Incubator Summer Academy - From Zero to Hero

Report of Contributions

Contribution ID: **2** Type: **not specified**

Opening Session and Keynote Speech

Monday 12 September 2022 09:00 (1 hour)

Join us in the opening of the Incubator Summer Academy!

This event will be take place via Zoom.

→ Register here ←

Target audience

Learning target

Previous experience

Maximum number of participants

Presenters: KOSMIDER, Andreas (Helmholtz Association); THEIS, Fabian (Helmholtz AI); WIESTLER, Otmar D. (Helmholtz Association)

Session Classification: General

Contribution ID: **3** Type: **not specified**

Intermediate: Sharing Scientific Software Solutions Across Tools and Domains with Helmholtz Imaging Solutions

Tuesday 13 September 2022 10:00 (2 hours)

Brief content:
1. Simplifying reproducibility for users and authors of scientific tools
2. Introduction to Helmholtz Imaging Solutions and Album
3. Basics of using Helmholtz Imaging Solutions
4. Writing your own Helmholtz Imaging Solution
5. Publishing solutions in a catalog

→ **Register here** ←

Target audience

Previous experience

Phython basics

Maximum number of participants

unlimited since online

Learning target

- How to save time when dealing with scientific software; - How to achieve reproducible scientific routines with existing tools

Primary author: HELMHOLTZ IMAGING

Presenters: SCHMIDT, Deborah; HELMHOLTZ IMAGING

Session Classification: Workshops (Helmholtz Imaging)

Track Classification: Intermediate

Contribution ID: **4** Type: **not specified**

Advanced: Machine Learning for Instance Segmentation and Tracking

Wednesday 21 September 2022 13:00 (2 hours)

based on python, follow-up to the course by Paul Jäger on September 15, 2022.

The course will build on the introduction to convolutional neural networks in Imaging by Paul Jäger, and will cover essential rules for designing your own networks, in particular when dealing with large image data. You will get hands-on experience in setting up and training your own networks for image analysis tasks like images classification and image segmentation.

The number of participants is limited to 20.

→ Register here ←

Target audience

no specific

Maximum number of participants

20

Previous experience

Python; the course is a follow up on the "Machine Learning-Based Biomedical Image Analysis" course by Paul Jäger, google account (we use GoogleColab)

Learning target

Hands-on experience in setting up and training your own networks for image analysis tasks.

Primary author: HELMHOLTZ IMAGING

Presenters: KAINMÜLLER, Dagmar (MDC Berlin); HELMHOLTZ IMAGING

Session Classification: Workshops (Helmholtz Imaging)

Track Classification: Expert track/Advanced

Contribution ID: **6** Type: **not specified**

Intermediate: Machine Learning-Based Biomedical Image Analysis

Thursday 15 September 2022 14:00 (2h 45m)

Brief Content:
1. Introduction to Machine Learning-based Image Analysis
2. Applications and Examples on Biomedical Images
3. Introduction to nnU-Net
4. Hands-on Tutorial on how to train and apply nnU-Net (using google colab). The tutorial starts right after this course and will take 45min, number of participants is limited to 30.

→ Register here ←

Learning target

Basic principles of Machine Learning and how it is used for Image analysis with focus on the biomedical domain. How to install and apply the state-of-the-art method in biomedical image segmentation: nnU-Net.

Maximum number of participants

Target audience

Data Science, Medical Informatics, Bioinformatics, Robotics

Previous experience

Enthusiasm for IT, General Programming Skills, google account (we use GoogleColab)

Primary author: HELMHOLTZ IMAGING

Presenters: LÜTH, Carsten (Helmholtz Imaging); HELMHOLTZ IMAGING; KLEIN, Lukas (Helmholtz Imaging); JÄGER, Paul (Helmholtz Imaging)

Session Classification: Workshops (Helmholtz Imaging)

Track Classification: Intermediate

Contribution ID: **7** Type: **not specified**

General: Helmholtz Imaging for you!

Friday 16 September 2022 11:00 (45 minutes)

From Helmholtz Imaging Modalities to the Helpdesk to Solutions to great images! A quick tour through the Helmholtz Imaging portfolio and how you can exploit our support and services to do your imaging experiments.

→ Register here ←

If you want to join spontaneously, here is the link:
https://desy.zoom.us/j/66379738048 (Kenncode: HI4U)

Target audience

all

Learning target

Get to know Helmholtz Imaging

Previous experience

None

Maximum number of participants

unlimited

Primary author: HELMHOLTZ IMAGING

Presenters: HELMHOLTZ IMAGING; HEUSER, Philipp (HIP/DESY)

Session Classification: General

Track Classification: Fundamental

Contribution ID: **8** Type: **not specified**

Data Challenge: Kick-off

Wednesday 14 September 2022 17:00 (1 hour)

Help a hematologist out!

Join us and find elegant domain transfer solutions for blood-cell classification.

