

Bachelor Seminar:

Current Topics in ML (IN0014)

Master Seminar:

Selected Topics in ML Research (IN2107,
IN4872)

Preliminary Meeting

Lecturer: Filippo Guerranti (on behalf of David Luedke)

Winter Term 2025

- David Luedke
- Seminars: Filippo Guerranti, Tim Beyer, Fabio Rosenthal, Leon Goetz, Marcel Kollovieh, Niklas Kemper, Sebastian Schmidt

For the **Master** seminar Machine Learning (IN2064) is a hard requirement

More information is available on the website:

Bachelor:

<https://www.cs.cit.tum.de/daml/lehre/wintersemester-2025-26/seminar-current-topics-in-machine-learning/>

Master:

<https://www.cs.cit.tum.de/daml/lehre/wintersemester-2025-26/seminar-selected-topics-in-machine-learning-research/>

Topics I: (Preliminary)

- LLMs
 - Automated LLM Adversarial Attacks
 - LLM Defenses
 - Positional Encodings for Transformers
 - Encoding Graphs for LLMs
- Modern Architectures & Training
 - Static and Dynamic Sparsity in DL Architectures
 - Transformer Learning Capacity across Tasks
- Vision
 - Diffusion for realistic Scene Creation
 - Vision-Language-Action models in Robotics usecases

Topics II: (Preliminary)

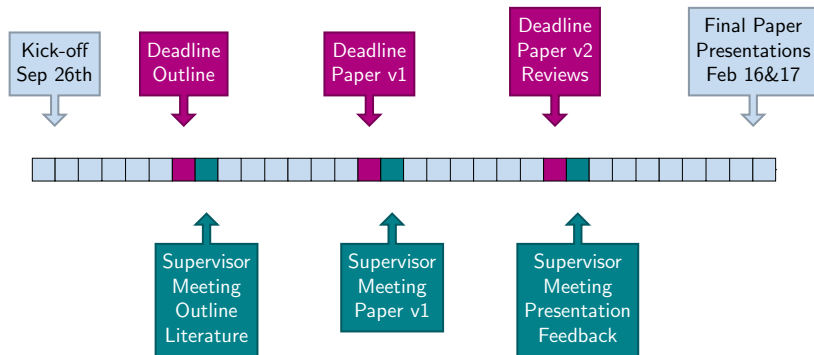
- Generative Models
 - Transdimensional generative models
 - Consistency Models
 - Time Series Foundation Models
- Graphs
 - Graph Transformers
 - Common Challenges in Graph Machine Learning
 - Graph Positional Encodings

What will you do?

1. Read **seed research papers** (provided by us)
2. Start your **snowball research** from there (references to, from these papers, relevant keywords)
3. Summarize your findings, criticism, and research ideas in a **short paper** (4 pages, double column)
4. Write **reviews** of other students work
5. **Present** your work in final talk + discussion round with your peers

Grade will be based on **all** parts: Paper, reviews, talk and overall participation

Schedule



Why attend this Seminar?

1. Learn about and explore **state-of-the-art** research in ML
2. **Analyze and criticize** recent publications
3. Improve your **scientific writing**
4. Participate in a **review process** akin to international conferences
5. Improve your **presentation skills**

Requirements

- Strong knowledge of machine learning and mathematics
- Passed relevant courses (the more, the better)
 - Machine Learning (hard requirement)
 - Machine Learning for Graphs and Sequential Data (formerly Mining Massive Datasets)
 - Machine Learning Lab
- Motivation
- Additional selection criteria
 - relevant experience (projects in companies, experience as a HiWi)
⇒ you can send an overview of your experience to us (see end of slides)

Registration via the **matching system!**

<https://matching.in.tum.de/>

Current Topics in ML (IN0014)

Selected Topics in Machine Learning Research (IN2107, IN4872)

+ Fill out the **application form!**

<https://forms.gle/zwL3bVprTE7k7Dx5>

Be aware of the official deadline for seminar and practical course matching!

Application

- Which course (lab/seminar) are you applying for?
- List of ML-related lectures you attended
- **Concise** overview of your resume (bullet list, not a complete CV)