ErUM-Data-Hub

Advancing Digital Transformation in Germany by training ErUM-Scientists

CHEP Pre-Workshop 2024, 19.10.2024

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Bundesministerium für Bildung und Forschung

ERUM DATA HUB

ErUM: German Research on Universe and Matter

20.000 Scientists & 10.000 PhD Students

Federal Ministry of Education and Research

Astroparticle Physics

Elementary Particles Physics

Research with neutrons

Research with nuclear probes and ion beams

Research with synchrotron radiation

German Observatory Council

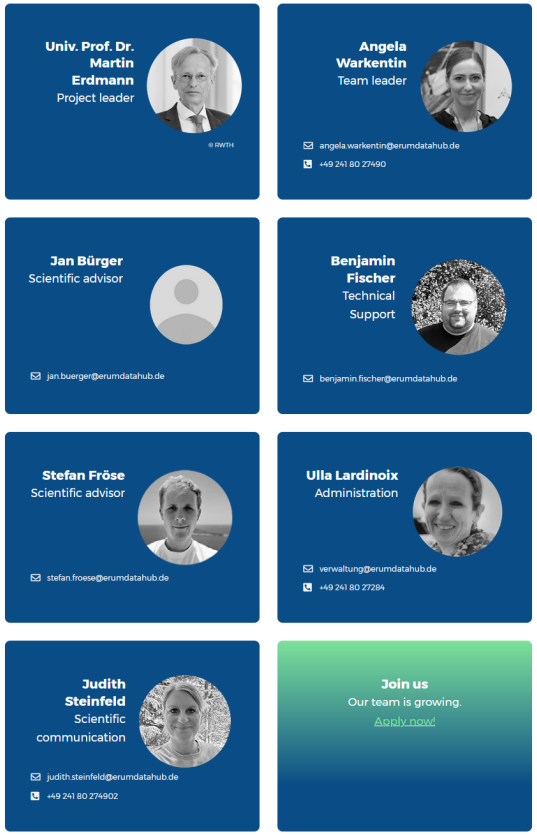
Accelerator Physics

Hadron and nuclear physics

Related sciences and industry

ErUM-Data-Hub: Digital Knowledge Agent

A growing Team...



with Big Goals...

Central Networking and Transfer Office for the Digital Transformation in German **Research on Universe and Matter** (ErUM)

- → Promote Networking
- → Intensify Exchange
- → Strengthen Communication
- → Expand Digital Competencies

and exciting Activities.

- → Community Support
- → Transfer (Industry Fairs & Workshops)
- → Outreach (Blog, Social Media, Podcast)

- → Community Engagement
- → Schools & Workshops

Disseminating digital competencies to a broad ErUM audience

Schools:

- Deep Learning Schools: Basic & Advanced Concepts
- Fast & Efficient Python Programming

Expert Workshops:

- Sustainability in ErUM-Data
- Inverse Problems in ErUM-Data
- Research Data Management
- …

Community Workshops:

- Career Development
- ErUM-Connect: Networking Days
- Online Short-Pitch & Discussion Sessions

Train-the-Trainer Workshops:

- Deep Learning Train-the-Trainer Workshop

Multidimensional event concept: beyond knowledge transfer

Aachen, Bonn, Berlin, Dortmund, Dresden, Hamburg, Meinerzhagen, München, Wiehl, Wuppertal, ...

Monday

16:30	Registration
17:30	**Welcome**
18:00	**Setting the Scene:** Opening Talk
19:30	Welcome Dinner

Tuesday

8:30	Coffee
9:00	**Efficient Python Programming:** Lecture
10:30	Coffee
11:00	**Efficient Python Programming:** Hands-On
13:00	Lunch
14:30	**Accelerator Optimised Programming:** Lecture
16:00	Coffee
16:30	**Accelerator Optimised Programming:** Hands-On
18:30	Dinner
19:15	Walk through Aachen
20:00	**Pub Quiz**