Manual classification of blood cells is a tedious, but important task, for instance to diagnose diseases such as anemia or leukemia. Machine learning makes it easier, but algorithms that work on one set of images might not work on another. Join this challenge and find a solution that may contribute to making clinicians lives easier.

We'll kick off on September 14 with an introduction to the challenge and end with our award ceremony on September 23. You'll be working on your own time. On all days of the challenge there will be mentor support availabe in gather.town from 12-13 pm. Computing resources are available via HAICORE.

Sign up now!

Deadline for submissions: 22.09.2022

→ Register here ←

Target audience

Learning target

Previous experience

Maximum number of participants

Session Classification: Data Challenge

Contribution ID: **9** Type: **not specified**

Intermediate: Introduction to Napari

Thursday 22 September 2022 10:00 (4 hours)

It is recommended to take a Python-Basics Course before. For example from the first week of this Summer Academy.

In this course we will introduce image processing with Python, Jupyter lab and Napari. Students will learn how to process images interactively in Napari and afterwards how to replicate the same results in Jupyter notebooks. Additionally, the students will get an idea how to export tables of measurements and plot results in Jupyter notebooks. The notebooks can then be conserved and allow reproducible image data science mid-/long-term. We will use Python libraries such as numpy, scipy, scikit-image, pandas and matplotlib. Furthermore, GPU-accelerated image processing using pyclesperanto for processing 3D data will be introduced as well.

Attendees who attend the course should go through the installation instructions provided on this website:
https://www.napari-hub.org/plugins/devbio-napari#installation

In case of issues with the installation, attendees can reach out any time –before the course - by opening a thread on https://image.sc and tagging @haesleinhuepf . Or **consider joining the session at 9:30 to solve installation issues**.

This course is an excelent follow up to the lecture series Imaging - from Organisms to Molecules runing this summer term. **Participants of the lecture will be given preference in participation.**

→ Register here ←

Maximum number of participants

unlimited

Previous experience

Phython basics.

Target audience

Researcher from Biology, Chemistry, Physics, Engineering, Computer Science, Mathematics with an affinity to Imaging

Learning target

how to process images interactively in Napari, how to replicate the same results in Jupyter notebooks, how to export tables of measurements and plot results in Jupyter notebooks. GPU-accelerated image processing using pyclesperanto for processing 3D data will be introduced as well

Presenters: HELMHOLTZ IMAGING; HAASE, Robert (TU Dresden)

Session Classification: Workshops (Helmholtz Imaging)

Track Classification: Intermediate

Contribution ID: **10** Type: **not specified**

Fundamental: Fundamentals of Scientific Metadata / day 1

Wednesday 14 September 2022 09:00 (5 hours)

In this course we will look at the intricate relationship between (digital) research data, metadata and knowledge, discuss why metadata is critical in today's research, as well as explain some of the technologies and concepts related to structured machine-readable metadata.

Have you ever struggled to make sense of scientific data provided by a collaborator - or even understanding your own data 5 months after publication? Do you see difficulties in meeting the data description requirements of your funding agency? Do you want your data to have lasting value, but don't know how to ensure that?

Precise and structured description of research data is key for scientific exchange and progress - and also for the recognition of your effort in data collection. The solution: make your data findable, accessible, interoperable and reusable by describing them with metadata.

You will learn:

- about the differences between and the importance of data & metadata
- to annotate your research data with structured metadata
- to find and evaluate a suitable metadata framework and data repository
- to use basic Markdown / JSON / XML
- which tools are already available to level up your metadata annotation game
- why structured metadata is important and how it can increase your scientific visibility

organized by HMC Hub Information

→ **Register here** ←

Learning target

Target audience

PhD students, Postdocs, early career researchers

Previous experience

none

Maximum number of participants

20

Presenters: STRUPP, Annika; GERLICH, Silke (HMC)

Session Classification: Workshops (HMC)

Track Classification: Fundamental

Contribution ID: **11** Type: **not specified**

Fundamental: Fundamentals of Scientific Metadata / day 2

Thursday 15 September 2022 09:00 (5 hours)

In this course we will look at the intricate relationship between (digital) research data, metadata and knowledge, discuss why metadata is critical in today's research, as well as explain some of the technologies and concepts related to structured machine-readable metadata.

Have you ever struggled to make sense of scientific data provided by a collaborator - or even understanding your own data 5 months after publication? Do you see difficulties in meeting the data description requirements of your funding agency? Do you want your data to have lasting value, but don't know how to ensure that?

Precise and structured description of research data is key for scientific exchange and progress - and also for the recognition of your effort in data collection. The solution: make your data findable, accessible, interoperable and reusable by describing them with metadata.

You will learn:

- about the differences between and the importance of data & metadata
- to annotate your research data with structured metadata
- to find and evaluate a suitable metadata framework and data repository
- to use basic Markdown / JSON / XML
- which tools are already available to level up your metadata annotation game
- why structured metadata is important and how it can increase your scientific visibility

organized by HMC Hub Information

This is day two of the course starting on September 14 at 9 am.

