

21.10.25

# Scientific Machine Learning

## **GENERAL INTRODUCTION**

- **Personal Introduction**
- **Intro to `opencampus.sh`**
- **Organizational Matters**
- **Course Projects**
- **ML Frameworks**

# PERSONAL INTRODUCTION

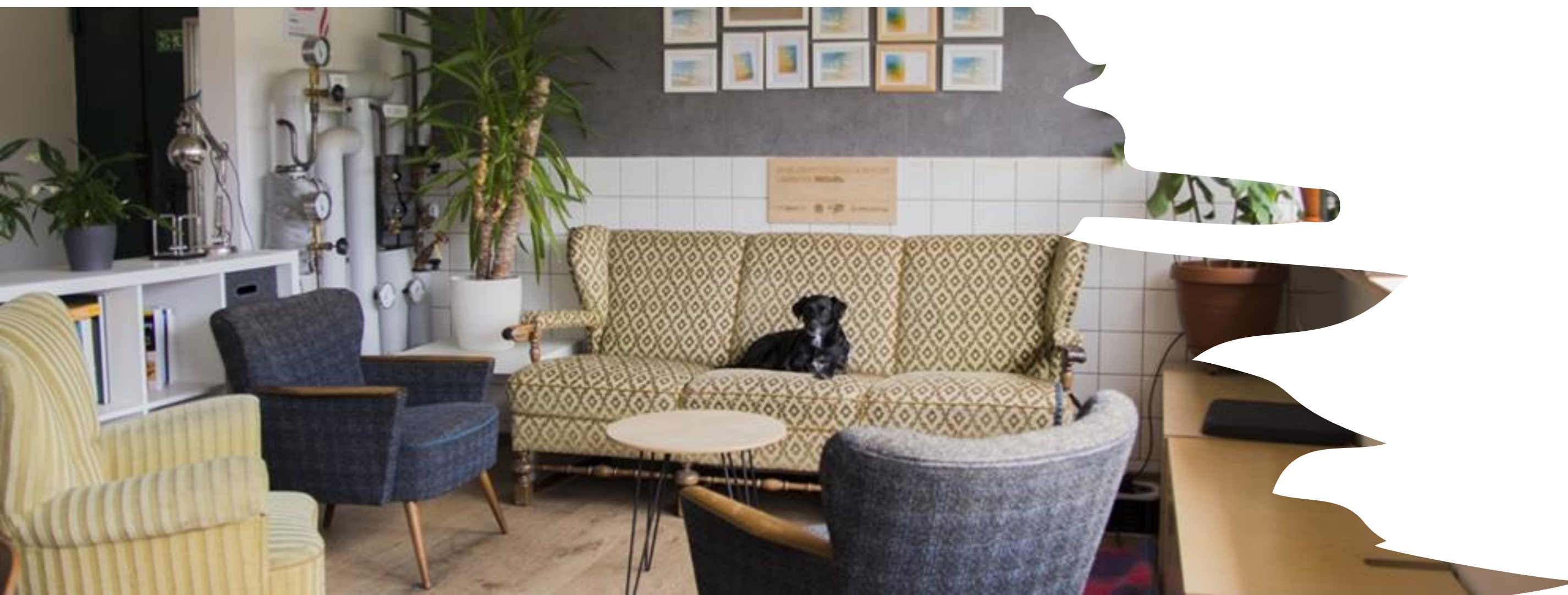




- Nonprofit organization which oversees a variety of initiatives
- Offering a wide range of educational opportunities, support, and networking for entrepreneurs, creatives, and anyone curious, regardless of age, educational background, or origin
- The services are open to everyone and mostly free.
- The goal is to support the entrepreneurial landscape, promote creative change processes, and contribute to innovative and sustainable future development.











