

DeepLearning inLifeSciences



EUROPEAN
UNIVERSITY
ALLIANCE



CHARLES
UNIVERSITY



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HEIDELBERG
ZUKUNFT
SEIT 1386



UNIVERSITÀ
DEGLI STUDI
DI MILANO



<https://deeplife4eu.github.io/>



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SEIT 1386

- Online course organized by 5 european universities, as part of 4EU+
 - Charles University Prague
 - Heidelberg University
 - University Paris-Sorbonne
 - Warsaw University
 - University Milano
- Goal: illustrate the **applications of deep learning approaches in various fields of life sciences**
 - genomics
 - structural bioinformatics
 - image analysis

Schedule

Introduction

Date	Speaker	Topic
26.02	Bartek Wilczynski	Intro and Mathematical foundation to DL
4.03	Marco Frasca	CNN / RNN
11.03	Carl Herrmann	Autoencoders / VAE
18.03	Dario Malchiodi	Attention mechanisms and transformers
<i>Easter break</i>		
8.04	Dario Malchiodi	Transformers and RNN for sequence analysis
15.04	Britta Velten	Models for multimodal data integration
22.04	Carl Herrmann	VAE in single-cell genomics

Genomics & sequences

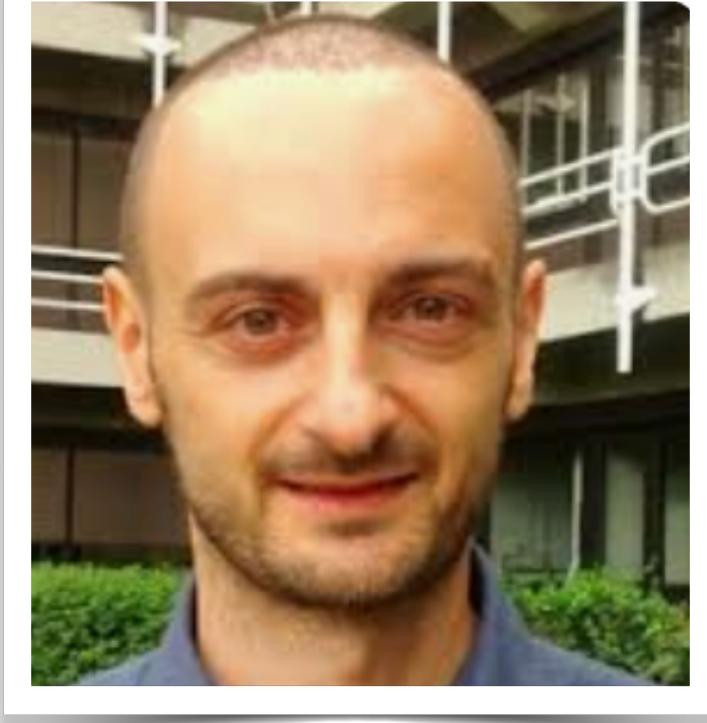
Protein & Structural Bioinformatics

Date	Speaker	Topic
29.04	Joanna Sulkowska	AlphaFold, EMSFold to predict structure of proteins
6.05	Joanna Sulkowska	RNN, CNN models for topology/graph analysis in biopolymers
13.05	David Hoksza	Deep learning models for protein-ligand binding site prediction
23.05	Elodie Laine	Diffusion models for protein design
27.05	Martin Schätz	Intro to BiolImage Analysis and Deep Learning Utilization
3.06	Grégoire Sergeant-Perthuis	Deep Architectures for sampling macromolecules
10.06	Karl Rohr	Deep learning for segmentation