Learning target

Target audience

PhD students, Postdocs, early career researchers

Previous experience

none

Maximum number of participants

20

Presenters: STRUPP, Annika; GERLICH, Silke (HMC)

Session Classification: Workshops (HMC)

Track Classification: Fundamental

Contribution ID: **12** Type: **not specified**

POSTPONED: Intermediate: Cooperation HMC + Helmholtz Imaging: Imaging Metadata

Monday 19 September 2022 14:00 (3 hours)

Metadata for scientific images is crucial for the success of any imaging experiment. What are metadata, where do you find them, how do you exploit them? The use of metadata in imaging highly depends on the domain. In some research areas metadata is already a well established standard while others scribble them in their notebook.

Here we will give an introduction to metadata in imaging, using some use cases as examples, and show you some hands on examples how to deal with them in python.

Agenda:

- What is metadata?
- Imaging Modalities in the case studies
- Case Study - Photon and Neutron Science Imaging
- Case Study - Oceanic Imaging
- Case Study - Medical Imaging
- Hands-on: Jupyter notebook for image metadata

Basic Python knowledge will help you to follow the hands-on (but it is not mandatory).
If you want to learn more about metadata, we invite you to take a look at HMCs training material collection: https://helmholtz-metadaten.de/en/hmc-office/training-material-collection

→ Register here ←

Maximum number of participants

Target audience

Working with imaging modalities

Learning target

Record imaging metadata and select suitable metadata standards

Previous experience

Nice to have, not mandatory: Capturing and organizing images, metadata

Presenters: CRISTIANO, Luigia (HZB); NOLDEN, Marco (DKFZ); HEUSER, Philipp (HIP/DESY); SCHOENING, Timm (GEOMAR)

Contribution ID: **14** Type: **not specified**

Data Challenge: Closing & Award Ceremony

Friday 23 September 2022 11:00 (1 hour)

The top three teams will present their solutions to the *Incubator Summer Academy* data challenge "Help a hematologist out!".

The closing & award ceremony will take place via Zoom.

Register here

Target audience

Learning target

Previous experience

Maximum number of participants

Session Classification: Data Challenge

Contribution ID: **15** Type: **not specified**

Fundamental: Introduction to Python

Monday 12 September 2022 10:00 (7h 30m)

Note: Due to huge demand we will offer this event also on 6., 9. and 12. September. Please choose the date that best suits you when registering.

In this workshop, participants will learn how to work with the Python programming language. We will introduce the basic building blocks needed to "make the computer do stuff" and lay a solid basis for future self-guided learning or more advanced courses.

No prior knowledge in programming is required. We do recommend Thonny (https://thonny.org/) as a good starter tool, but you are free to bring your own setup.

We will include a break of 30 minutes after around 90 minutes of workshop and a lunch break of 60 minutes.

→ Register here ←

Previous experience

Target audience

People who have never programed before or want to switch to the Python language

Maximum number of participants

20

Learning target

Acqiure a fundamental understanding how to write programs in Python and have a basis for future learning

Primary author: ERXLEBEN, Fredo (Helmholtz-Zentrum Dresden-Rossendorf)

Presenter: ERXLEBEN, Fredo (Helmholtz-Zentrum Dresden-Rossendorf)

Session Classification: Workshops (HIFIS)

Track Classification: Fundamental

Contribution ID: **17** Type: **not specified**

Fundamental: Introduction to Git

Tuesday 13 September 2022 09:00 (6 hours)

The workshop provides a solid introduction into the practical usage of the version control system Git in combination with the collaboration platform GitLab.

This workshop will cover the following topics:

- Introduction to version control
- Git setup
- Basic local Git workflow
- Branching and merging
- Resolving Conflicts

→ Register here ←

Target audience

Learning target

Previous experience

Maximum number of participants

Primary authors: WOLFF, Benjamin (Deutsches Zentrum für Luft- und Raumfahrt); SCHLAUCH, Tobias (DLR)

Presenters: WOLFF, Benjamin (Deutsches Zentrum für Luft- und Raumfahrt); SCHLAUCH, Tobias (DLR)

Session Classification: Workshops (HIFIS)

Track Classification: Fundamental

Contribution ID: **18** Type: **not specified**

Intermediate: Data Science with Python (Pandas)

Wednesday 14 September 2022 09:00 (5 hours)

In this quick workshop we will get an overview over the data science framework *pandas*.

Participants should have some fundamental knowledge on how to work with Python and have a working Python-installation ready and the *pandas*-package installed.

The workshop contains a code-along introduction and a introduces a set of exercises to build some practical experience.
Instructors will be available to help with the exercises and give feedback on your solutions.

The workshop includes a 30-minute break every 90 minutes and offers the opportunity to take a lunch break at your own discretion during the exercise part (after 12:30).