# CORL

**COZY WORKING, CULTURE  
& EVENTS**







# FABLAB KIEL



# MACHINE LEARNING DEGREE

WORLD CLASS ONLINE  
COURSES COMBINED WITH  
LOCAL EXPERTS

With  
programming  
background

Without  
programming  
background

Einführung in  
Data Science und  
maschinelles  
Lernen

Python: Beginner  
to Practitioner

Machine  
Learning with  
TensorFlow



Intermediate  
Machine  
Learning

Practical  
Engineering  
with LLMs

Minimum 12.5 ECTS

Time Series  
Predictions

Machine  
Learning für die  
Medizin

Deepdive into  
LLMs

starter  
kitchen.de  
Prototyping  
Week

**Kiel.AI**

Coding.  
Waterkant

Minimum 1 Participation

opencampus.sh Machine Learning Degree





# CODING.WATERKANT

Coding Camp  
from July 7-11, 2025

## PROTOTYPINGWEEK

Von der Idee zum Pitch bei der #PTW!

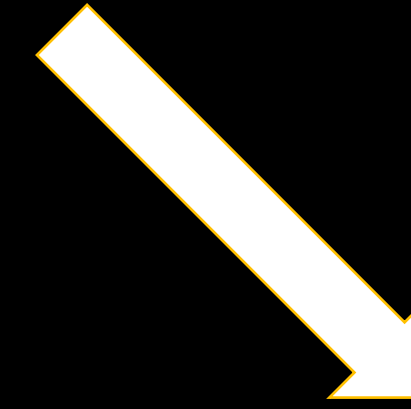
coming soon

#PTW26 | 23. - 27.02.2026

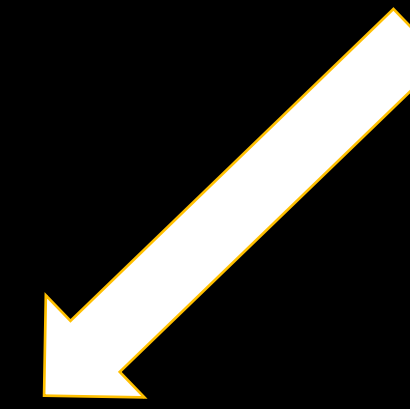


# CHAT

Zoom-Link



GitHub



☆ 25W | Scientific Machine Learning ▾ 👤 22 ☆ 📄 Every Tuesday 18h00 [Zoom-Link](#) [GitHub-Link](#)



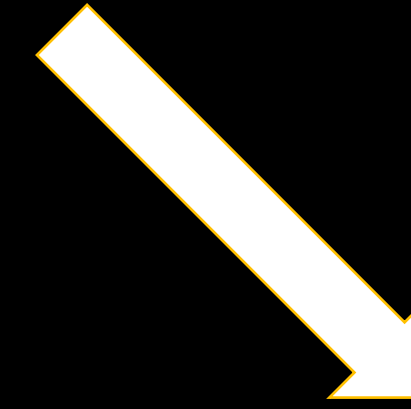
## 25W | Scientific Machine Learning

- Please, ask questions to us in the chat

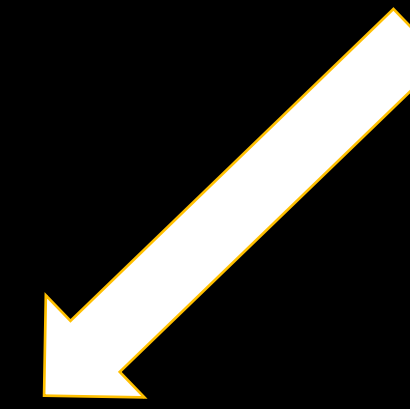


# CHAT

Zoom-Link



GitHub



☆ 25W | Scientific Machine Learning ▾ 22 ☆ 📄 Every Tuesday 18h00 [Zoom-Link](#) [GitHub-Link](#)



## 25W | Scientific Machine Learning

- Please, ask questions to us in the chat



# ORGANIZATIONAL MATTERS

- **Use your full names in the zoom meetings!**
- **Complete your profile in the Mattermost chat with your full name and a "photo".**
- **Please write me/us if you will not go on with the course!**



