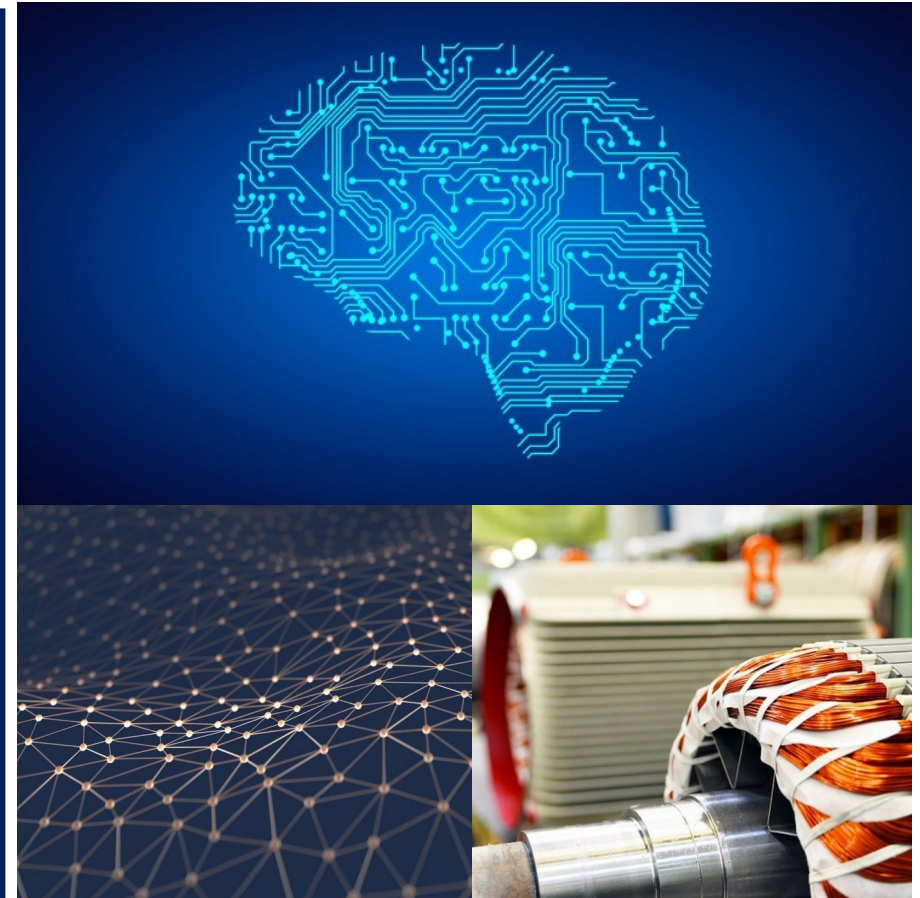




Nachwuchsgruppe ML-Expert
Dr.-Ing. Oliver Wallscheid



UNIVERSITÄT PADERBORN
