

Bio-Image Data Science Training School 2024

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Marie-Sophie von Braun, Matthias Täschner, Robert Haase

GEFÖRDERT VOM



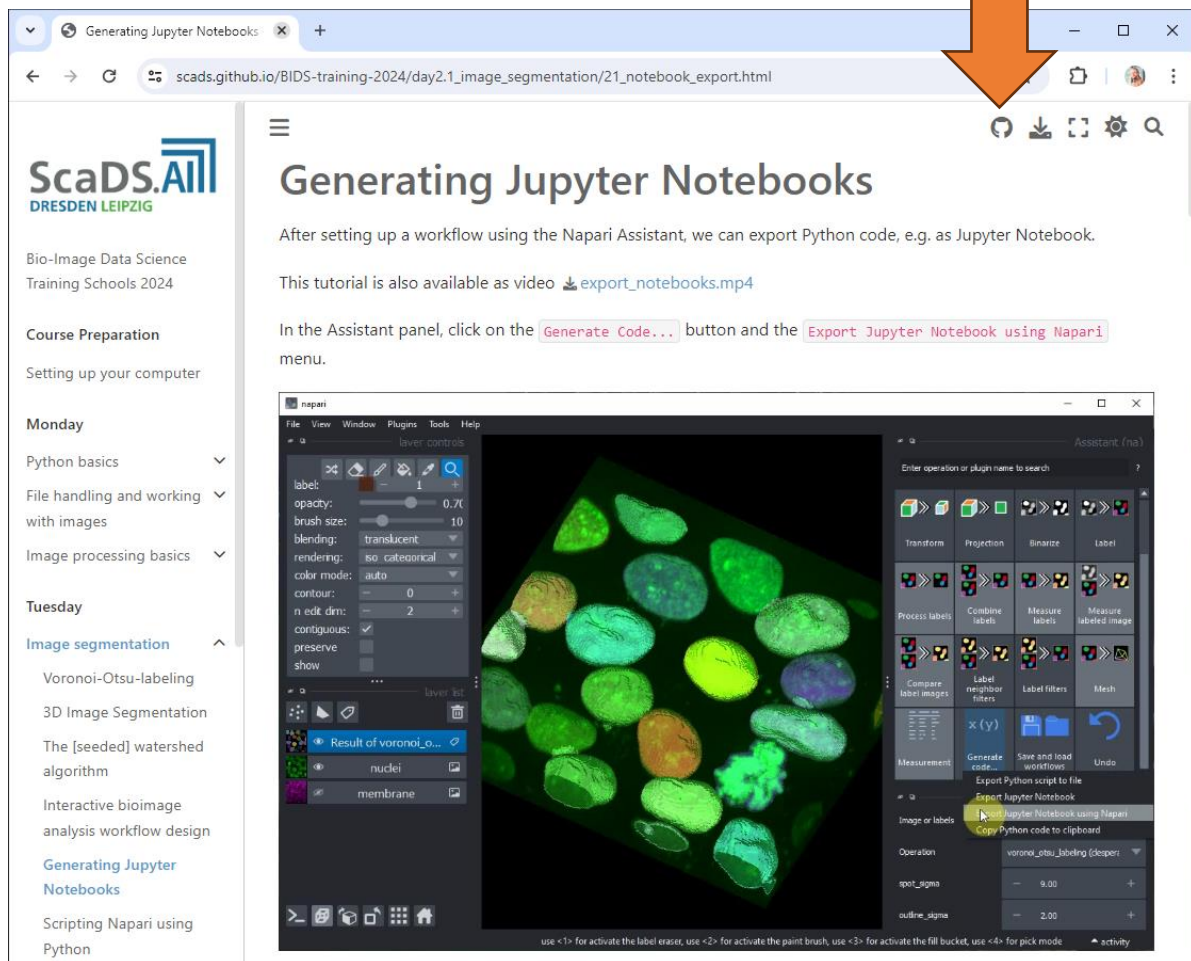
Bundesministerium
für Bildung
und Forschung



Diese Maßnahme wird gefördert durch die Bundesregierung aufgrund eines Beschlusses des Deutschen Bundestages. Diese Maßnahme wird mitfinanziert durch Steuermittel auf der Grundlage des von den Abgeordneten des Sächsischen Landtags beschlossenen Haushaltes.

