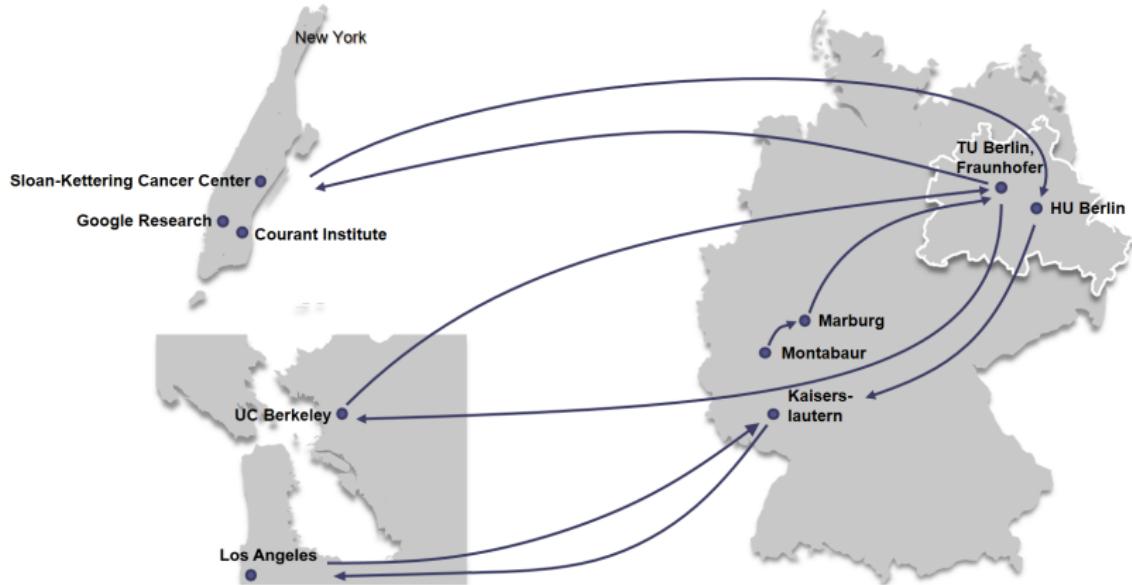


1.2 About Us

Machine Learning 1: Foundations

Marius Kloft (TUK)