→ Register here ←

Target audience

People familiar with Python who want to get to know the popular data science framework

Previous experience

Python Fundamentals

Maximum number of participants

20

Learning target

Get an overview over the framework and gather first hands-on experience working with pandas

Primary author: ERXLEBEN, Fredo (Helmholtz-Zentrum Dresden-Rossendorf)

Presenters: ERXLEBEN, Fredo (Helmholtz-Zentrum Dresden-Rossendorf); FOERSTER, Thomas (HZDR)

Session Classification: Workshops (HIFIS)

Track Classification: Intermediate

Contribution ID: **19** Type: **not specified**

Intermediate: Introduction to GitLab CI

Thursday 15 September 2022 09:00 (5 hours)

This workshop provides a practical introduction to Continuous Integration (CI) using GitLab CI. It will cover these aspects:

- Setting up a basic CI pipeline with linting and testing.
- Advanced concepts to optimize the CI implementation. With a focus on
  - Performance
  - Reducing Redundancies
  - Concise pipeline definition and cross-project reuse.
- Optional: Other useful examples what CI could be used for.

→ Register here ←

Target audience

Learning target

Previous experience

Maximum number of participants

Primary author: HUSTE, Tobias (Helmholtz-Zentrum Dresden-Rossendorf)

Co-authors: HUESER, Christian (Helmholtz-Zentrum Dresden-Rossendorf (HZDR)); ZIEGNER, Norman (UFZ)

Presenters: HUESER, Christian (Helmholtz-Zentrum Dresden-Rossendorf (HZDR)); ZIEGNER, Norman (UFZ); HUSTE, Tobias (Helmholtz-Zentrum Dresden-Rossendorf)

Session Classification: Workshops (HIFIS)

Track Classification: Intermediate

Contribution ID: **20** Type: **not specified**

Fundamental: Introduction to GitLab

Wednesday 14 September 2022 09:00 (6 hours)

This workshop provides a practical introduction into GitLab.

In detail, we cover the following topics:
- Overview about GitLab
- Working with the Git repository
- Planning tasks using Issues
- Collaboration using Merge Requests
- Overview of advanced functionalities

→ **Register here** ←

Target audience

Learning target

Previous experience

Maximum number of participants

Primary authors: WOLFF, Benjamin (Deutsches Zentrum für Luft- und Raumfahrt); SCHLAUCH, Tobias (DLR)

Presenters: WOLFF, Benjamin (Deutsches Zentrum für Luft- und Raumfahrt); SCHLAUCH, Tobias (DLR)

Session Classification: Workshops (HIFIS)

Track Classification: Fundamental

Contribution ID: **21** Type: **not specified**

Intermediate: Visualization with Python (matplotlib)

Thursday 15 September 2022 09:00 (5 hours)

In this quick workshop we will get an overview over the data visualization framework *matplotlib*.

Participants should have some fundamental knowledge on how to work with Python + *pandas* and have a working Python-installation ready and the *pandas* and *matplotlib*-packages installed.

The workshop contains a code-along introduction and a introduces a set of exercises to build some practical experience.
Instructors will be available to help with the exercises and give feedback on your solutions.

The workshop includes a 30-minute break every 90 minutes and offers the opportunity to take a lunch break at your own discretion during the exercise part (after 12:30).

→ Register here ←

Target audience

People interested in data visualization

Previous experience

Python Fundamentals, Experience in Pandas

Maximum number of participants

20

Learning target

Use the Python framework matplotlib to create visualizations from data sets

Primary author: ERXLEBEN, Fredo (Helmholtz-Zentrum Dresden-Rossendorf)

Presenters: ERXLEBEN, Fredo (Helmholtz-Zentrum Dresden-Rossendorf); FOERSTER, Thomas (HZDR)

Session Classification: Workshops (HIFIS)

Track Classification: Intermediate

Contribution ID: **22** Type: **not specified**

Intermediate: Foundations of Research Software Publication

Wednesday 21 September 2022 09:00 (5 hours)

We will provide you with actionable advice about how to prepare your research code before publishing it or submitting it alongside a research publication.

This workshop will cover the the following topics:

- Code repository structuring
- Minimum coding practices
- Documentation
- Open source licensing
- Minimum software release practices
- Software citation

We demonstrate the practical implementations of the presented topics using a data publication project as an example.

→ **Register here** ←

Target audience

Learning target

Previous experience

Maximum number of participants

Primary authors: WOLFF, Benjamin (Deutsches Zentrum für Luft- und Raumfahrt); SCHLAUCH, Tobias (DLR)

Presenters: WOLFF, Benjamin (Deutsches Zentrum für Luft- und Raumfahrt); SCHLAUCH, Tobias (DLR)

Session Classification: Workshops (HIFIS)

Track Classification: Intermediate

Contribution ID: **23** Type: **not specified**

General: Helmholtz Career Corner

Thursday 22 September 2022 16:00 (2 hours)

Come and join us in the Helmholtz Career Corner in gather.town!

This is the place where you can gather information about career opportunities within the Helmholtz Community- be it the latest job openings or exchange opportunities. Get an overview of the activities of some Helmholtz Centers and platforms, and network with your peers and representatives from the Helmholtz Community.