Training Materials

We updated the materials during the training school, download them again



ScaDS.DRESDEN LEIPZIG

Bio-Image Data Science Training Schools 2024

Course Preparation

Setting up your computer

Monday

- Python basics
- File handling and working with images
- Image processing basics

Tuesday

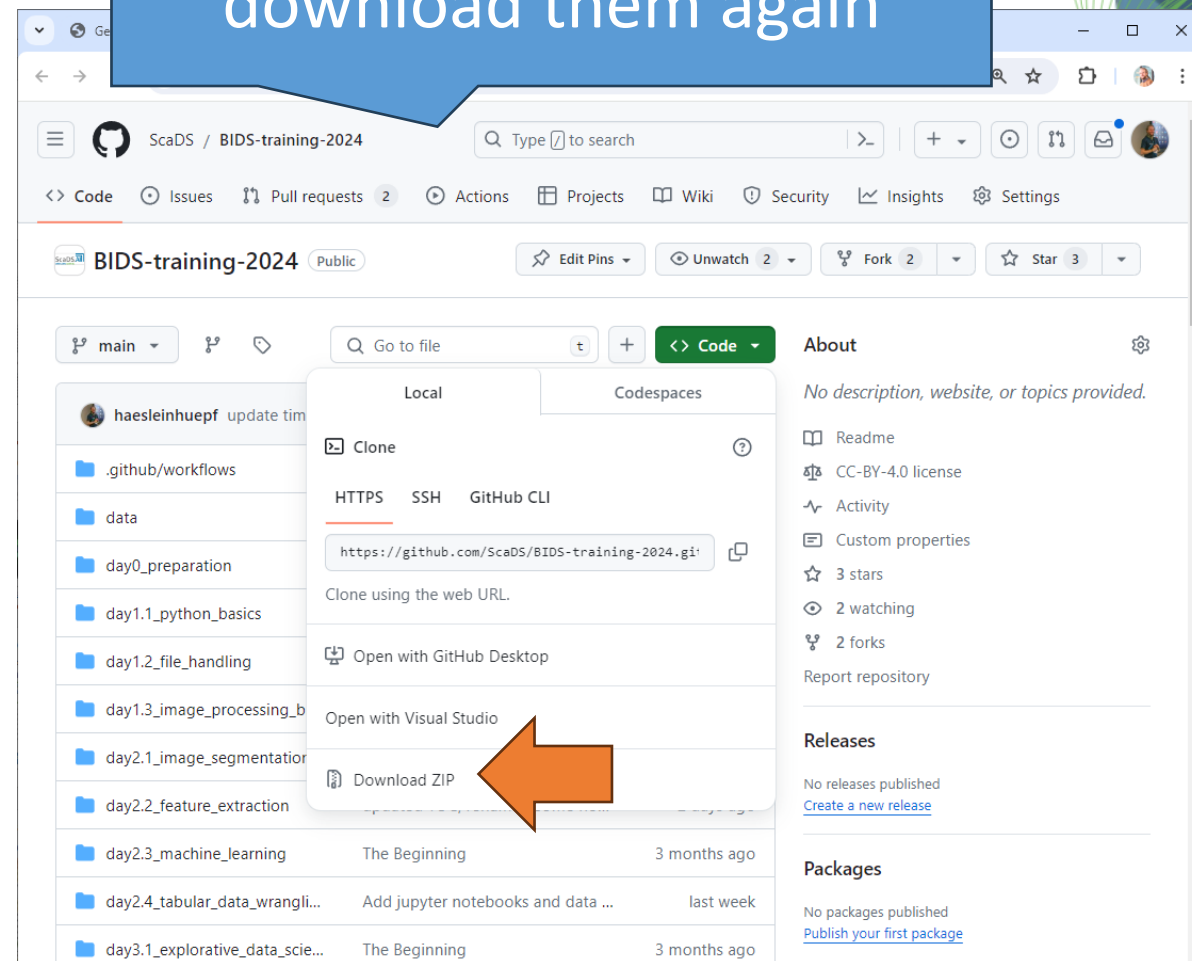
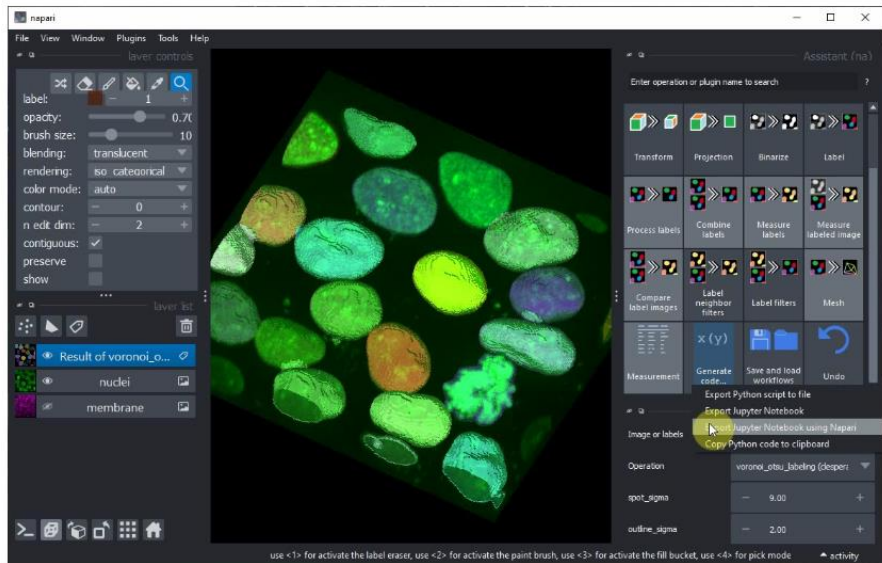
- Image segmentation
 - Voronoi-Otsu-labeling
 - 3D Image Segmentation
 - The [seeded] watershed algorithm
 - Interactive bioimage analysis workflow design
 - Generating Jupyter Notebooks
 - Scripting Napari using Python

