Workshop on Reconstruction and Machine Learning in Neutrino Experiments

in Hamburg

Björn Wonsak

Welcome

- Some had a very long trip!

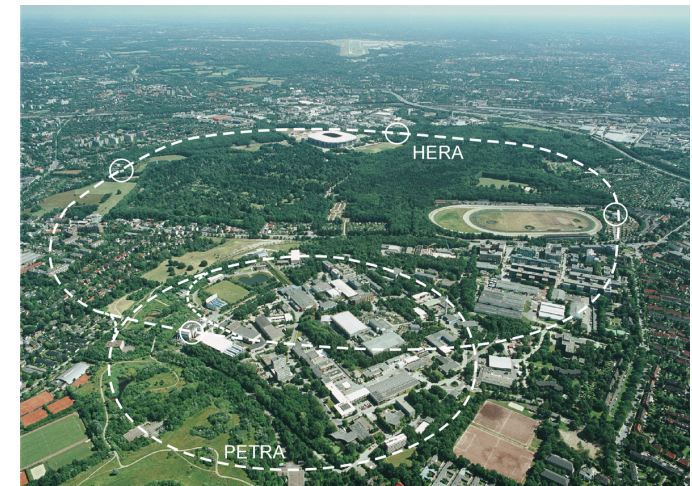- I'm very happy to have you all here!

+ Valparaiso, Chile

# General Information

- **DESY:**
    - Used to be center of particle physics
        - Still strong involvement in this area
    - Now mainly a center for brilliant light sources
    - Also large interest in dark matter searches
    - Also strong in astro-particle physics at DESY-Zeuthen

Guided tour: Will give you the full overview on this!
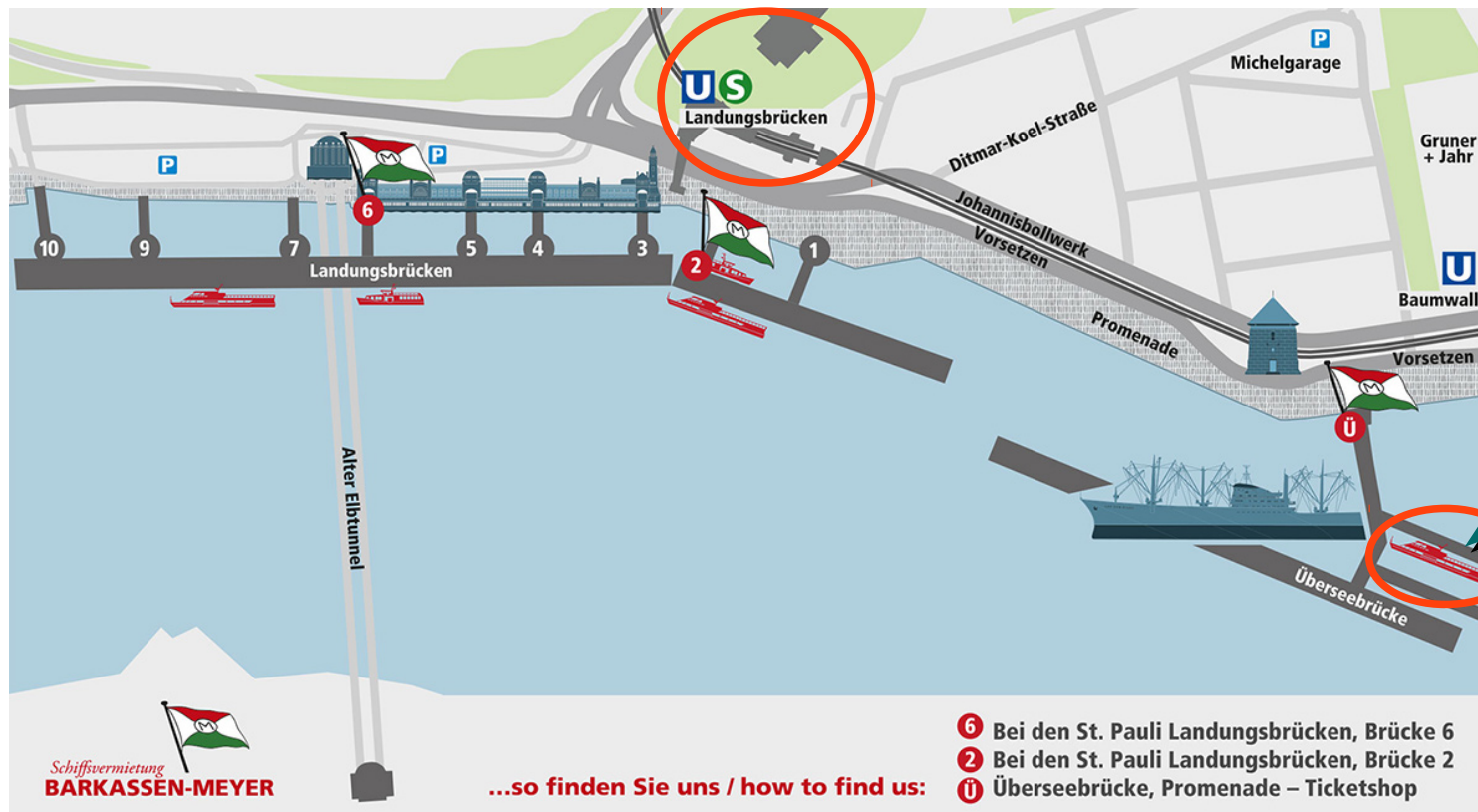Starts with a talk in this seminar room at 16:00.

