max Horn, **Michael Moor**, Bastian Rieck, Marc Zimmermann, Dean Bodenham, Karsten Borgwardt<sup>‡</sup>, Gunnar Rättsch<sup>‡</sup>, and Tobias M. Merz<sup>‡</sup>. *Early prediction of circulatory failure in the intensive care unit using machine learning*. *Nature Medicine*, Volume 26, Issue 3, pp. 364–373, March 2020.
- 2019
10. **Michael Moor**, Max Horn, Bastian Rieck, Damian Roqueiro, Karsten Borgwardt. *Early Recognition of Sepsis with Gaussian Process Temporal Convolutional Networks and Dynamic Time Warping*. *Proceedings of the 4th Machine Learning for Healthcare Conference (MLHC)*, Volume 106 of Proceedings of Machine Learning Research, pp. 2–26, August 2019.
  11. Bastian Rieck<sup>†</sup>, Christian Bock<sup>†</sup>, Matteo Tognioli<sup>†</sup>, **Michael Moor**, Max Horn, Thomas Gumbsch, Karsten Borgwardt. *Neural Persistence: A Complexity Measure for Deep Neural Networks Using Algebraic Topology*. *Proceedings of the International Conference on Learning Representations (ICLR)*, 2019.
  12. Anne Christin Meyer-Gerspach, Ralph Peterli, **Michael Moor**, Philipp Madörin, Andreas Schötzau, Diana Nabers, Stefan Borgwardt, Christoph Beglinger, Oliver Bieri, Bettina Wölnerhanssen. *Quantification of Liver, Subcutaneous, and Visceral Adipose Tissues by MRI Before and After Bariatric Surgery*. *Obesity surgery*, Volume 29, Issue 9, pp. 2795–2805. Mai 2019.
- 2018
13. Christian Bock, Thomas Gumbsch, **Michael Moor**, Bastian Rieck, Damian Roqueiro, Karsten Borgwardt. *Association Mapping in Biomedical Time Series via Statistically Significant Shapelet Mining*. *Bioinformatics*, Volume 34, Issue 13, pp. i438–i446, July 2018

#### INVITED TALKS

- 2020/09 *Topological representation learning (45')*. DataSig Seminar, Mathematical Institute, University of Oxford.

#### ACADEMIC ACTIVITIES

- 2020 Program Committee for the ICML 2020 workshop on the art of learning with missing values (Artemiss).
- 2019-Present Peer-reviewing for the journals *Machine Learning (Springer Nature)*, *Nature Communications*, and *Bioinformatics*, as well as the conferences ISMB 2019, ECML PKDD 2019, ISMB 2020, MLHC 2020.

#### AWARDS AND ACTIVITIES

- 2011-2020 Fellowship of the Swiss Study Foundation
- 2012-2014 Author for the think tank GBS Schweiz, a community blog about Rationality and Science
- 2013 TedX Zurich Talk about (charitable) impact through rationality

- 2012 Gold medal and price for best male choir at the World Choir Games in Cincinnati with Männerstimmen Basel
- 2011 2<sup>nd</sup> and price for best own composition with The Glue at Harmony Sweepstakes Contest, Broadway NY
- 2008 3<sup>rd</sup> at Swiss Youth Music Contest with harp

#### OTHER INFORMATION

*Languages*

GERMAN · Native speaker  
ENGLISH · Fluent  
FRENCH · Intermediate  
MANDARIN · Beginner

*Technical*

Python (PyTorch, Tensorflow) · R · MATLAB · SQL · L<sup>A</sup>T<sub>E</sub>X

*Current Interests*

Machine Learning for Healthcare · Time Series Analysis · Differentiable Learning · Topological Machine Learning