Generating Jupyter Notebooks

After setting up a workflow using the Napari Assistant, we can export Python code, e.g. as Jupyter Notebook.

This tutorial is also available as video [export_notebooks.mp4](#)

In the Assistant panel, click on the **Generate Code...** button and the **Export Jupyter Notebook using Napari** menu.



ScaDS / BIDS-training-2024

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BIDS-training-2024 Public

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main

Go to file

Clone

HTTPS SSH GitHub CLI

<https://github.com/ScaDS/BIDS-training-2024.git>

Clone using the web URL.

Open with GitHub Desktop

Open with Visual Studio

Download ZIP

haesleinhuepf update time

- .github/workflows
- data
- day0_preparation
- day1.1_python_basics
- day1.2_file_handling
- day1.3_image_processing_b
- day2.1_image_segmentation
- day2.2_feature_extraction
- day2.3_machine_learning
- day2.4_tabular_data_wrangli...
- day3.1_explorative_data_scie...

About

No description, website, or topics provided.

Readme

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Activity

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No releases published

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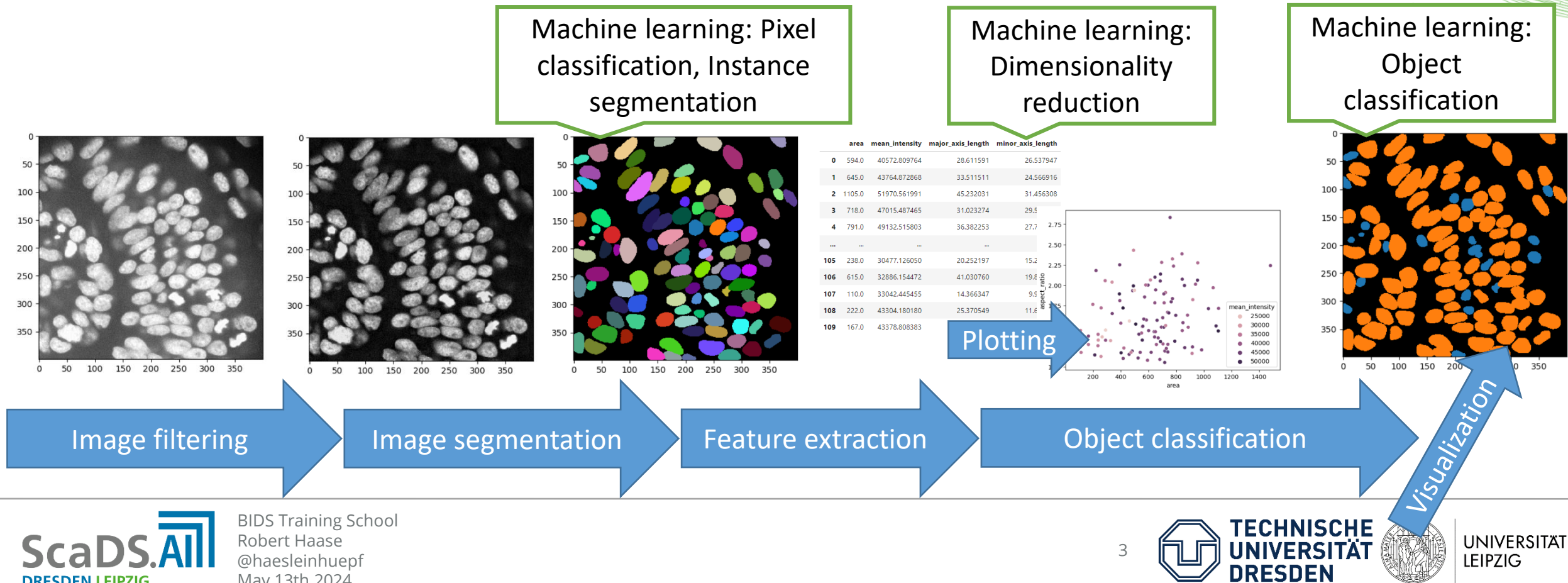
Packages

No packages published

[Publish your first package](#)

Overview: Bio-image Data Science

- [Image] Data Analysis workflows
- Goal: **Quantify observations, substantiate conclusions with numbers**



Python error messages

```
[1]: from skimage.io import imread
```

```
[2]: imread("unknown_file.tif")
```

```
-----  
FileNotFoundError                                Traceback (most recent call last)  
~\AppData\Local\Temp\ipykernel_17160\2534596731.py in ?()  
----> 1 imread("unknown_file.tif")  
  