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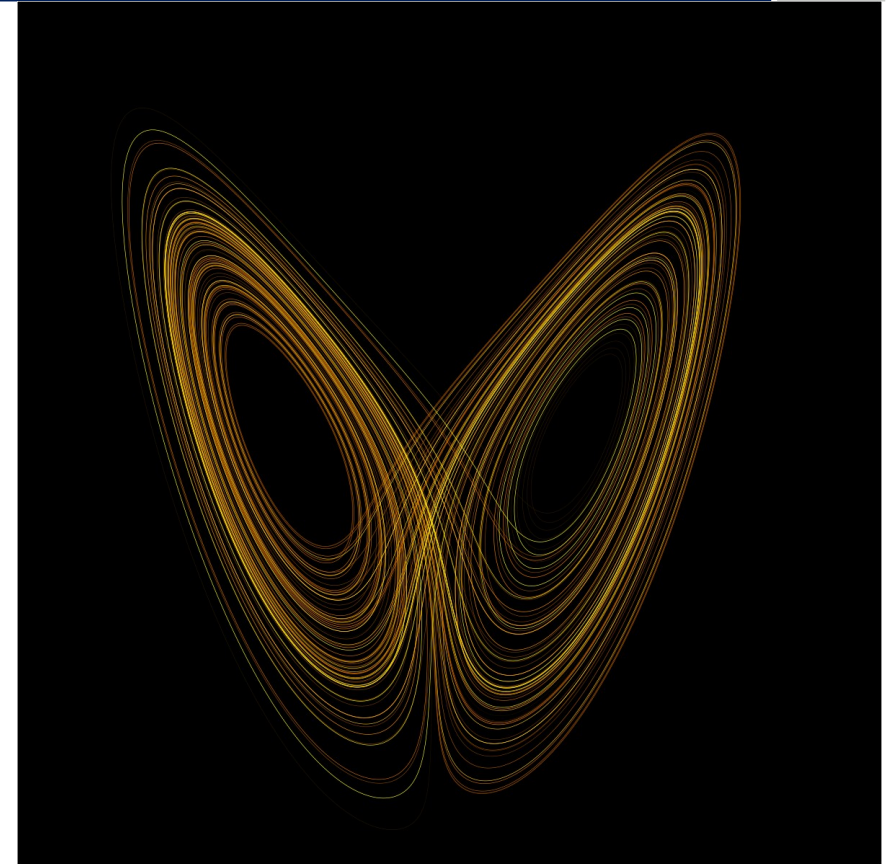
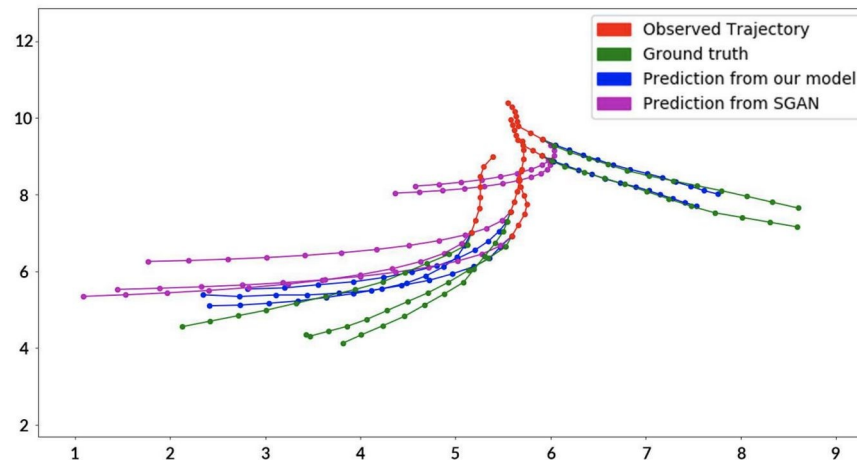