About::Me



Marius Kloft

About::Us—ML Teaching @ TU KL



Till Werner
HiWi Exercises



Geri Gokaj
HiWi Exercises



Tobias Michels
HiWi Coding



Billy Joe Franks
TA



Marius Kloft
Prof

About::Us—ML Group @ TU KL



Dennis Wagner
PhD



Philipp Liznerski
PhD



Saurabh Varshneya
PhD



Billy Joe Franks
PhD



Sourav Dutta
PhD



Charu James
PhD



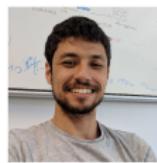
Naghmeg Ghanooni
PhD



Waleed Mustafa
PhD



Matthias Kirchler
PhD



Rodrigo Alves
PhD



WeiChen Li
PhD



Phil Ostheimer
PhD



Antoine Ledent
Postdoc



Marius Kloft
Prof



Nooshin Haji-Ghassemi
Postdoc



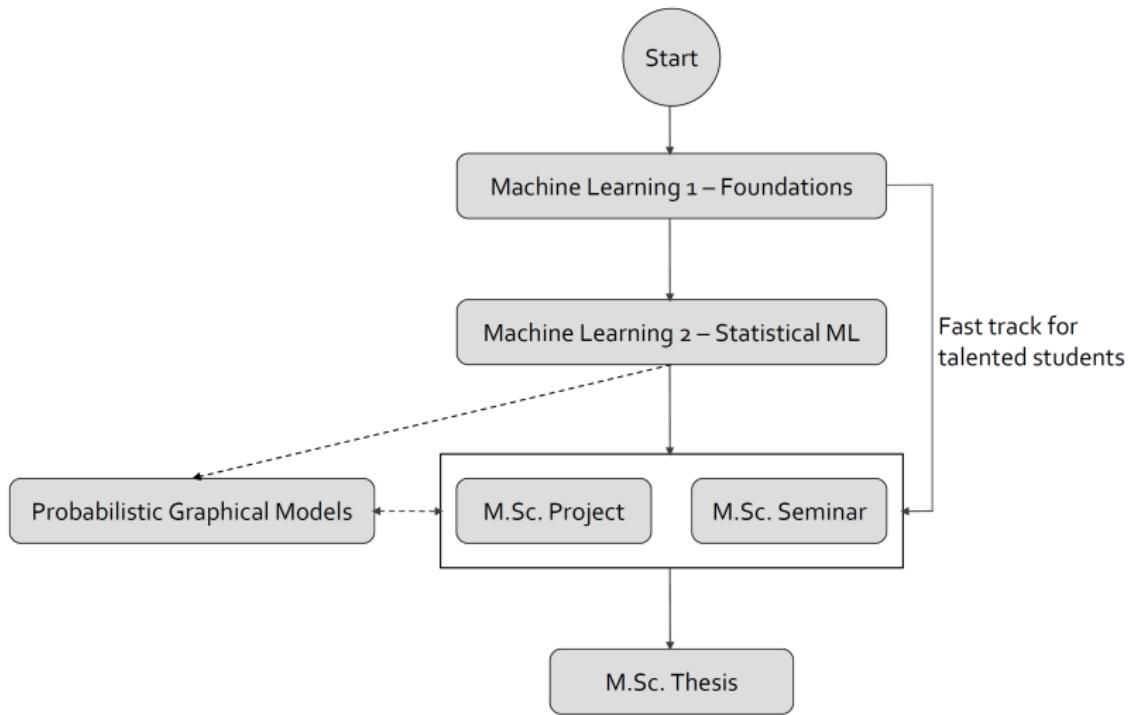
Sophie Burkhardt
Jun.-Prof

Teaching Overview 1/2

Our topics in **teaching**

- ▶ ML BSc project (WiSe)
- ▶ BSc thesis
- ▶ Machine Learning I (SoSe)
- ▶ Machine Learning II (WiSe)
- ▶ Probabilistic Graphical Models (SoSe)
- ▶ MSc Seminar (WiSe & SoSe)
- ▶ ML MSc project
- ▶ MSc thesis
- ▶ PhD thesis

Teaching Overview 2/2 (MSc)



Research Overview

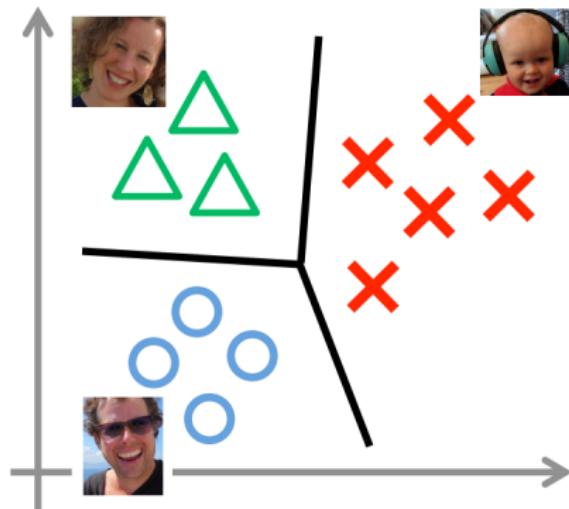
Our topics in **research**:

- ▶ Theory → Algorithms → Applications

Our Topics in Research (1)

EXtreme Classification (XC)

Classification using an eXtremely large amount of Classes



Example: face recognition

Y. Lei *et al.*, Data-dependent generalization bounds for multi-class classification, *IEEE Trans. Inf. Theory*, vol. 65, no. 5, pp. 2995–3021, 2019

Our Topics in Research (2)

Deep Anomaly Detection

Detecting **rare, novel, or anomalous** data instances in large data collections using deep learning.



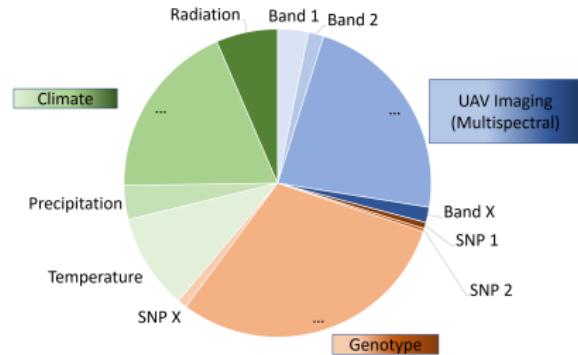
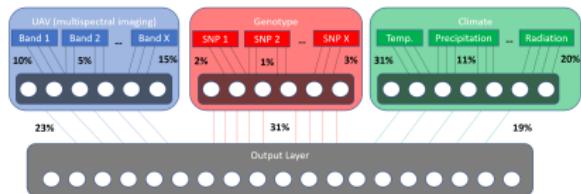
Ex.: detection of anomalous images (here: weird bedrooms)

L. Ruff et al., Deep one-class classification, in *Proceedings of the 35th International Conference on Machine Learning (ICML)*, ser. Proceedings of Machine Learning Research, vol. 80, PMLR, 2018, pp. 4390–4399

Our Topics in Research (3)

Interpretable Multiple Neural Learning

Integrating multiple data representations into deep learning,
in an interpretable way

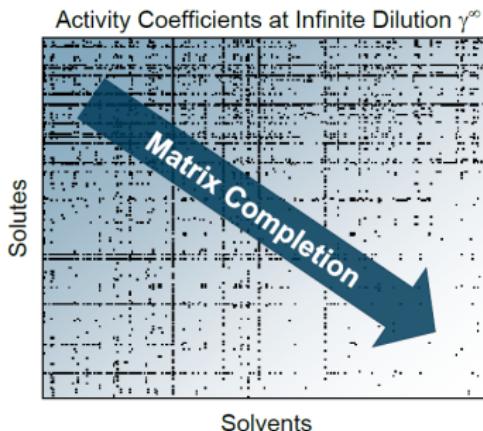


Example: predict plant breeding value from environmental,
hyperspectral, and genetic data

Our Topics in Research (4)

Applications of ML (e.g. in Chemical Engineering)

Helping chemical engineers to develop more economic ways of using materials and energy



Example: prediction of thermodynamical interactions of substances using matrix completion

F. Jirasek *et al.*, Machine learning in thermodynamics: Prediction of activity coefficients by matrix completion, *The Journal of Physical Chemistry Letters*, vol. 11, no. 3, pp. 981–985, 2020. DOI: 10.1021/acs.jpclett.9b03657