



Area Seminar

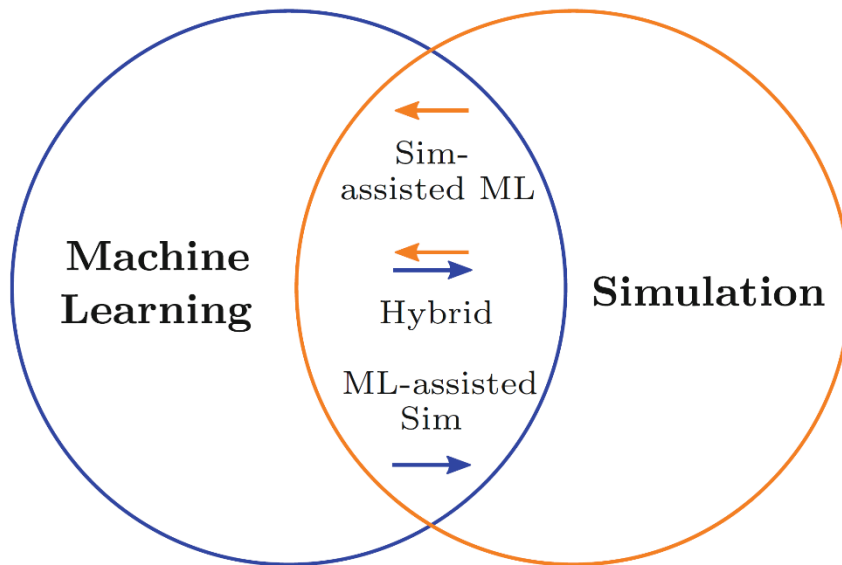
Combining Machine Learning and Simulation

*Modeling and Simulation,
Institute for Visual and Analytic Computing (VAC)*

STUD.IP lecture Number: 23965

Machine Learning and Simulation

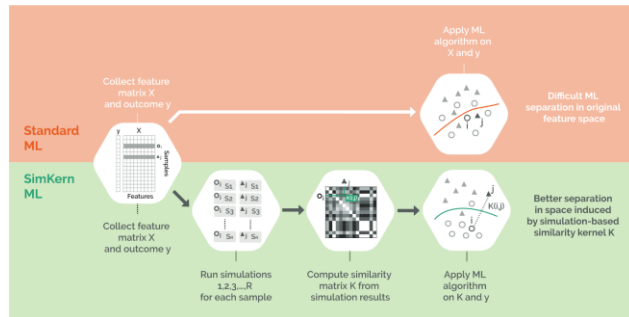
Two complementary methods



von Rueden, L., Mayer, S., Sifa, R., Bauckhage, C., & Garcke, J. (2020). Combining machine learning and simulation to a hybrid modelling approach: Current and future directions. In *Advances in Intelligent Data Analysis XVIII*. DOI: [10.1007/978-3-030-44584-3_43](https://doi.org/10.1007/978-3-030-44584-3_43)

Some Example Topics

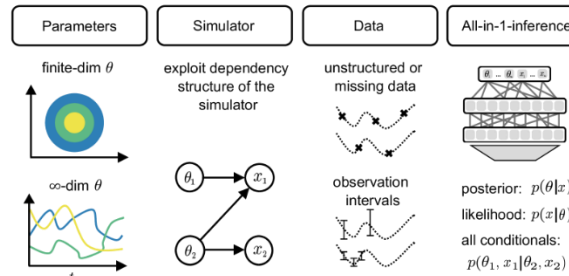
Combining ML methods with SIM methods



Deist, Timo M., et al. "Simulation-assisted machine learning." *Bioinformatics* 35.20 (2019): 4072-4080.

DOI: [10.1093/bioinformatics/btz199](https://doi.org/10.1093/bioinformatics/btz199)

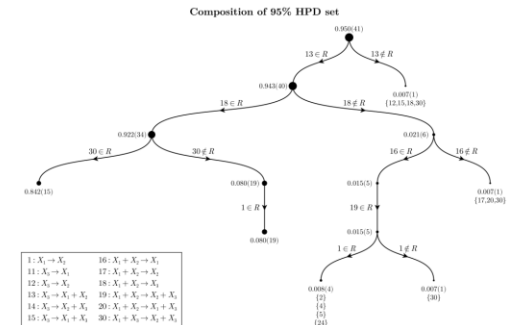
ML for more performant Simulation



Gloeckler, Manuel, et al. "All-in-one simulation-based inference." Proceedings of the 41st International Conference on Machine Learning (2024).

DOI: [10.48550/arXiv.2404.09636](https://doi.org/10.48550/arXiv.2404.09636)

Learning Simulation Models



Foo, Yong See, et al. 2025. "Quantifying Structural Uncertainty in Chemical Reaction Network Inference." arXiv:2505.15653. Preprint, arXiv, May 21. DOI: [10.48550/arXiv.2505.15653](https://doi.org/10.48550/arXiv.2505.15653)

The full list of topics will be presented during the kick-off meeting on 13th October.

Organization

- **First meeting:** Tue 13th October, 09:00 in SR 222, A.-Einstein-Str. 26 (Neubau Elektrotechnik)
- **Language:** English (or German)
- **Skills:** How to find and read papers? How to write a research article? How to give a scientific presentation?
- **Content:** Three lectures, independent reading and writing, presentation to the class
- **Contact:** Pia Wilsdorf, pia.wilsdorf@uni-rostock.de
Anja Wolpers, anja.wolpers@uni-rostock.de
Justin Kreikemeyer, justin.kreikemeyer@uni-rostock.de

Modalities (tentative)

The „exam“

1. **Prüfungsvorleistung:** being present in the seminar classes and presentations
2. **Presentation:** 20min presentation (firm!) + 10min discussion in class
3. **Report:** 10 pages in LNCS template; content: summary and discussion of your chosen paper's ideas and review of related work. After submission, 10min conversation with the supervisor to confirm your understanding.