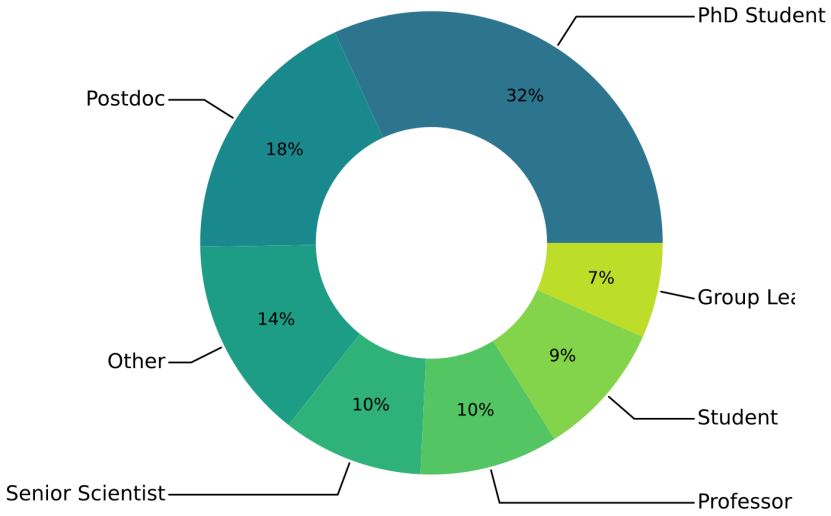
Wednesday

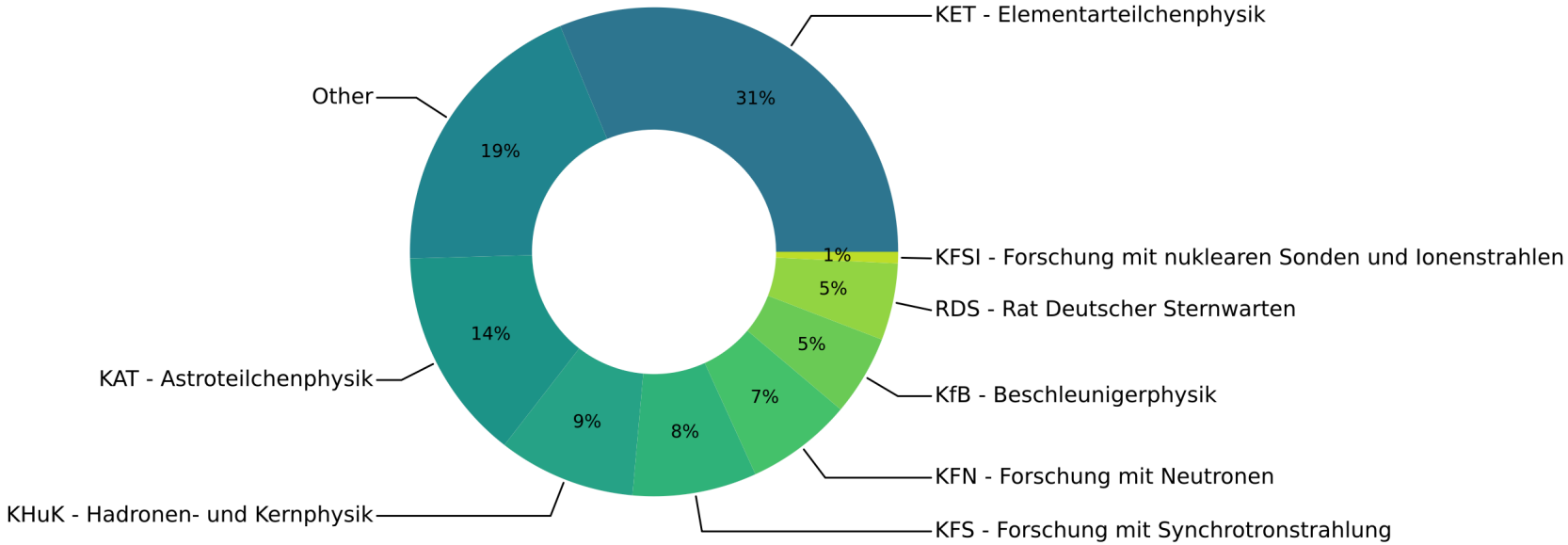
	Coffee
	GPU Programming: Lecture
	Coffee
	GPU Programming: Hands-On
	Group Picture & Lunch
	Sustainability & Programming
15:00	**Challenge**
	Coffee
	Challenge
	Dinner
	Challenge (optional working time)

Thursday

	Coffee
	Challenge
11:00	Coffee
11:15	**Challenge Presentations, Award Ceremony & Farewell**
13:30	Lunch

Disseminating digital competencies to a broad ErUM audience: over 850 ErUM-Scientists reached (in person)





KET = Elementary Particles Physics
KAT = Astroparticle Physics
KFS = Research with synchrotron radiation
KFSI = Research with nuclear probes and ion beams

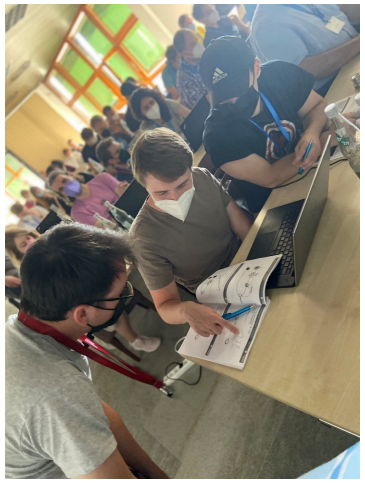
KFN = Research with neutrons
KfB = Accelerator Physics
KHuK = Hadron and nuclear physics
RDS = German Observatory Council