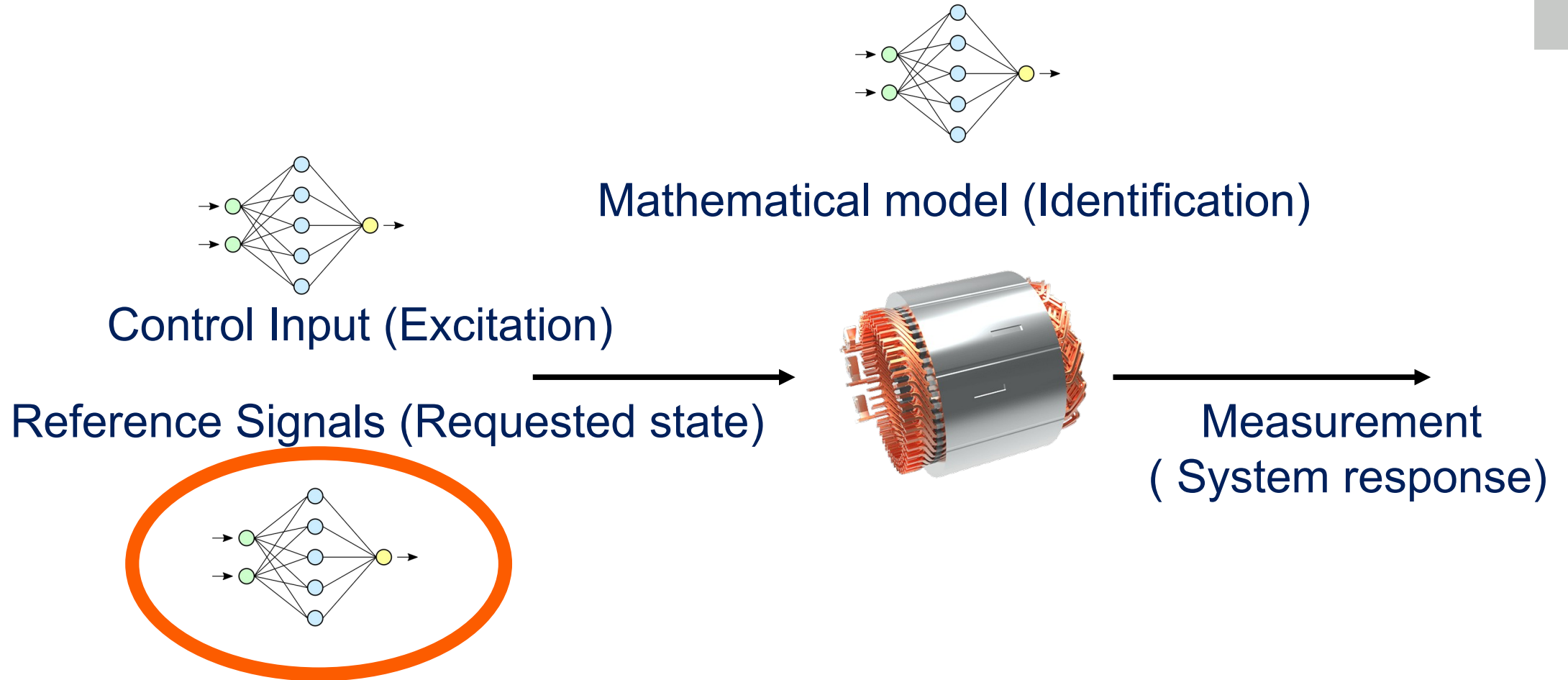
PG SS 2023 Dynamic System Exploration

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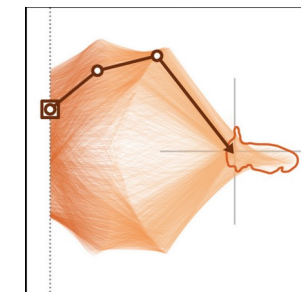
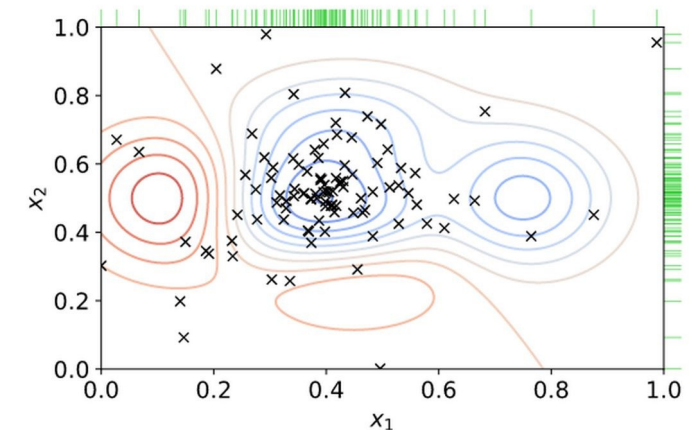
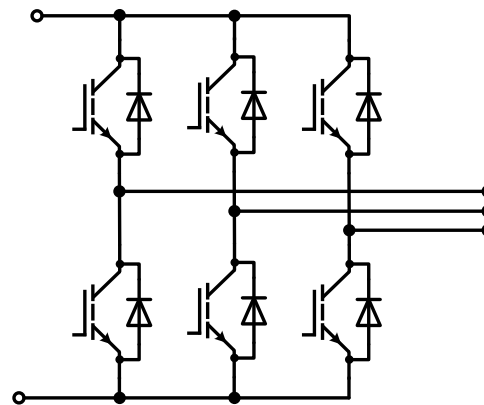
Wilhelm Kirchgässner
Marvin Meyer
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- Differential equations
 - Ordinary or partial
- Can be represented in state-space
- Solving initial value problems
- Real-world systems need to be identified
- Data-driven learning





- Which reference signals should be generated to maximize learning per time?
- Data-driven and/or learnable algorithm should consider:
 - Previously generated reference trajectories
 - Visited states
 - Input-, state-, and output space coverage
 - System constraints
- Safety critical applications



- Neural ordinary differential equations
- Tree Parzen estimator/ Gaussian processes (Bayesian optimization)
- Invertible neural networks
- Variational AutoEncoder/ Diffusion Model
- Reinforcement Learning
- Heuristics based on model predictive control



Thank you for your attention

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