DESY Sites of Interest
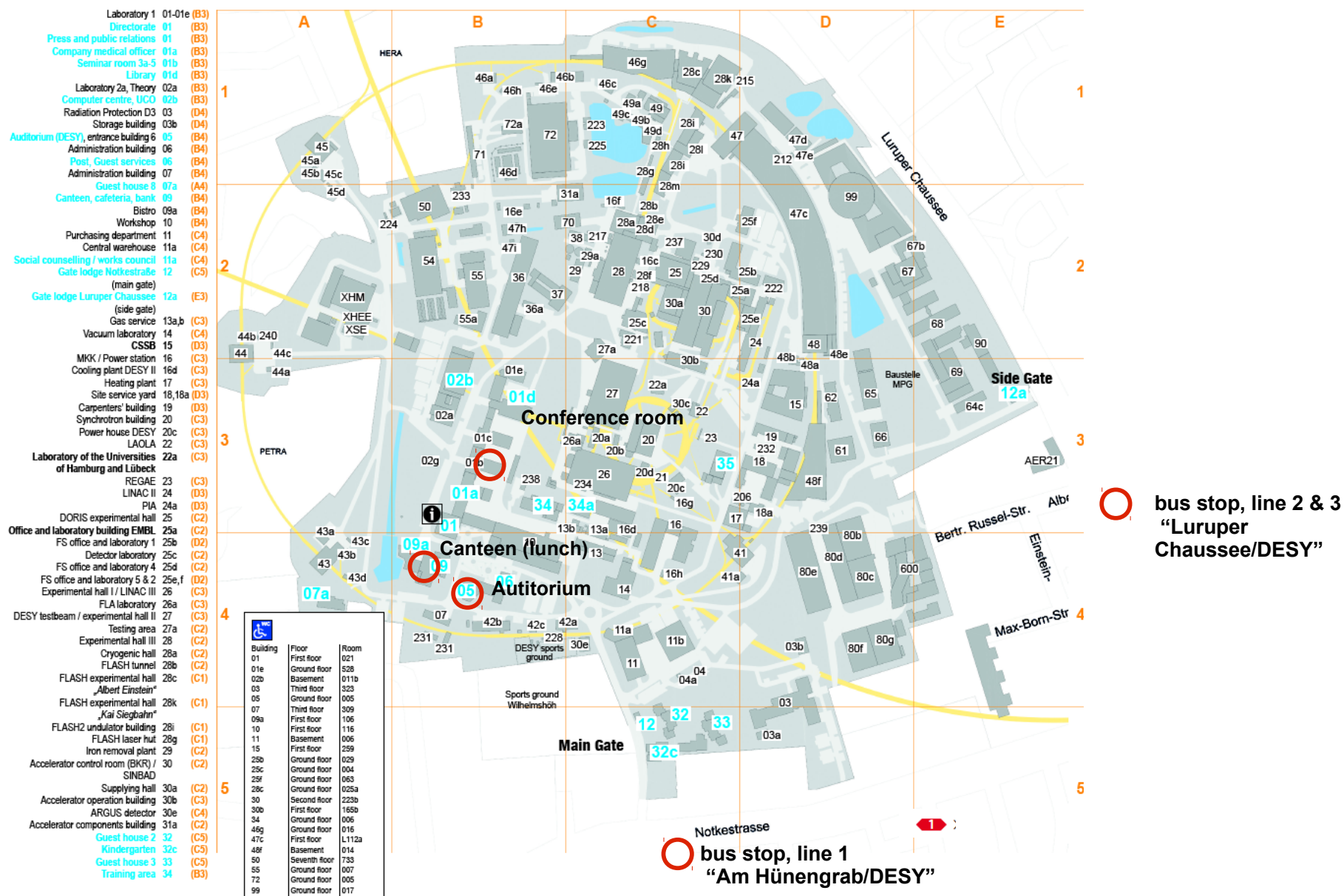
Our Diner on Tuesday