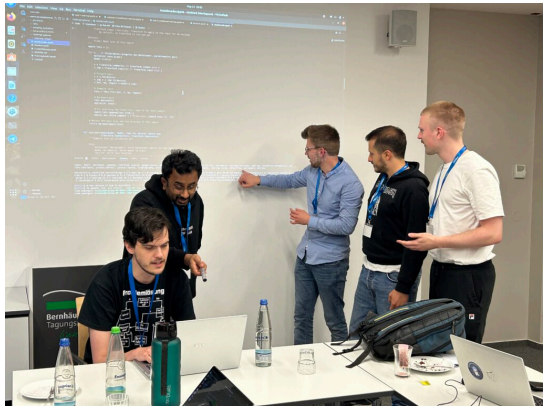
Creating multiplicators for the communities

„I am writing to inform you that Arpan and I will be holding a one-day workshop to present what we've learned from the Fast & Efficient Python School. Attached to this email, you'll find the invitation poster for the workshop.

I'm excited to share the knowledge I've gained and am grateful to you for organizing such an excellent workshop, which has been a tremendous learning experience for us."

Focussing on the community's actual needs





ErUM-Community: most requested topics

General Topics:

- Deep Learning (Transformer, GANs, Autoencoder)
- Machine learning
- **AI & ethics (scientific integrity)**
- **Sustainable Research**
- Teaching methods & materials (flipped classroom)
- Bayesian analysis and statistics
- (Multivariate) Statistics
- Monte-Carlo methods

Programming:

- Git, good coding practices, debugging & bash scripting
- Programming languages (not as accessible ones as Python)
- More mathematical groundwork and how deep learning concepts are implemented in code (e.g. in PyTorch)
- Python Programming & Tools
- Software Packaging
- How to program in a memory/cpu friendly way
- Sustainable Programming
- Collaborative software development
- **Project management (how to structure coding projects)**

Big Data:

- Data Processing, Data Analysis & Data Formats
- Cross platform data management, data storage and data archival tools and systems

Most requested support measure: a platform for materials

- „There are great materials, but where to find them?“
- Sreamlined, organized, up-to-date
- „Seal of Quality“ (moderated?)
- Possibility of interacting

Learning and Teaching Materials for ErUM-Data-Scientist

Are you an ErUM-Data-Scientist who wants to expand your digital skills or do you want to support (young/prospective) ErUM-Scientists in pursuing digital transformation?

With our material collection we want to provide an overview of existing materials and contacts by outlining where to find what.

The collection of existing materials is complemented by our own materials which include for example videos and slides from various workshops and schools organized by the ErUM-Data-Hub in collaboration with DIG-UM with which we reached over 800 participants so far.

If you want to be subscribed or unsubscribed from this list please contact judith.steinfeld@erumdatahub.de

Our collection of materials covers many different topics. You can click on one or more tags to filter the list...

Click on one or more tags to filter the list and click again on a tag to cancel the filter

Atmospheric Neutrino Spectra autoencoder Bayesian big data analytics CERN ChatGPT CHEP conference convolutional neural networks deep learning diffusion models exercise expert workshop generative models GPU graph neural networks hands-on information field theory Interferometric Imaging Interoperable Data Analysis inverse problems lecture machine learning Mars mastering model building neural network building blocks neural networks normalizing flows particle grow programming programming school python realtime machine learning recurrent neural networks research data management software optimization solution sustainability sustainable computing sustainable datacenter task train-the-trainer transformers tutorial videos VISPA x-ray