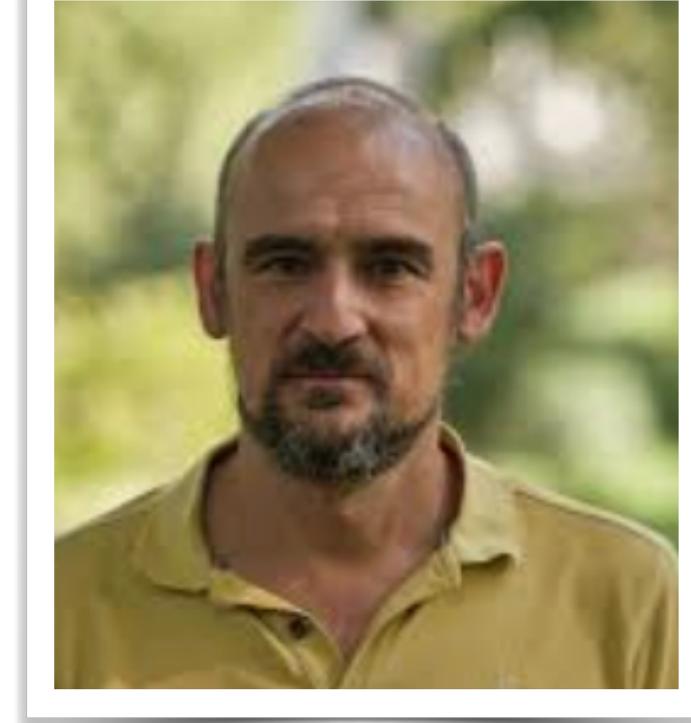
Lab debrief: Monday 4.30 - 5pm

Lectures: Mondays 5pm - 6.30 pm

Team



Marco Frasca
Milan



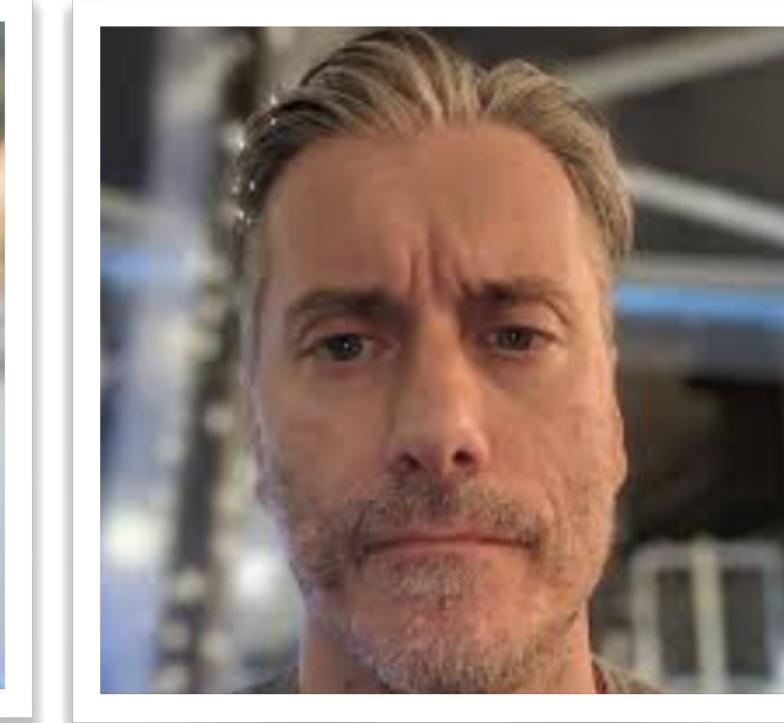
Carl Herrmann
Heidelberg



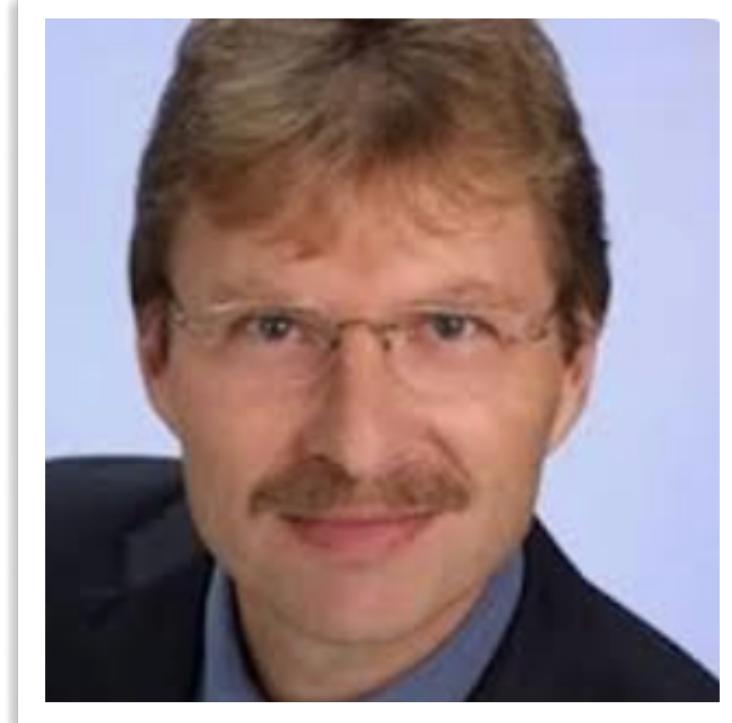
David Hoksza
Prague



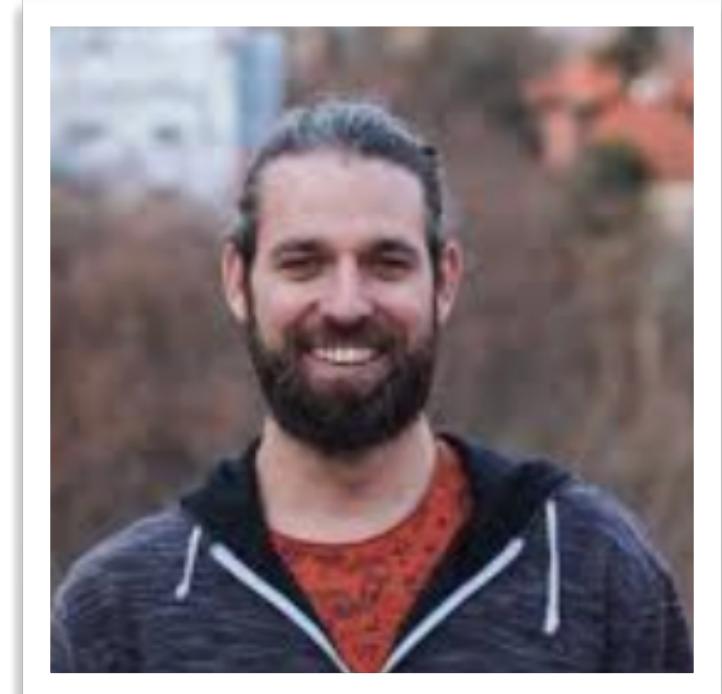
Elodie Laine
Paris



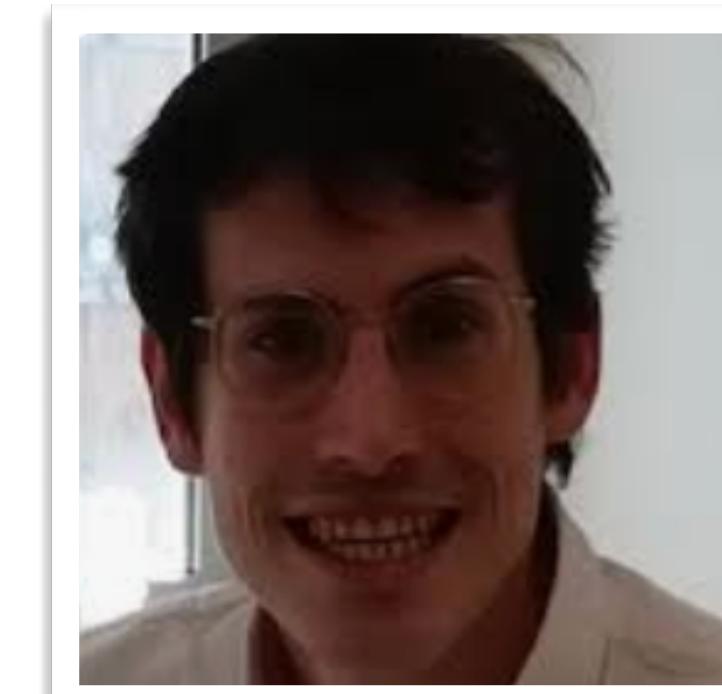
Dario Malchiodi
Milan



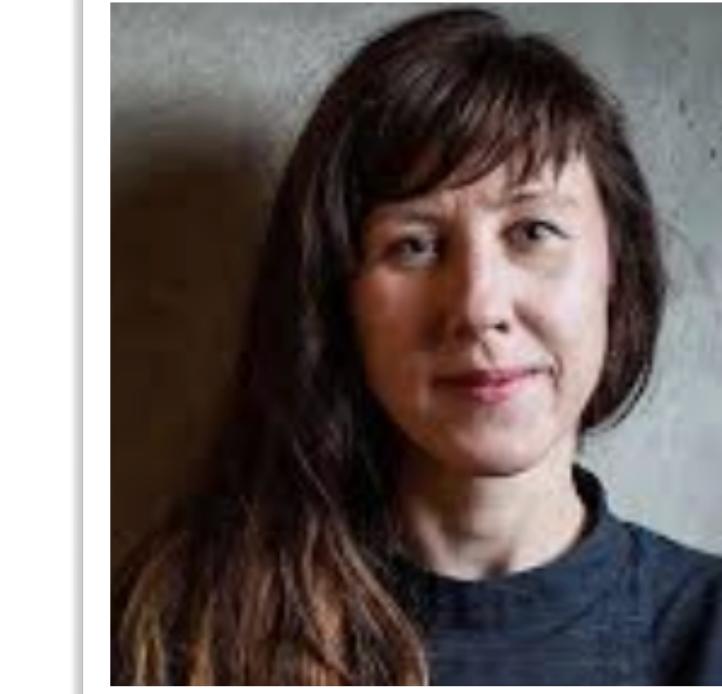
Karl Rohr
Heidelberg



Martin Schätz
Prague



Grégoire Sergeant-Perthuis
Paris



Joanna Sułkowska
Warsaw



Britta Velten
Heidelberg



Bartek Wilczyński
Warsaw

see detailed description here
<https://deeplife4eu.github.io/team/>

Organisation

- **Online lectures (Monday 5pm - 6.30pm)**
→ lectures will be **recorded**; videos and slides will be available online!
- **Practical lab sessions**
 - each lecture will be completed with a practical lab session
 - python notebook will be introduced by lecturer