- **Harbor-cruise**
- **Ship:** MS "Hafen Hamburg" or MS "Hamburger Deern"

Metro-station "Landungsbrücken"

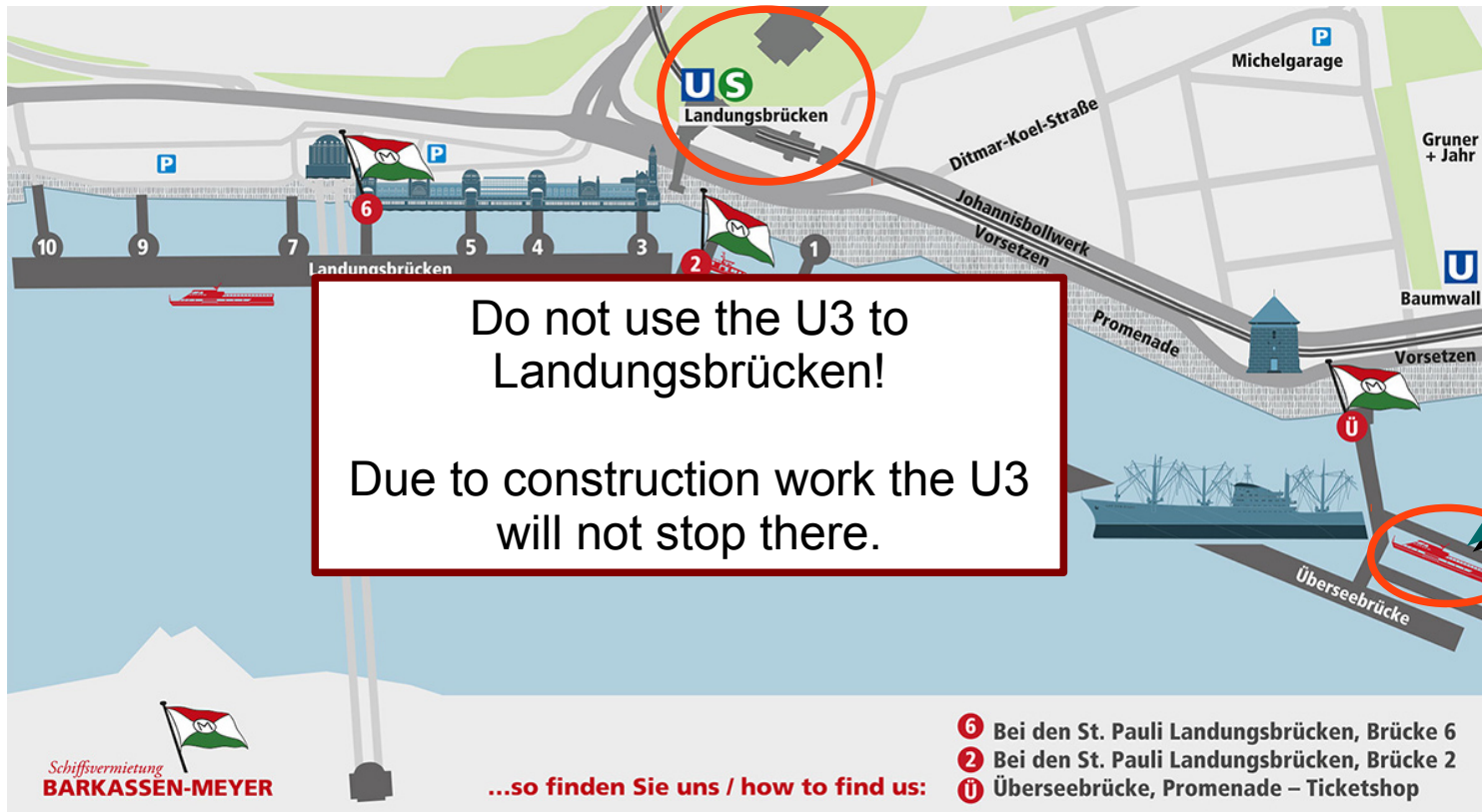**Boarding site**

Our Diner on Tuesday

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Metro-station "Landungsbrücken"

Do not use the U3 to Landungsbrücken!

Due to construction work the U3 will not stop there.

Boarding site

Our Diner on Tuesday

- **Boarding 19:45 (7:45 PM)**
- **Cast off: 20:00 (8:00 PM)**

How to go there

- To get Information about public transportation use:
  https://www.hvv.de/en

Internet Access

- **Three possibilities:**
  - Eduroam
  - Conference Net:
    - DESY-Guest-Test (no password)
  - DESY Guest Net

  https://it.desy.de/services/networks/guest_net/index_eng.html

Guest net
General Information

For guests and visitors DESY operates a guest network which can be used by Ethernet (LAN) or wireless (WIFI) after email registration.
Basically, with this network it is possible to access the internet with network-compatible devices. The guest network can be used if you connect your device to the left plug of a network socket or by using the unencrypted WIFI network 'DESY-Guest'.

Registration and Log in Procedure

> If a device is connected to the guest network (via WIFI or LAN) an IP address will be requested - usually automatically - via DHCP. After that you must register by email. It is possible to use all internet browsers to call up any **unencrypted webpage** (http://... **NOT** http**s**://...). You will then be forwarded automatically to the web portal of the guest network.

  Note: The 'desy.de' website can generally also be reached from non-registered guests and devices. Therefore, there will be **no forwarding** to the portal of the DESY guest network from the webpage 'http://www.desy.de'.

> To register to the DESY guest network and to receive the login credentials, please click on **"Receive your credentials by EMail"**.