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Title	URL	Tags	Date	Author
		All		
Event / Next Generation Environment for Interoperable Data Analysis "2nd Expert Workshop" / REANA / Tutorial I	https://gitlab-p4n.aip.de/punch_public/reana/tutorials/-/blob/main/README.md	-	09/2024	Elena Sacchi et al.
Event / Next Generation Environment for Interoperable Data Analysis "2nd Expert Workshop" / REANA / Tutorial II	https://cloud.aip.de/index.php/s/wtBTFtMgo5Nxdwd	-	09/2024	Elena Sacchi et al.
Event / Next Generation Environment for Interoperable Data Analysis "2nd Expert Workshop" / Analysis Facilities / Talk	https://indico.desy.de/event/45148/contributions/174552/attachments/92486/125214/AnalysisFacilities0924.pdf	-	09/2024	Thomas Kuhr
Event / Next Generation Environment for Interoperable Data Analysis "2nd Expert Workshop" / REANA Deployment on PUNCH Infrastructure and User Experiences / Talk	https://indico.desy.de/event/45148/contributions/174551/attachments/92636/125480/Erum-UI-17092024.pdf	-	09/2024	Harry Enke
Event / Next Generation Environment for Interoperable Data Analysis "2nd Expert Workshop" / Dr. Jan Lucas Uslu Using Large Language Models in Scientific Research: Grounding Models in Reality using Data / Talk	https://indico.desy.de/event/45148/contributions/174563/attachments/92587/125393/USLU_Using_LLMs_in_Scientific_Research.pdf	-	09/2024	Jan Lucas Uslu
Event / Next Generation Environment for Interoperable Data Analysis "2nd Expert Workshop" / Preserve-to-reuse: Building REANA reproducible data analysis platform / Talk	https://indico.desy.de/event/45148/contributions/174550/attachments/92484/125211/reana-erum-20240917.pdf	-	09/2024	Tibor Simko
Event / 1st Computing School "Fast and Efficient Python" / Accelerator Optimised Programming / GitHub	https://github.com/jonas-eschle/fast_and_eff_python	-	08/2024	Jonas Eschle
Event / 1st Computing School "Fast and Efficient Python" / GPU Programming / Lecture	https://indico.desy.de/event/40133/contributions/174039/attachments/92019/124412/GPU_programming_Aachen_August2024.pdf	-	08/2024	Alessandro Scarabotto
Event / 1st Computing School "Fast and Efficient Python" / Efficient Python Programming / Lecture	https://indico.desy.de/event/40133/sessions/16470/attachments/92004/124386/FastPython.pdf	-	08/2024	Vassil Vassilev
Event / 1st Computing School "Fast and Efficient Python" / Programming & Sustainability / Talk	https://indico.desy.de/event/40133/sessions/16475/attachments/92051/124450/PythonSchoolAachen2024_PNfinal.pdf	-	08/2024	Pardis Niknejadi
Event / 1st Computing School "Fast and Efficient Python" / Accelerator Optimised Programming / Exercises	https://docs.google.com/presentation/d/1PZoLXe9pfX6h-ysH6HOfYsO6s6hysxhQN2lPUClx0hY/edit#slide=id.p	-	08/2024	Jonas Eschle

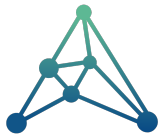
Trying out new concepts in 2025

Publish Your Own Python Package

- In-person Workshop, 2 -3 days
- Smaller group: about 20 persons
- High participant / tutor ratio
- Python Packaging (& bindings)
- Bring your code and we will help you publish / polish
- Keynotes: Publishing, Documentation, Testing, Code-Quality, Automatisiation (CI/CD)

Conceptual Advances in Deep Learning

- Conference-Style Workshop, 3,5 Days
- Bringing together Industry and ErUM-Scientists working on advanced technologies Contributions from ErUM-Scientists
- Industry-Fair / Exhibition



Outlook & Cooperation

Outlook 2025:

- Programm 2025 to be published in November 2024
- Deep Learning Schools, Python Programming School, Deep Learning Train-the-Trainer
- (Publishing) Software Tools, Sustainability, AI & Ethics
- Event-Support, Career Development, Community visits
- Material collection

Let´s work together!

- Want to speak at our events?
- Want to (co-)organize an event?
- Want to join forces in the material collection?
- Want to reach the ErUM-Community?

Let´s connect!

We appreciate your ideas,

questions & feedback

Angela Warkentin

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https://erumdatahub.de/veranstaltungen/

Backup

Links

- ErUM-Data-Hub: https://erumdatahub.de/
  - About ErUM-Data
  - About DIG-UM
  - Podcast, Blog, Social Media
  - Event Support & Consortia Building
- ErUM-Data-Hub Events on Indico: https://indico.desy.de/category/984/
- Mailinglists: https://wiki.erumdatahub.de/de/mailing-lists

ErUM-Communities

The ErUM-Data-Hub implements the measures of the ErUM-Data Action Plan. In doing so, the Hub maintains close contact with the German ErUM communities:

KAT

Astroparticle Physics

The Committee for Astroparticle Physics represents all German physicists in the field of astroparticle physics.

More →

KET

Elementary Particles Physics

The Committee for Elementary Particle Physics is the elected representation of the German particle physicists.

More →

KfB

Accelerator Physics

The Accelerator Physics Committee represents the interests of accelerator physics employees and students.

More →

KFN

Research with neutrons

The KFN is an independent interest group with the aim to promote research with neutrons in Germany.

More →

KFS

Research with synchrotron radiation

The KFS represents all researchers working with synchrotron radiation in Germany.

More →

KFSI

Research with nuclear probes and ion beams

The KFSI represents and promotes research with nuclear probes and ion beams in Germany.

More →

KHuK

Hadron and nuclear physics

The Hadron and Nuclear Physics Committee coordinates and represents the interests of German hadron and nuclear physicists.

More →

RDS

German Observatory Council

The Council of German Observatories represents the interests of the institutes active in astronomical research in Germany.

More →

Multidimensional event concept: beyond knowledge transfer