 - lab session will either be on-site or online (depending on the university, check with your instructor!)
- **Lab debrief** each Monday before the next lecture (**4.30pm - 5pm**)

All course material and info can be found here
<https://deeplife4eu.github.io>

Practical labs

- Python notebooks, available in the GitHub folders or through the website
- Notebooks can be accessed and worked on through Google Colab (requires a Google account!)
- Limited resources, but sufficient for practical labs
- You can install a PyTorch environment on your computer and work locally if you prefer!

The screenshot shows a GitHub repository named "Lecture-materials" which is public. The repository has one branch and no tags. The main page displays a list of files and folders. A commit by user "carlherrmann" is shown, updating the README.md file. The repository contains folders for weeks 01 through 09, each containing a README.md file and other files like PDFs and IPYNB files. A specific commit for Week_01 is highlighted, showing the update of README.md. Below the repository view, there is a section titled "Lecture material Week 1 - Intro and Mathematical foundation to DL" and a link to "Bartek Wilczynski (Warsaw)" with a red box around the "Open in Colab" button.

Lecture-materials Public

main 1 Branch 0 Tags Go to file Add file Code

carlherrmann Update README.md f913bc3 · 4 minutes ago 25 Commits

Week_01 Update README.md 4 minutes ago

Week_02 updated Readme 6 hours ago

Week_03 updated Readme 6 hours ago

Week_04

Week_05

Week_06

Week_07

Week_08

Week_09

Lecture-materials / Week_01 /

carlherrmann Update README.md

Name	Last commit message
..	added folders for weeks
Deep4Life_Lab_1_Introduction_to_pytorch_noSolution.ipynb	Lecture Slides #1
DeepLife-1-Intro.pdf	
README.md	Update README.md

README.md

Lecture material Week 1 - Intro and Mathematical foundation to DL

Bartek Wilczynski (Warsaw)