# Kurstermine

**21.10.2025** Introduction  
18:00 - 20:00 [ONLINE](#)

**28.10.2025** Deep Learning + Discrete Computer Worlds  
18:00 - 20:00 [ONLINE](#)

**04.11.2025** PDEs + Finite Differences in 1D and 2D  
18:00 - 20:00 [ONLINE](#)

**11.11.2025** PINNs Basics+ Pseudospectral Methods  
18:00 - 20:00 [ONLINE](#)

**18.11.2025** PINNs Theory + Finite Elements - Static & Dynamic  
18:00 - 20:00 [ONLINE](#)

**25.11.2025** Operator Learning + Spectral Element Methods  
18:00 - 20:00 [ONLINE](#)

**02.12.2025** Guest Lecture by COMSOL  
18:00 - 20:00 [ONLINE](#)

**09.12.2025** Operator Learning + Basics Uncertainty Quantification  
18:00 - 20:00 [ONLINE](#)

**16.12.2025** Large-Scale Operators + Uncertainty Propagation  
18:00 - 20:00 [ONLINE](#)

**23.12.2025** Attention Operators + Reliability and Sensitivity  
18:00 - 20:00 [ONLINE](#)

**06.01.2026** Guest Lecture by COMSOL + Hybrid Workflows  
18:00 - 20:00 [ONLINE](#)

**13.01.2026** Neural Differential Equations + JAX  
18:00 - 20:00 [ONLINE](#)

**20.01.2026** Applications in Life Science  
18:00 - 20:00 [ONLINE](#)

**27.01.2026** Final Presentations  
18:00 - 20:00 [ONLINE](#)

Christmas Break – New Year



# EXERCISES

- Each week every group/person will present exercises/notebooks
- We will split the tasks
- Volunteering is highly appreciated
- Each of you presents at least once



# PROJECTS

CFD:

Electrodynamics:

Mechanical Engineering:

Climate:

Other:



# RELEVANCE OF THE PROJECTS

- Most important for a career in ML will be work experience and your GitHub/GitLab profile
- Focus on building a noteworthy project repository
- Use the template repository
- Outstanding projects will be nominated for the VDE prize



# PROJECTS

## EVENTS

Coding.Waterkant 2023

Prototyping Week

## PROJECTS

[How to Start, Complete, and Submit Your Project](#)

Possible Projects

Past Projects

## ADDITIONAL RESOURCES

Glossary

Coursera

Selecting the Optimizer

Choosing the Learning Rate

Learning Linear Algebra

Learning Python

Support Vector Machines

ML Statistics

## TOOLS

Git

## How to Start, Complete, and Submit Your Project

In all Machine Learning courses you have:

- to complete a machine learning project in a team of up to 4 participants,
- attend at least all but 2 sessions of the course, and
- use the provided project template repository for documentation (unless otherwise instructed).

### # Starting Your Project

1. **Navigate to the [Template Repository](#)**
2. **Use this Template:** Above the file list, click the "Use this template" button.

Add file ▼

<> Code ▼

Use this template ▼

Create a new repository

Open in a codespace

c676926 2 min

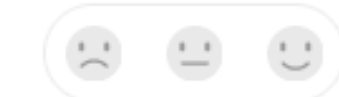
2 minutes ago

[Starting Your Project](#)

[Working on Your Project](#)

[Submitting Your Project](#)

Was this helpful?



📄 Export as PDF







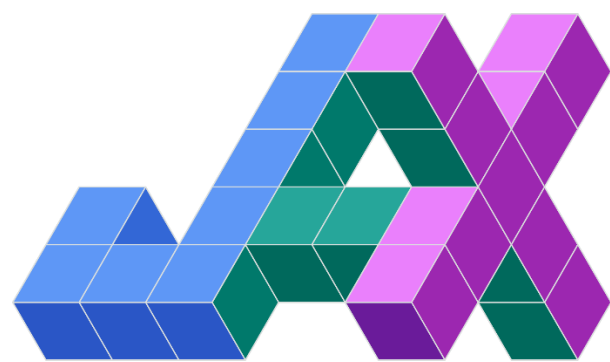
# PROJECT TOOLS

# DEVELOPMENT ENVIRONMENTS





PYTORCH





# TASKS UNTIL NEXT WEEK

- **ETH Zürich Course:**
  - **AI in Science and Engineering**
  - ....
- Short Course on *Computational Methods in Geophysics*
- ....