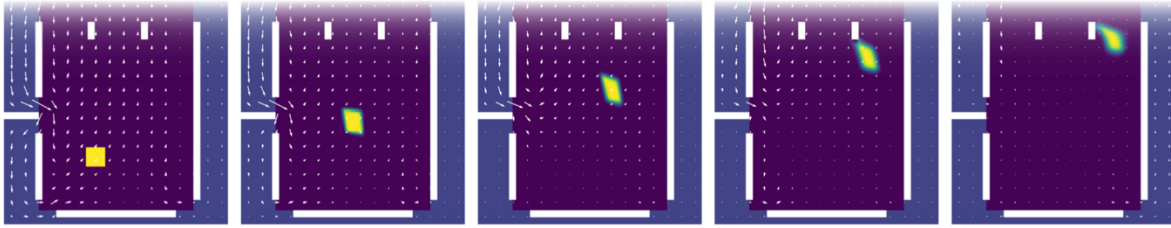


Deep Learning in Physics

Kickoff Lecture

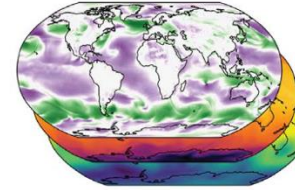
16.10.2024

Björn List, Patrick Schnell

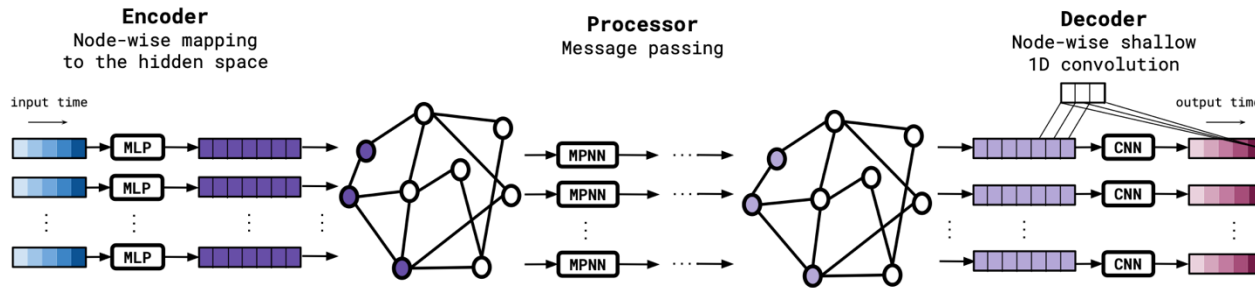
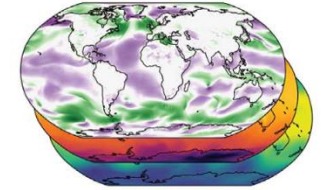


Holl et al. (2020)

A Input weather state

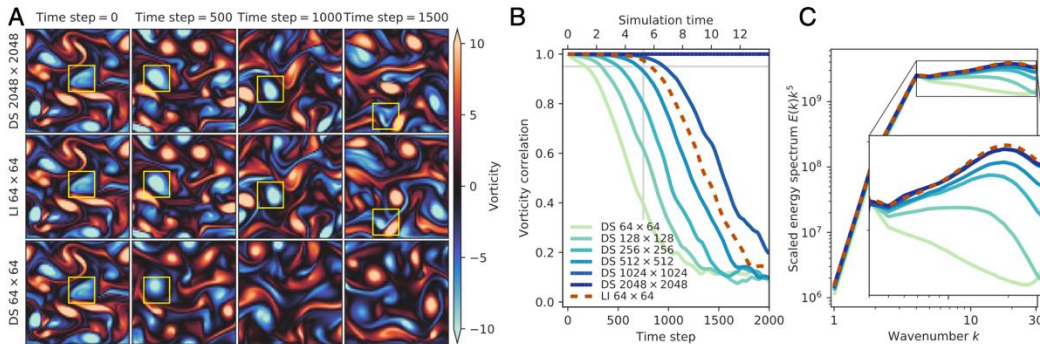
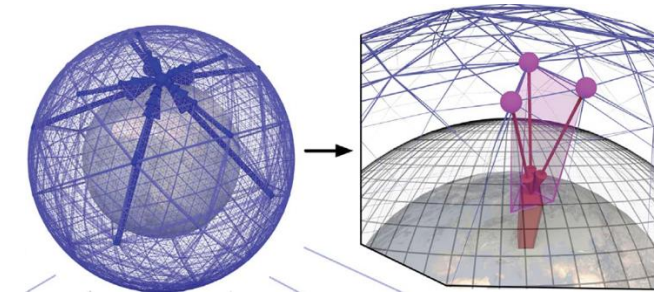