Additionally, we are happy to announce the addition of two new partners to the Career Corner: Siemens and ELLIS will present their PhD and Postdoc programs.

You have already received the link to our gather.town space by email at the beginning of the Incubator Summer Academy. We are looking forward to seeing you there!

→ Register here ←

Target audience

Learning target

Previous experience

Maximum number of participants

Presenters: BUEHRIG, Sophia; SCHWORM, Stephanie; SCHWARZE, Viktoria (Helmholtz Information & Data Science Academy)

Session Classification: General

Contribution ID: **24** Type: **not specified**

Intermediate: Introduction to Statistical Learning / day 1

Wednesday 21 September 2022 14:00 (3h 30m)

Topics covered involve basic concepts in statistical learning, as well as supervised learning techniques (high-dimensional regression and classification) and unsupervised learning (mixture models and dimension reduction).

→ Register here ←

Target audience

PhD students and any other academics with a master degree

Previous experience

Python, Numpy, Sklearn

Maximum number of participants

-

Learning target

Participants will understand the fundamentals behind statistical learning and standard ML techniques such as linear regression, lasso, adaboost and random forest etc.

Presenter: PENG, Tingying

Session Classification: Workshops (Helmholtz AI)

Track Classification: Intermediate

Contribution ID: **25** Type: **not specified**

Advanced: Introduction to Interpretable Machine Learning

Thursday 22 September 2022 14:00 (4 hours)

During this course participants will get an introduction to the topic of Explainable AI (XAI). The goal of the course is to help participants understand how XAI methods can help uncover biases in the data or provide interesting insights. After a general introduction to XAI, the course goes deeper into state-of-the-art model agnostic interpretation techniques as well as a practical session covering these techniques. Finally, we will focus on two model specific post-hoc interpretation methods, with hands-on training covering interpretation of random forests and neural networks with imaging data to learn about strengths and weaknesses of these standard methods used in the field.

→ Register here ←

Target audience

Any

Maximum number of participants

50

Previous experience

Attended course Introduction to Machine Learning and Introduction to Deep Learning (or relevant experience)

Learning target

Participants will gain an understanding and practical experience of classic interpretability methods for Machine Learning and Deep Learning

Presenters: BUKAS, Christina (Helmholtz AI); CEA, Donatella (Helmholtz AI); GEORGII, Elisabeth (Helmholtz AI); MERDIVAN, Erinc (Helmholtz AI); SUBRAMANIAN, Harshavardhan (Helmholtz AI); PELIN, Helena (Helmholtz AI); HOFFMANN, Helene (Helmholtz AI); MEKKI, Isra (Helmholtz AI); BARROS DE ANDRADE E SOUSA, Lisa (Helmholtz AI); VALIZADEH, Mahyar (Helmholtz AI); PIRAUD, Marie (H.AI/ HMGU); UMER, Rao Muhammad (Helmholtz Munich); STARKE, Sebastian (Helmholtz AI)

Session Classification: Workshops (Helmholtz AI)

Track Classification: Expert track/Advanced

Contribution ID: **26** Type: **not specified**

General: Keynote

Outcome of the Pilot Project AI-CORE: https://www.ai-core.eoc.dlr.de/

Target audience

Learning target

Previous experience

Maximum number of participants

Presenters: RÖSEL, Anja; HEIDLER, Konrad

Contribution ID: **27** Type: **not specified**

Helmholtz Entrepreneurs: From Idea to I did

Tuesday 20 September 2022 15:00 (2 hours)

What is entrepreneurial thinking and why does it matter?

Entrepreurial thinking is a way of thinking and refers to the capacity to act upon opportunities and ideas, and to transform them into value for others. It is founded upon creativity, critical thinking and problem solving, taking initiative and perseverance and the ability to work collaboratively in order to plan and manage projects that are of cultural, social or financial value.

Why does it matter? Businesses and employers across all sectors presuppose the academic and technical excellence of graduates. However, they must increasingly differentiate and identify future employees based on core competencies and skills, such as creative problem-solving, teamwork, understanding of risk and overall resilience. In many countries, however, academic institutions are very slow to adjust, partly because traditional career advancement in academia is mostly dependent on research activity. In the same way as labour markets and workplaces are undergoing rapid change, higher education and research institutions need to adjust in order to stay relevant. This requires entrepreneurial thinking among students, researchers and staff alike.

This workshop is based on experiential and action-based learning and will give participants a short, hands-on introduction on what it means to think entrepreneurially and how it may be useful in career development.

→ Register here ←

Target audience

any academic level

Learning target

Basics of entrepreneurship, Understanding of the opportunities to create a start-up

Previous experience

Optional: Entrepreneurship event beginning of June

Maximum number of participants

-

Presenters: VAN HOLTHE, Emma (Helmholtz AI); ALEXANDRAKIS, Julian (Helmholtz Transfer); SEYFRID, Mathieu (Helmholtz AI)

Session Classification: General

Contribution ID: **28** Type: **not specified**

Intermediate: Introduction to Deep Learning / day 1

Monday 19 September 2022 09:00 (8 hours)

This is an hands-on introduction to the first steps in Deep Learning, intended for researchers who are familiar with (non-deep) Machine Learning.