Open in Colab

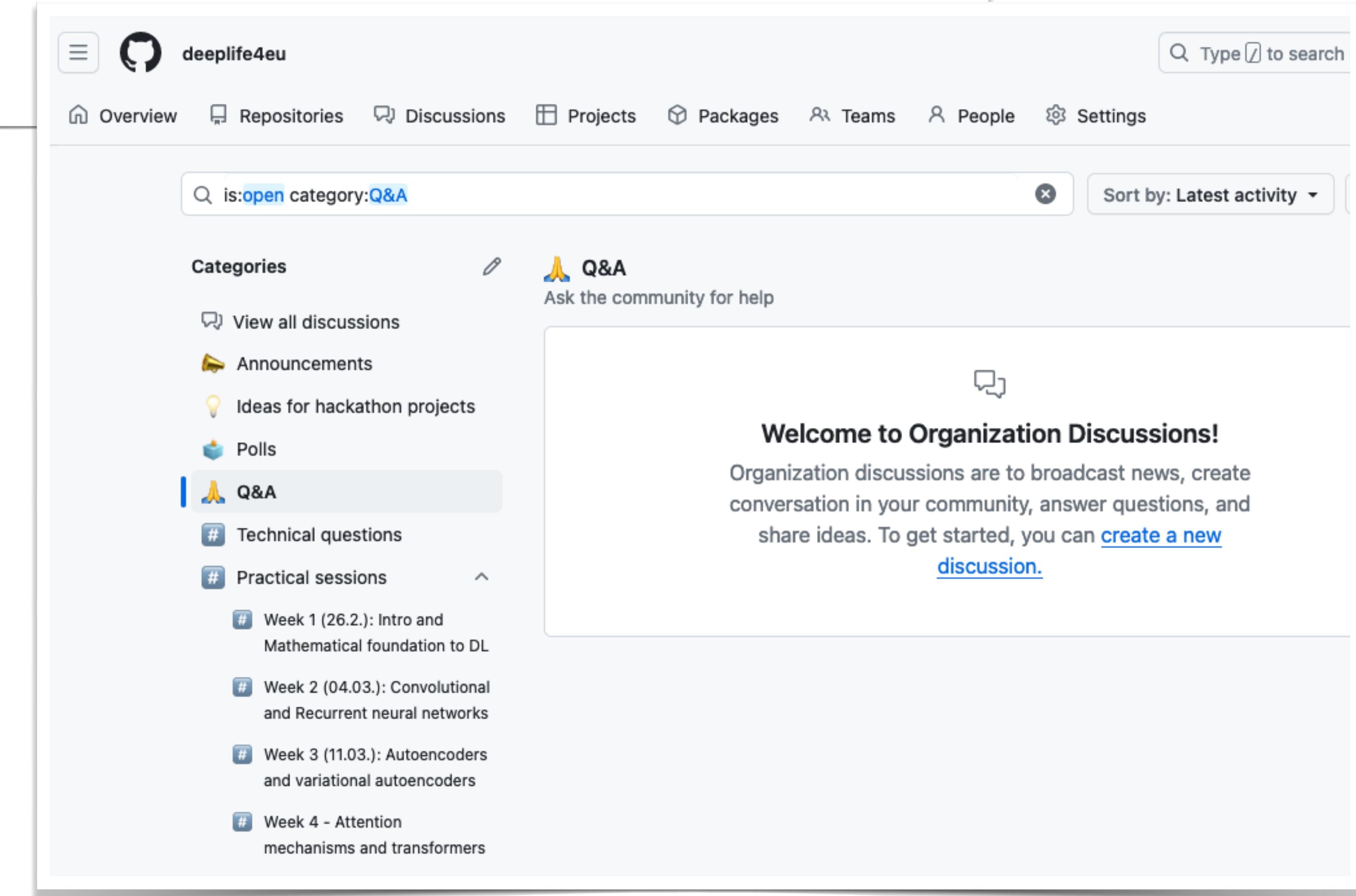
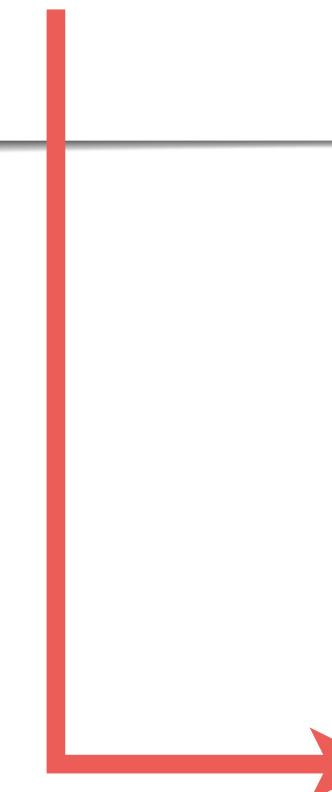
Q & A