~\mambaforge\envs\bio399\lib\site-packages\skimage\io\_io.py in ?(fname, as_g  
ray, plugin, **plugin_args)
```

↓

```
FileNotFoundError: [Errno 2] No such file or directory: 'C:\\Users\\haase\\un  
known_file.tif'
```

Where did
it happen?

What
happened?

```
[ ]:
```



Ask ChatGPT



Du

What does the code `image[:,::5]` do?



Du

Explain me like I'm 12 years old and keep it short



ChatGPT

Imagine you have a big grid of colored squares, which is a picture. If you take every fifth square from each row and each column, and put those squares together to make a smaller grid, that's what the code ``image[:,::5, ::5]`` does. It makes the big picture smaller by keeping only some of the squares and skipping a lot in between. This makes the picture smaller and simpler!

Exploring Python modules and functions

```
[1]: import napari_segment_blobs_and_things_with_membranes as nsbatwm
```

```
[ ]: nsbatwm.g
```

```
[ ]: f gauss_otsu_labeling function
f gaussian function
f gaussian_blur function
f gaussian_laplace function
f grayscale_closing function
f grayscale_dilation function
f grayscale_erosion function
f grayscale_opening function
f regionprops function
f register_function function
```

TAB key

Exploring Python modules and functions

```
[1]: import napari_segment_blobs_and_things_with_membranes as nsbatwm
```

```
[ ]: nsbatwm.gauss_otsu_labeling(
```

```
[ ]:
```

SHIFT +
TAB key

Signature:

```
nsbatwm.gauss_otsu_labeling(  
    image: 'napari.types.ImageData',  
    outline_sigma: float = 2,  
    *,  
    viewer: 'napari.viewer.Viewer' = None,  
) -> 'napari.types.LabelsData'
```

Docstring:

Gauss-Otsu-Labeling can be used to segment objects such as nuclei with bright intensity on low intensity background images.