  Fill in the fields: last name, first name and email address and accept the DESY data protection provisions. Confirm your entry details with **"Register"**. Your credentials will then be sent by email to the specified email address.

> For the following **five minutes** you have limited access to the Internet to retrieve your emails and access the login data.

> Return to the portal webpage of the DESY guest network (https://guestnet-portal.desy.de) and close the temporary connection via **"Terminate Connection"**.

> You can now log in to the DESY guest network with your credentials. Fill in **"Login"** and **"Password"** and **accept** the DESY "Condition of Use". Please confirm with **"Enter"**.

  For the validity of the guest network account it is required to log in once per device. After that it is possible to use this device in the guest network during the following days without a renewed log in.

  Note: A guest network account is valid up to **10 days** and can be used with **five devices** at the same time.

If anything should be unclear or in case you have questions, the UCO (User Consulting Office) will provide support by phone at **+49-40-8998-5005**, or by email to **uco@desy.de**.

TRIUMF-Helmholz Workshop on Scientific Computing

- Held in parallel with related topic
- "Scientific Comuting" getting a lot of interest nowadays!
- Interest also steered by politicians

https://indico.desy.de/indico/event/22522/

Good opportunity to widen horizon of our workshop!
→ We will join in for two talks in the auditorium!

Our Timetable

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Registration
Building 1b, SR4b, DESY Hamburg — 08:45 - 09:10

Welcome/Introduction
Building 1b, SR4b, DESY Hamburg — 09:10 - 09:25

Talks: Reconstruction 1
Björn Wonsak
Building 1b, SR4b, DESY Hamburg — 09:25 - 10:15

Coffee break
Building 1b, SR4b, DESY Hamburg — 10:15 - 10:45

Talks: TRIUMP-Helmholz workshop. Keynote: Perspectives on the Future of Data Intensive Computing
Oliver Oberst
Building 5, Auditorium, DESY Hamburg — 10:45 - 11:35