B Predict the next state

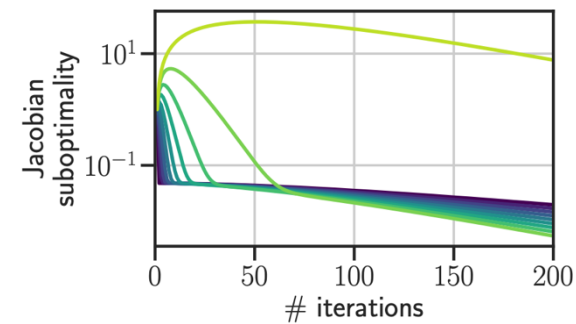


Brandstetter et al. (2022)

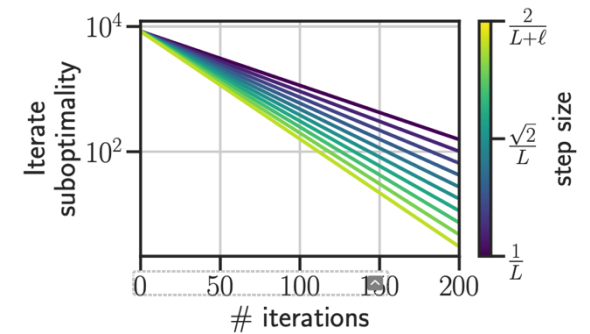
Lam et al. (2022)



Kochkov et al. (2021)



Scieur et al. (2022)



About this Seminar



- Recent research topics in **deep learning for physics**
 - **Architectures**
 - **Learning algorithms**
 - **Applications**
- Familiarize yourself with the **underlying physics & ML applicability**
- Students conduct **independent analyses** of the topic and related work
- Develop writing & presentations skills
- Submission: Presentation slides, report

Presentation



Slides:

- Any style you like, **submit as PDF**
- **Follow guidelines** (text-balance, visualizations, highlighting etc.)
- Feedback on semi-final slides provided by advisor

Presenting:

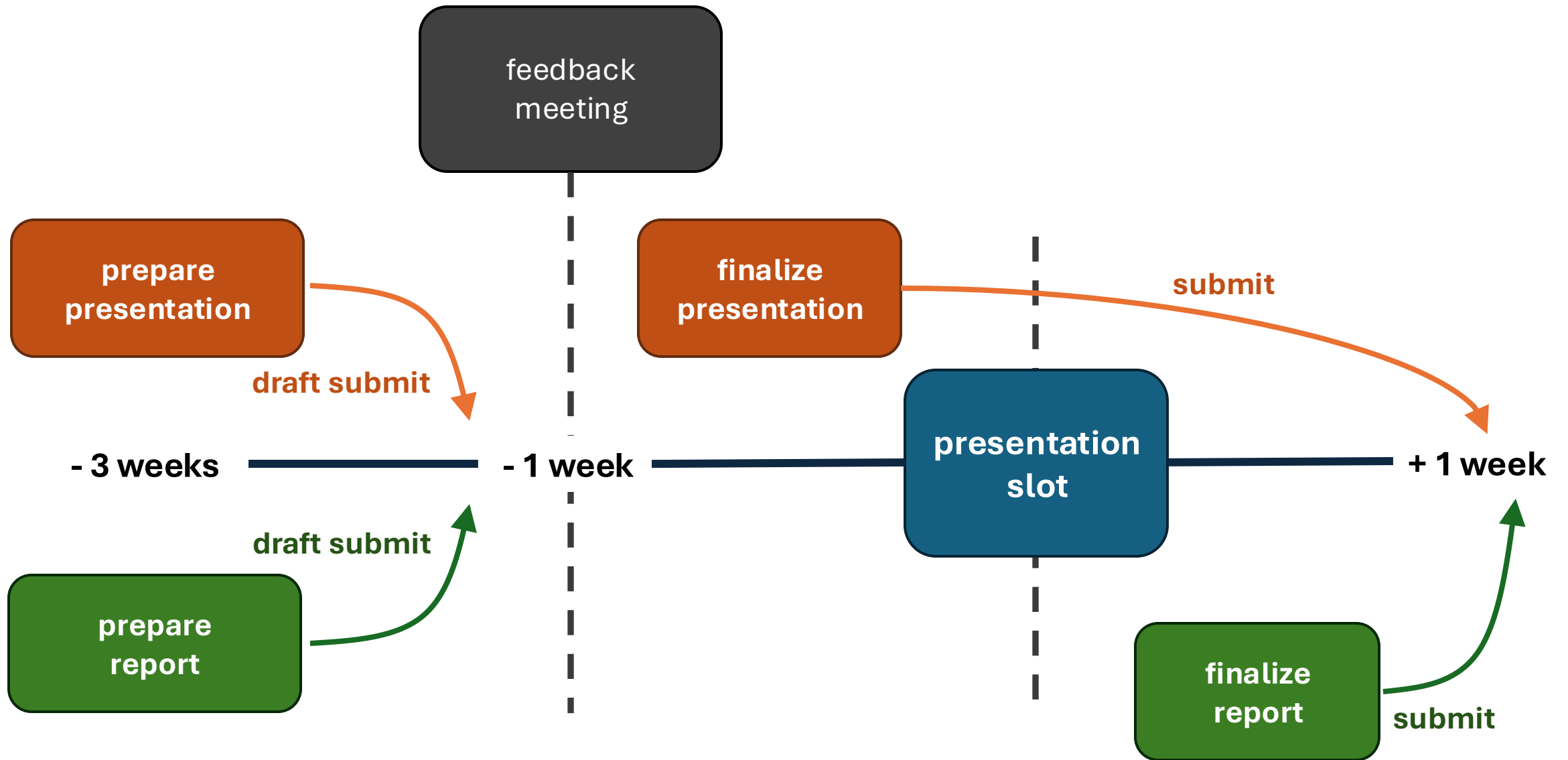
- Present in **English**
- Target **25 min** for presentation, **10 min** for questions
- **Test your setup beforehand** (laptop/projector)!
- Tips for a good presentation: [DocTUM: How to give a great scientific talk](#)

Report



- Maximum 6 pages
- ACM SIGGRAPH TOG format (acmtog) [available online](#)
- Guideline
 - Start with a **summary of the paper (required for semi-final version!)**
 - **Own thought and reasoning** should be the main focus
 - Example: comparison to literature, pros & cons, future work...
- Feedback provided by advisor, final version due **after** talk

Your Timeline



Additional Resources



All information is available on [the website!](#)

Background Reading:

- Book: Hastie et al., [The Elements of Statistical Learning](#)
- Book/Online: Goodfellow et al., [Deep Learning](#)
- Online: Nielsen, [Neural Networks and Deep Learning](#)
- Online: Thuerey et al., [Physics-based Deep Learning](#)

Additional Information



- TUMonline registration is handled by us, you do not need to sign up
- Advisor:
 - Assigned to you in advance (see website)
 - Contact your advisor **1 week before** your presentation at the latest
- Attendance:
 - Missing **one session** is allowed, let us know in advance and write a short summary of the papers (ca. 1 page)
 - Missing **another** session means failing the seminar (special rules for severe issues as appropriate)

Grading Criteria

Presentation

- Good explanations
- Knowledgeable
- Clarity
- Stage performance

Slides

- Design, text density
- Citations
- Highlighting
- Visualizations

Report

- Base summary
- Literature review
- Own judgement

Other

- Own experiments
- Participation in discussions

Any questions?