The use of Deep Learning has seen a sharp increase of popularity and applicability over the last decade. While Deep Learning can be a useful tool for researchers from a wide range of domains, taking the first steps in the world of Deep Learning can be somewhat intimidating.

We start with explaining the basic concepts of neural networks, and then go through the different steps of a Deep Learning workflow. Learners will learn how to prepare data for deep learning, how to implement a basic Deep Learning model in Python with Keras, how to monitor and troubleshoot the training process and how to implement different layer types such as convolutional layers.

More information can be found here: https://carpentries-incubator.github.io/deep-learning-intro/

→ Register here ←

Maximum number of participants

20-25

Target audience

Any Academic Level

Previous experience

numpy ndarrays, fundamentals of classification - ideally participants will have already taken the Intoruction to Machine Learning course

Learning target

This introduction aims to cover the basics of Deep Learning in a practical and hands-on manner, so that upon completion, you will be able to train your first neural network and understand what next steps to take to improve the model

Presenter: STEINBACH, Peter (HZDR)

Session Classification: Workshops (Helmholtz AI)

Track Classification: Intermediate

Contribution ID: **29** Type: **not specified**

Intermediate: Introduction to Machine Learning / day 1

Thursday 15 September 2022 14:00 (4 hours)

This course will introduce participants to the concepts of AI and Machine Learning, covering clustering and clasifications fundamentals as well as practical experience with standard methods for both techniques. Lastly, participants will gain an insight on best practises for evaluating a machine learning model's performance (ROC curve, FPR etc.)

More information can be found here: https://deeplearning540.github.io/

→ Register here ←

Target audience

any academic level

Previous experience

fundamentals of pandas

Maximum number of participants

20-25

Learning target

Learn fundamentals of Machine Learning and gain hands-on experience with training clustering and clasification models

Presenter: STEINBACH, Peter (HZDR)

Session Classification: Workshops (Helmholtz AI)

Track Classification: Intermediate

Contribution ID: **30** Type: **not specified**

Fundamental: Reproducible Data Science / day 1

Tuesday 13 September 2022 13:00 (5 hours)

Topics:
- What is reproducible research?
- Reproducible research practices
- Project organisation for reproducible research
- Reproducible analyses

This course will span over two days. The second half will be on September 14 at 2 pm.

→ **Register here** ←

Target audience

PhD students at all levels and any other interested person

Learning target

In this workshop you will learn about the most important reproducible research practices and start implementing them. This includes project organization and publication of research output (data, code, etc.). This is a practical workshop where you will improve your current research project.

Maximum number of participants

25-30

Previous experience

Basic coding skills (e.g. R or Python)

Presenter: SEIBOLD, Heidi

Session Classification: Workshops (Helmholtz AI)

Track Classification: Fundamental

Contribution ID: **31** Type: **not specified**

?? Introduction to Fiji

Target audience

Learning target

Previous experience

Maximum number of participants

Contribution ID: **32** Type: **not specified**

?? Imaging Libraries

Target audience

Learning target

Previous experience

Maximum number of participants

Contribution ID: **33** Type: **not specified**

HIDA lecture: Data-Driven Inertial Sensing

Friday 16 September 2022 10:00 (1 hour)

The purpose of navigation is to determine the position, velocity, and orientation of manned and autonomous platforms, humans, and animals. Obtaining accurate navigation commonly requires fusion between several sensors, such as inertial sensors and global navigation satellite systems, in a model-based nonlinear estimation framework. Recently, data-driven approaches applied in various fields show state-of-the-art performance, compared to model-based methods. In this talk, we address data-driven based navigation algorithms, recently derived at the autonomous navigation and sensor fusion lab. The purpose of those algorithms is to enhance common navigation and estimation tasks and open new possibilities for accurate and robust navigation. Data driven inertial navigation topics included in this talk will highlight hybrid learning and end to end learning approaches for different platforms and applications such as: pedestrian dead reckoning with inertial sensors, quadrotor dead recooking, learning vehicle trajectory uncertainty by hybrid models, and autonomous underwater vehicle navigation.

This lecture will take place in a hybrid format: We will stream the talk via Zoom from our HIDA offices in Berlin-Mitte.

→ Register here ←

Maximum number of participants

Learning target

Target audience

Open to everyone

Previous experience

None

Presenter: KLEIN, Itzik (The Hatter Department of Marine Technology, Charney School of Marine Sciences, University of Haifa, Israel)

Session Classification: General

Contribution ID: **36** Type: **not specified**

Intermediate: Introduction to Deep Learning / day 2

Tuesday 20 September 2022 09:00 (8 hours)

This is an hands-on introduction to the first steps in Deep Learning, intended for researchers who are familiar with (non-deep) Machine Learning.