The outline_sigma parameter allows tuning how precise segmented objects are outlined. Under the hood, this filter applies a Gaussian blur, Otsu-thresholding and connected component labeling.

See also

.. [0]

https://github.com/clEsperanto/pyclesperanto_prototype/blob/master/demo/segmentation/gauss_otsu_labeling.py

File: c:\users\haase\mambaforge\envs\bio399\lib\site-

The Image Science Community

- Developers of common image-analysis libraries answer your questions for free 😊

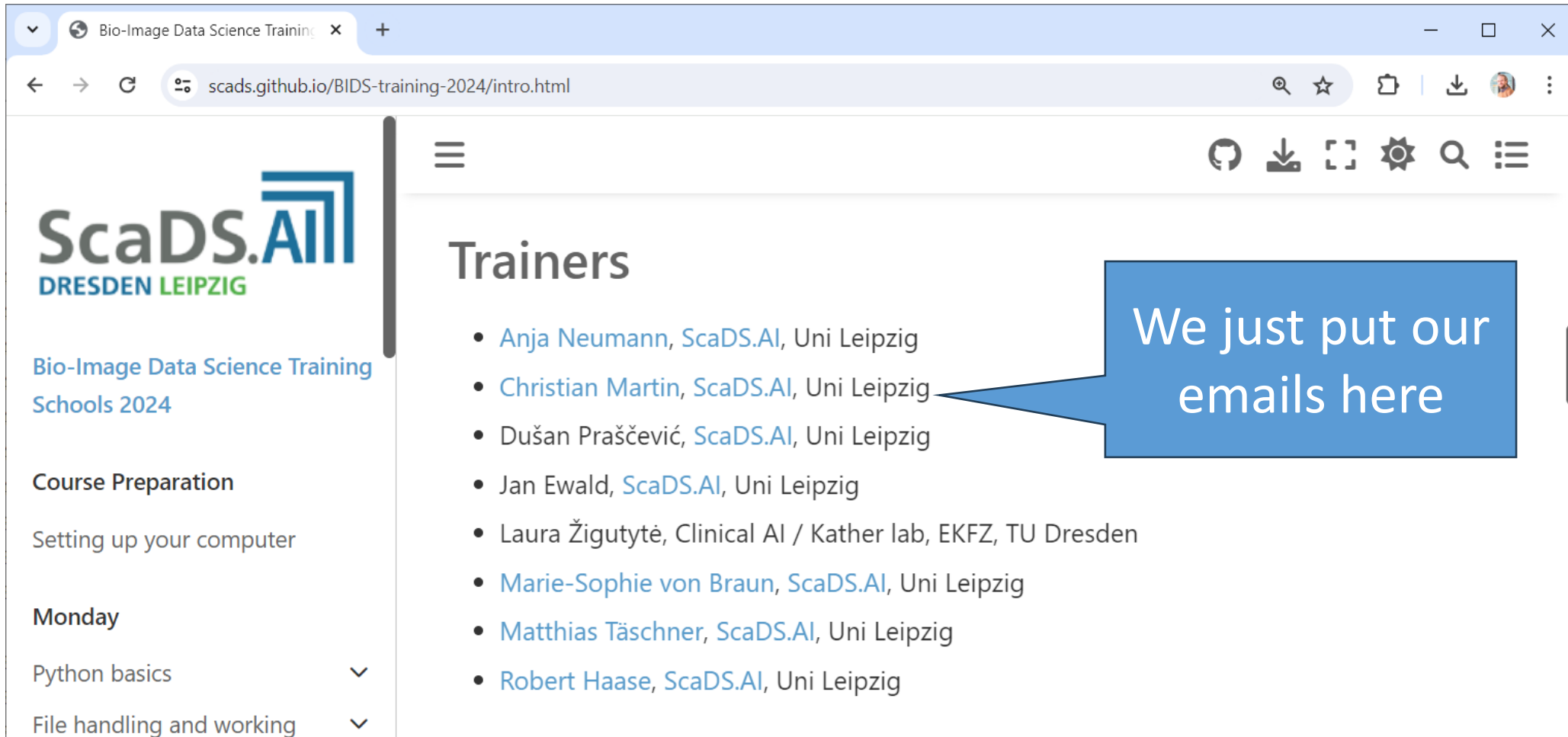
The screenshot shows a forum post on the image.sc website. The post is titled "Install issues with py-clesperanto-assistant" and is categorized under "Usage & Issues". It was posted by William Giang (@WillGiang) on July 2021. The post describes a problem with installing the napari-pyclesperanto-assistant plugin (v0.9.3) for napari 0.4.10 on Windows 10. The user lists their system requirements: MSVC v142 - VS 2019 C++ x64/x86 build tools (Latest), Windows 10 SDK (10.0.19041.0), C++ CMake tools for Windows, Testing tools core features - Build Tools, and C++ AddressSanitizer. The user mentions that after creating and activating a conda environment with python=3.8, they can pip install "napari[all]" without issue. The post also includes a link to the install instructions and a note that it was pyopencl-2021.2.3+cl12-cp38-cp38-win_amd64.whl instead of the (no longer available) 2020.3.1 version. The log for the napari-pyclesperanto plugin install suggests that it's trying to install 2021.2.1 and also suggests installing pybind11 and mako.

