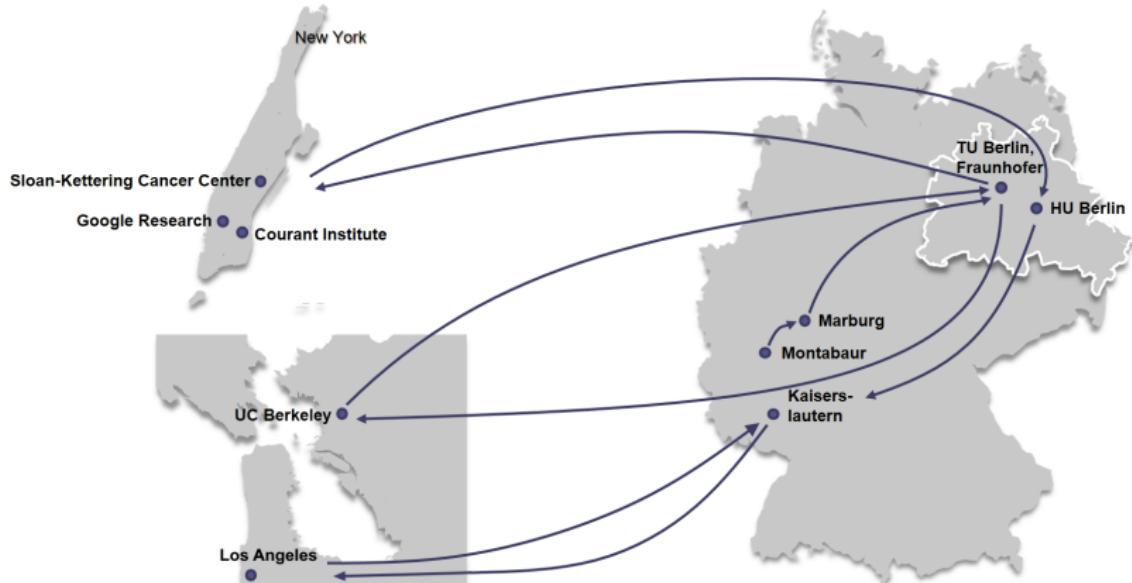


## 1.2 About Us

*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



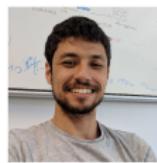
Naghmeg Ghanooni  
PhD



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



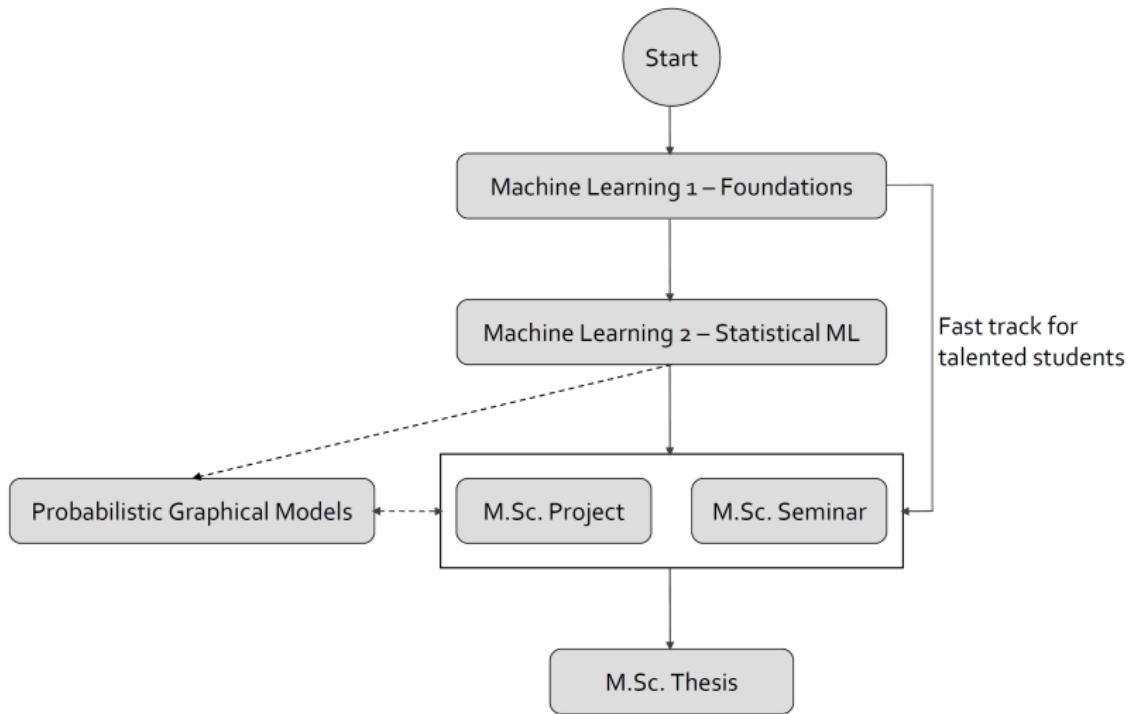
Sophie Burkhardt  
Jun.-Prof

# 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

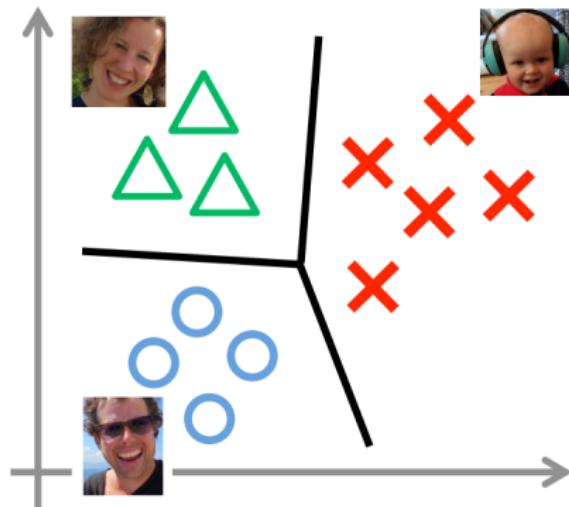
Our topics in **research**:

- ▶ Theory → Algorithms → Applications

# Our Topics in Research (1)

## EXtreme Classification (XC)

Classification using an eXtremely large amount of Classes