Talks: Reconstruction 2
Dr. Xin Qian
Building 1b, SR4b, DESY Hamburg — 11:45 - 13:00

Lunch
Building 1b, SR4b, DESY Hamburg — 13:00 - 14:30

Talks: Talks: Reconstruction 3
Abigail Waldron
Building 1b, SR4b, DESY Hamburg — 14:30 - 16:00

DESY tour

Mon 16/09 | **Tue 17/09** | Wed 18/09 | All days

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Talks: TRIUMPF-Helmholz Workshop. Keynote: How to know, where to look - prioritising in computer vision
Simone FRINTROP
Building 5, Autitorium, DESY Hamburg — 09:00 - 09:40

Talks: Talks: Machine Learning 1
Fatih Bay
Building 1b, SR4b, DESY Hamburg — 09:50 - 10:45

Coffee break
Building 1b, SR4b, DESY Hamburg — 10:45 - 11:15

Talks: Talks> Machine Learning 2
Dr. Oliver Schulz
Building 1b, SR4b, DESY Hamburg — 11:15 - 12:50

Lunch
Building 1b, SR4b, DESY Hamburg — 12:50 - 14:20

Talks: Talks: Machine Learning 3
Prof. Jianming Bian
Building 1b, SR4b, DESY Hamburg — 14:20 - 16:00

Coffee break
Building 1b, SR4b, DESY Hamburg — 16:00 - 16:30

Talks: Talks: Machinhe Learning 4
Joshua Renner
Building 1b, SR4b, DESY Hamburg — 16:30 - 18:00

19:45 Boarding for Harbor-cruise

Mon 16/09 | Tue 17/09 | **Wed 18/09** | All days

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Talks: Talks: Machine Learning 5
Viktor Pec
Building 1b, SR4b, DESY Hamburg — 09:00 - 10:50

Coffee break
Building 1b, SR4b, DESY Hamburg — 10:50 - 11:20

Talks: Talks: Machine Learning 6
Dr. Daniel Bick
Building 1b, SR4b, DESY Hamburg — 11:20 - 13:00

Enough room for lively discussions!

Our Timetable

Enough room for lively discussions!

19:45 Boarding for Harbor-cruise

Motivation of Workshop

- **Machine learning experienced big advance in recent years**

  → Inspired a lot of work in our field

- **Big data is a key-issue** (in HEP & civil live)

  → Many problems can only be solved with
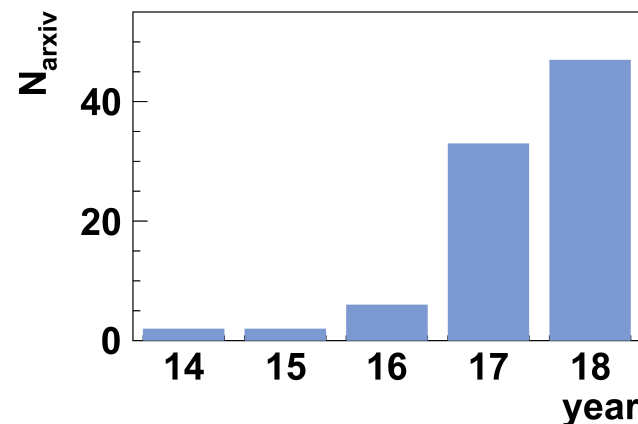
  some 'artificial' help

deep learning in particle & astroparticle physics

- **Their is a kind of 'magic' to it:**

  - Some things that used to take a lot of understanding and careful study seem to work almost automatically

    (at least that was my first impression)

  → **Question:** Will my expertise in 'reconstruction' become useless?

Motivation of Workshop II

- **My answer:** No.
    - Still a lot of understanding needed!
    - Sometimes 'classical' methods have same performance but might be robuster
    - Probably there is an optimal way to combine both!

- → **My motivation:**
    - Want to learn the merits and flaws of both!
    - Want to understand best ways to combine them

    Looking forward to all your interesting talks!

Back-up slides

Contact Persons

- **Overall organisation/Any kind of questions**
  - Björn Wonsak, Tel.: +49 179 7714574
- **Technical assistance during workshop**

  (Upload of talks, ...)
  - David Meyhöfer
- **Registration, receipts and other documents:**
  - Petra Hinzer

Where to find Information

- https://indico.desy.de/conferenceDisplay.py?confId=21853