The screenshot shows a reply to the forum post. The reply is from Robert Haase (@haesleinhuepf), the maintainer of clij and clesperanto, dated July 2021. He thanks the user for reporting the issue and explains that he recently hit issues with recent pyopencl > 2021.2.1 and thus, limited that dependency. He considers removing this with the next minor release next week. In the meantime, he suggests trying installing using conda. He provides the following commands:

```
conda create --name bio11 python==3.8.5
conda activate bio11
conda install -c conda-forge pyopencl==2021.2.1
pip install napari-pyclesperanto-assistant
pip install napari[all]
```

He asks if this helps and signs off with "Cheers, Robert". The reply is marked as a "Solution" and has 2 likes. Below the reply, there is a link to "Setup.py for plugin that depends on pyclesperanto".

Contact for follow-up discussions



The screenshot shows a web browser window with the URL `scads.github.io/BIDS-training-2024/intro.html`. The page features the ScaDS.AI logo and a sidebar with navigation links. The main content area is titled "Trainers" and lists eight individuals. A blue callout box with the text "We just put our emails here" points to the email addresses in the list.

ScaDS.AI DRESDEN LEIPZIG

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Monday

Python basics

File handling and working

Trainers

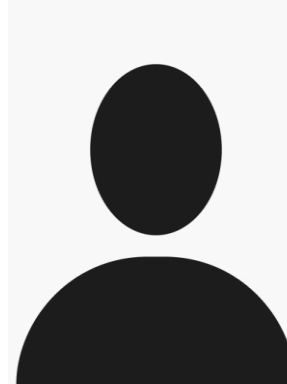
- Anja Neumann, ScaDS.AI, Uni Leipzig
- Christian Martin, ScaDS.AI, Uni Leipzig
- Dušan Prašević, ScaDS.AI, Uni Leipzig
- Jan Ewald, ScaDS.AI, Uni Leipzig
- Laura Žigutytė, Clinical AI / Kather lab, EKFZ, TU Dresden
- Marie-Sophie von Braun, ScaDS.AI, Uni Leipzig
- Matthias Täschner, ScaDS.AI, Uni Leipzig
- Robert Haase, ScaDS.AI, Uni Leipzig

We just put our emails here

Trainers & Supporters



Anja Neumann, Christian Martin, Dušan Prašević, Jan Ewald, Laura Žigutytė, Marie-Sophie von Braun, Matthias Täschner, Robert Haase



Mara Lampert, Susann Tilger, Nicole Spieß, Marvin Rosé

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