Example: face recognition

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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.



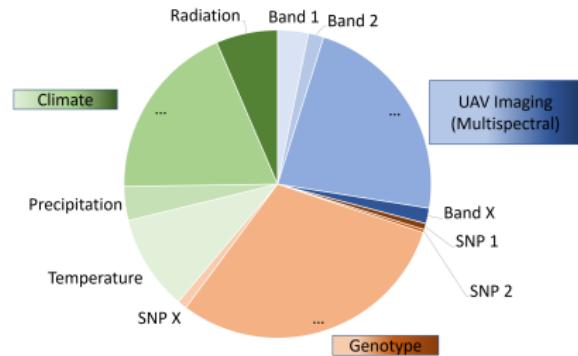
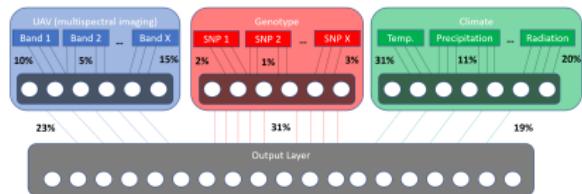
Ex.: detection of anomalous images (here: weird bedrooms)

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

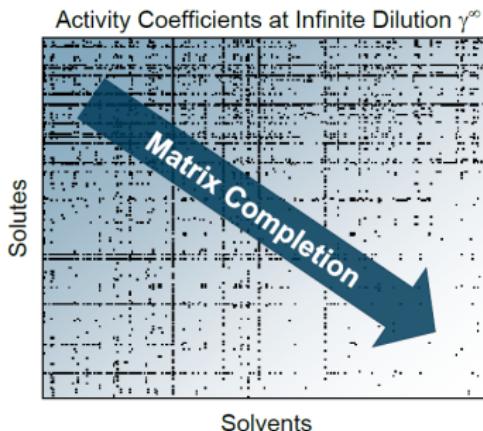


Example: predict plant breeding value from environmental,  
hyperspectral, and genetic data

# 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