Home Team Prerequisites & Schedule Setup Q & A

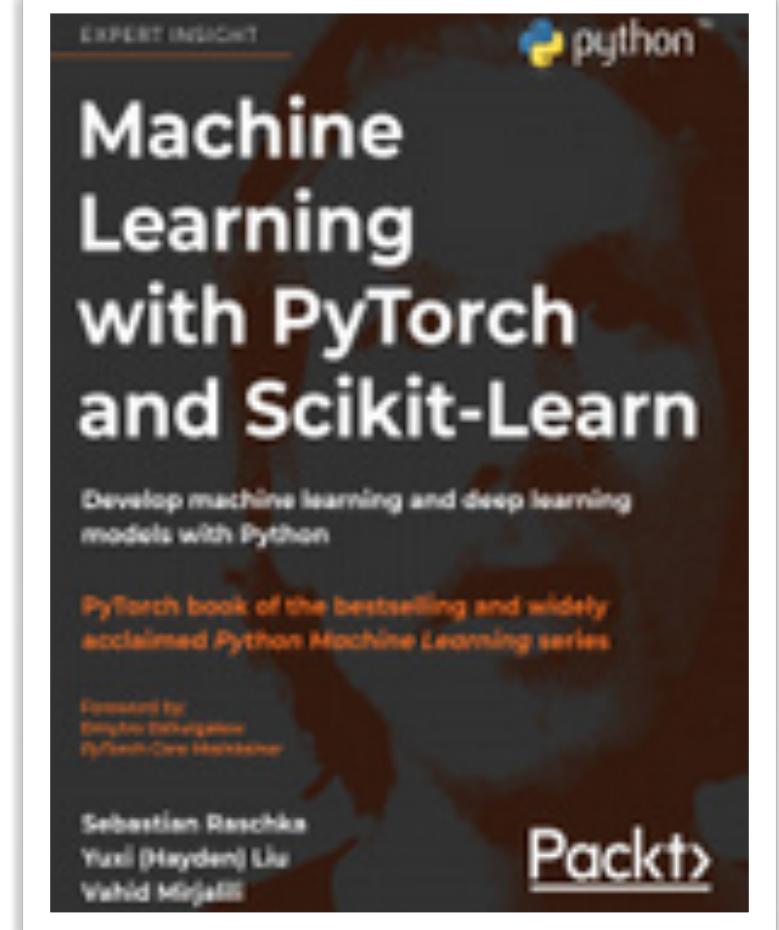
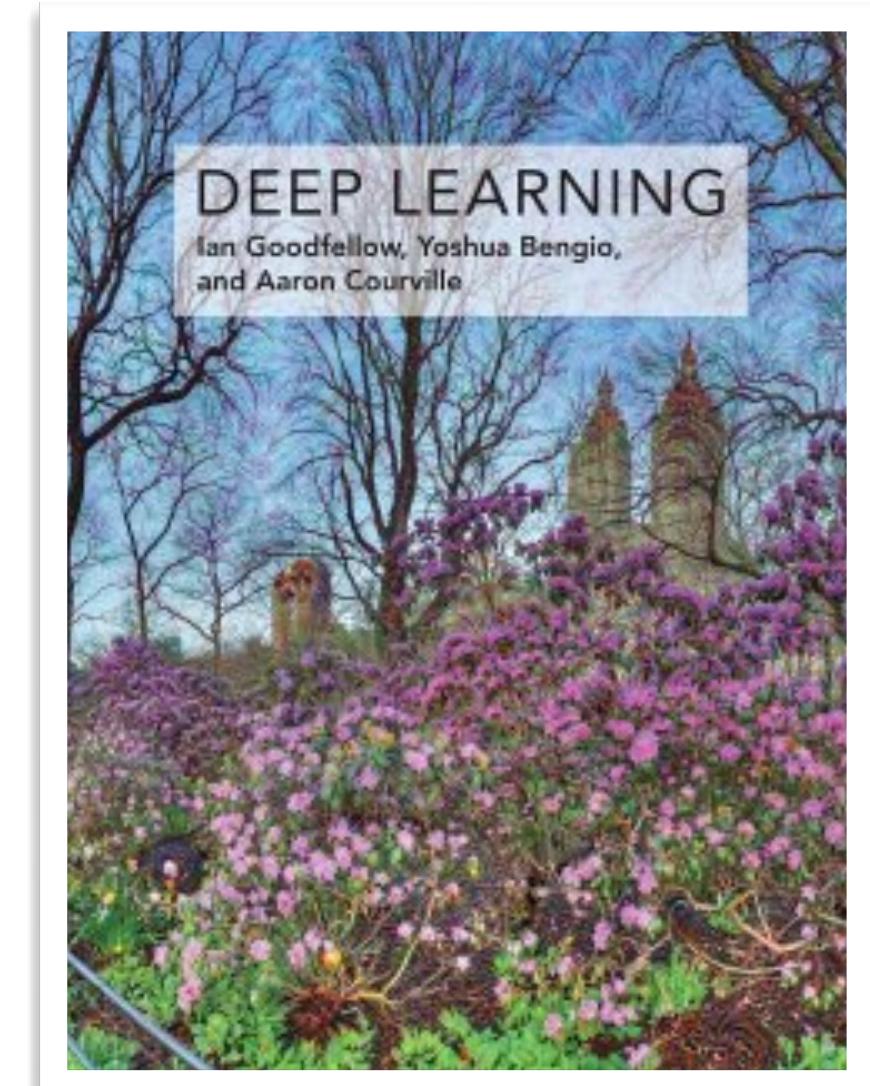