The use of Deep Learning has seen a sharp increase of popularity and applicability over the last decade. While Deep Learning can be a useful tool for researchers from a wide range of domains, taking the first steps in the world of Deep Learning can be somewhat intimidating.

We start with explaining the basic concepts of neural networks, and then go through the different steps of a Deep Learning workflow. Learners will learn how to prepare data for deep learning, how to implement a basic Deep Learning model in Python with Keras, how to monitor and troubleshoot the training process and how to implement different layer types such as convolutional layers.

More information can be found here: https://carpentries-incubator.github.io/deep-learning-intro/

This is day two of the course starting on September 19 at 9 am.

Maximum number of participants

20-25

Target audience

Any Academic Level

Previous experience

numpy ndarrays, fundamentals of classification - ideally participants will have already taken the Intoruction to Machine Learning course

Learning target

This introduction aims to cover the basics of Deep Learning in a practical and hands-on manner, so that upon completion, you will be able to train your first neural network and understand what next steps to take to improve the model

Presenter: STEINBACH, Peter (HZDR)

Session Classification: Workshops (Helmholtz AI)

Track Classification: Intermediate

Contribution ID: **37** Type: **not specified**

Intermediate: Introduction to Machine Learning / day 2

Friday 16 September 2022 09:00 (8 hours)

This is day two of the course starting on September 15 at 2 pm.

This course will introduce participants to the concepts of AI and Machine Learning, covering clustering and clasifications fundamentals as well as practical experience with standard methods for both techniques. Lastly, participants will gain an insight on best practises for evaluating a machine learning model's performance (ROC curve, FPR etc.)

More information can be found here: https://deeplearning540.github.io/

Previous experience

fundamentals of pandas

Maximum number of participants

20-25

Target audience

any academic level

Learning target

Learn fundamentals of Machine Learning and gain hands-on experience with training clustering and clasification models

Presenter: STEINBACH, Peter (HZDR)

Session Classification: Workshops (Helmholtz AI)

Track Classification: Intermediate

Contribution ID: **38** Type: **not specified**

Intermediate: Introduction to Statistical Learning Day 2

Thursday 22 September 2022 09:00 (3h 30m)

Topics covered involve basic concepts in statistical searning, as well as supervised learning techniques (high-dimensional regression and classification) and unsupervised learning (mixture models and dimension reduction).

This is day two of the course starting on September 21 at 2 pm.

Previous experience

Python, Numpy, Sklearn

Maximum number of participants

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Target audience

PhD students and any other academics with a master degree

Learning target

Participants will understand the fundamentals behind statistical learning and standard ML techniques such as linear regression, lasso, adaboost and random forest etc.

Presenter: PENG, Tingying

Session Classification: Workshops (Helmholtz AI)

Track Classification: Intermediate

Contribution ID: **39** Type: **not specified**

Fundamental: Reproducible Data Science / day 2

Wednesday 14 September 2022 14:00 (3 hours)

Topics:
- What is reproducible research?
- Reproducible research practices
- Project organisation for reproducible research
- Reproducible analyses

This is day two of the course starting on September 13 at 1 pm.

Maximum number of participants

25-30

Target audience

PhD students at all levels and any other interested person

Learning target

In this workshop you will learn about the most important reproducible research practices and start implementing them. This includes project organization and publication of research output (data, code, etc.). This is a practical workshop where you will improve your current research project.

Previous experience

Basic coding skills (e.g. R or Python)

Presenter: SEIBOLD, Heidi

Session Classification: Workshops (Helmholtz AI)

Contribution ID: **40** Type: **not specified**

DC: Hearts-Gym Kick-off

Teach an agent to play the Hearts card game, get into touch with multi-agent reinforcement learning.

Target audience

PhD students at all levels and any other interested person

Previous experience

Python, Git

Maximum number of participants

40

Learning target

Deep reinforcement learning basics, collaborative software development, work with a foreign code base.

Presenters: EBERT, Jan; KESSELHEIM, Stefan (FZ Jülich)

Contribution ID: **41** Type: **not specified**

Intermediate: Tutorial for ”Machine Learning-Based Biomedical Image Analysis”

Thursday 15 September 2022 16:45 (45 minutes)

Brief Content:
This tutorial is designed as a follow-up to the intermediate course “Machine Learning-Based Biomedical Image Analysis” on September 15, 2022 at 10:00 by Paul Jäger et al.

It comprises a hands-on Tutorial on how to train and apply nnU-Net (using google colab). **The number of participants is limited to 30.**

Participation in the course *“Machine Learning-Based Biomedical Image Analysis”* is mandatory.

Target audience

Data Science, Medical Informatics, Bioinformatics, Robotics

Learning target

Basic principles of Machine Learning and how it is used for Image analysis with focus on the biomedical domain. How to install and apply the state-of-the-art method in biomedical image segmentation: nnU-Net.