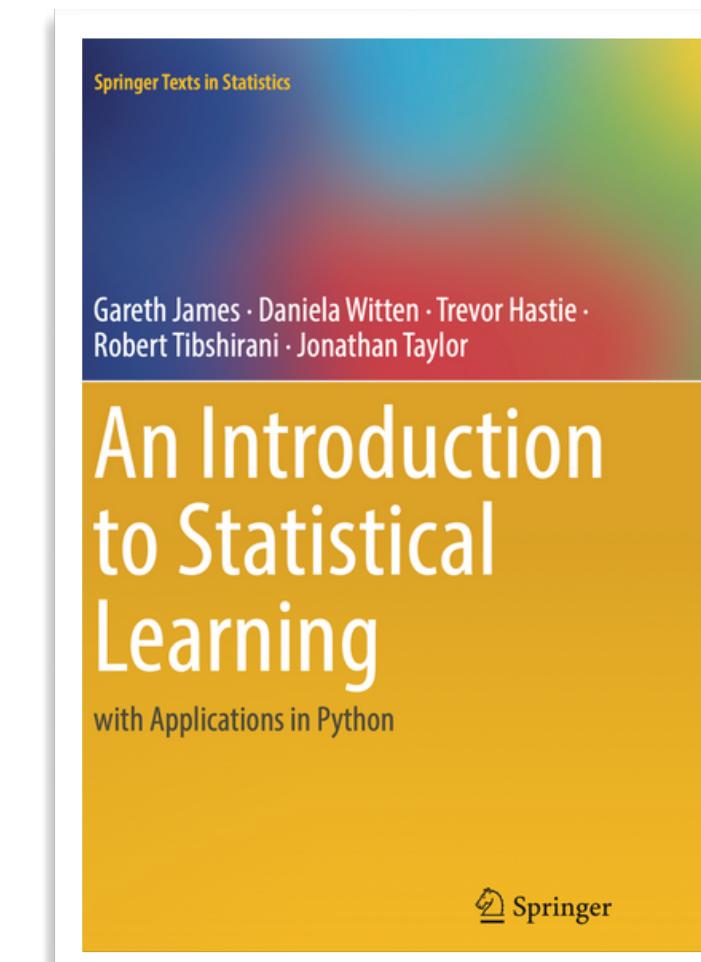
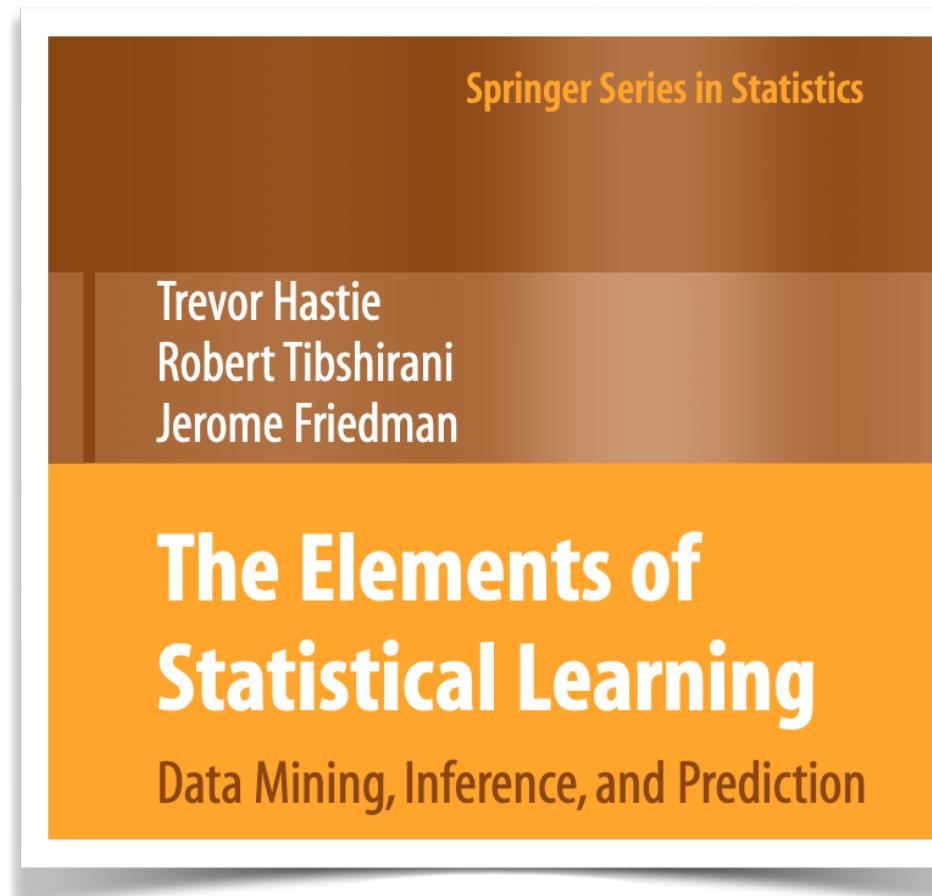
Q & A