Maximum number of participants

30

Previous experience

Participation in “Intermediate: Machine Learning-Based Biomedical Image Analysis”, Enthusiasm for IT, General Programming Skills, google account (we use GoogleColab)

Primary author: HELMHOLTZ IMAGING

Presenters: LÜTH, Carsten (Helmholtz Imaging); HELMHOLTZ IMAGING; KLEIN, Lukas (Helmholtz Imaging); JÄGER, Paul (Helmholtz Imaging)

Session Classification: Workshops (Helmholtz Imaging)

Contribution ID: **42** Type: **not specified**

Optional: Solve installation issues (related to the Napari Workshop)

Thursday 22 September 2022 09:30 (30 minutes)

This 30min slot is optional for those who had problems installing the program.
https://www.napari-hub.org/plugins/devbio-napari#installation

Please do install the programm before!
In case of issues with the installation, attendees can reach out any time –before the course - by opening a thread on https://image.sc and tagging @haesleinhuepf .

Use this session to solve still remaining issues with Robert (@haesleinhuepf).

Previous experience

Phython basics.

Maximum number of participants

unlimited

Target audience

Researcher from Biology, Chemistry, Physics, Engineering, Computer Science, Mathematics with an affinity to Imaging

Learning target

how to process images interactively in Napari, how to replicate the same results in Jupyter notebooks, how to export tables of measurements and plot results in Jupyter notebooks. GPU-accelerated image processing using pyclesperanto for processing 3D data will be introduced as well

Primary author: HELMHOLTZ IMAGING

Presenters: HELMHOLTZ IMAGING; HAASE, Robert (TU Dresden)

Session Classification: Workshops (Helmholtz Imaging)

Contribution ID: **43** Type: **not specified**

Intermediate: WS: Foundations of Research Software Publication

We will provide you with actionable advice about how to prepare your research code before publishing it or submitting it alongside a research publication.

This workshop will cover the the following topics:

- Code repository structuring
- Minimum coding practices
- Documentation
- Open source licensing
- Minimum software release practices
- Software citation

We demonstrate the practical implementations of the presented topics using a data publication project as an example.

Presenters: WOLFF, Benjamin; SCHLAUCH, Tobias

Contribution ID: **44** Type: **not specified**

Intermediate: WS: Foundations of Research Software Publication

We will provide you with actionable advice about how to prepare your research code before publishing it or submitting it alongside a research publication.

This workshop will cover the the following topics:

- Code repository structuring
- Minimum coding practices
- Documentation
- Open source licensing
- Minimum software release practices
- Software citation

We demonstrate the practical implementations of the presented topics using a data publication project as an example.

Presenters: WOLFF, Benjamin; SCHLAUCH, Tobias

Session Classification: Workshops (HIFIS)

Contribution ID: **45** Type: **not specified**

HIDA lecture: What is Health? Taking a Non Dualist Multi-Scale Approach to Studying Adaptive Immune Interactions

Wednesday 21 September 2022 09:00 (1 hour)

The reductive approach which sees health as the rejection of the other - be it cancer or pathogens is false. As we learn more about the individual characteristics of cells in the body and the variable forms of immune responses it becomes ever clearer that we need a new paradigm of study one that considers open systems of interactions across scales of biology rather than defining sharp borders of good and bad health outcomes. The immune system is comprised of multivariate B cells and T cells. To develop these repertiores they must first be tested for some level of activity. They are then activated during an immune response. Most commonly this secondary activation is seen to be by pathogens. However, it is becoming every clearer that these are not the only events that interest or influence are immune repertiores and their role in promoting health. The immune system also helps to cultivate and moderate the commensal bacteria in our gut and is a key factor in the modulation of cancer and autoimmunity. Setting goals and borders for the immune system is thus not an effective way to understand what it is doing. Instead we should study as far as we can the processes of immune interaction and change. In this lecture I will present our attempts to charecterize how the genome of B cell receptors encodes the potential for change in the adaptive immune system and how this is translated into actual patterns of diversity, implemented in a specific immune responses. I hope these ideas and findings will lead to further questions and help spark new conversations and research projects.

This lecture will take place via Zoom.

→ Register here ←

Target audience

Learning target

Previous experience

Maximum number of participants

Presenter: Prof. HERSHBERG, Uri (Chair of the Center for Biophysics and Quantitative Biology, University of Haifa, Israel)

Session Classification: General

Contribution ID: **46** Type: **not specified**

HMC FAIR Friday: Metadata as a key? Open science, good scientific practice and research integrity

Friday 23 September 2022 10:00 (1 hour)

Openness is a pillar for good scientific practice and contributes to research integrity. How do metadata fit in here?

About HMC FAIR Friday
To stimulate and support interdisciplinary exchange on FAIR and (meta)data, the Helmholtz Metadata Collaboration (HMC) - in close cooperation with the Helmholtz Information & Data Science Academy (HIDA) - is organising the lecture series.

Roland Bertelmann will kick off our fall/winter edition 2022.

→ Register here ←

Target audience

Learning target

Previous experience

Maximum number of participants

Presenter: BERTELMANN, Roland (Helmholtz Open Science Office)

Session Classification: General