In case of questions, you can start a discussion [here](#).



The screenshot shows the GitHub organization page for 'deeplife4eu'. The navigation bar includes 'Overview', 'Repositories', 'Discussions', 'Projects', 'Packages', 'Teams', 'People', and 'Settings'. A search bar at the top right contains the query 'is:open category:Q&A'. The left sidebar lists categories: 'View all discussions', 'Announcements', 'Ideas for hackathon projects', 'Polls', 'Q&A' (which is selected), 'Technical questions', and 'Practical sessions'. The main content area features a 'Q&A' section with the heading 'Ask the community for help'. Below it is a large box with the heading 'Welcome to Organization Discussions!' and the text: 'Organization discussions are to broadcast news, create conversation in your community, answer questions, and share ideas. To get started, you can [create a new discussion](#).'. A red box highlights the 'Q&A' section in the sidebar.

Resources



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PyTorch

Get Started Ecosystem Edge ▾ Blog Tutorials Docs ▾ Resources ▾ GitHub

2.2.1+cu121

Tutorials > Welcome to PyTorch Tutorials Shortcuts

Welcome to PyTorch Tutorials Additional Resources

Welcome to PyTorch Tutorials

What's new in PyTorch tutorials?

- PyTorch Inference Performance Tuning on AWS Graviton Processors
- Using TORCH_LOGS python API with `torch.compile`
- PyTorch 2 Export Quantization with X86 Backend through Inductor
- Getting Started with DeviceMesh
- Compiling the optimizer with `torch.compile`

Search Tutorials

PyTorch Recipes [+]

Introduction to PyTorch [-]

Learn the Basics

Quickstart

Tensors

Datasets & DataLoaders

Check website for links to books!

Final meeting



- Final hackathon meeting in **Heidelberg 14-16th June**
- Travel funds are available for participants from the 4EU+ universities (check with your local instructor)
- Goal: meet - talk - work - enjoy
- Hackathon like format with group projects across universities; keynote presentations
- Projects will be extensions of lab exercises

Details will be announced through the website!