



VISTA Welcome

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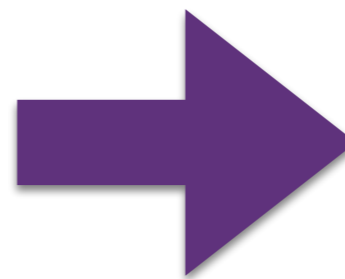
VISTA Seminar — 27.2.2025

What's a VISTA?

Hamburg VISTA Virtual Initiative for Science & Technology in AI

Substantial research into ML & AI
applications & foundations in Hamburg

But distributed across many institutions



VISTA:

- Connect researchers
- Initiate joint projects
- Advertise results & jobs
- Build towards sustained projects



Hamburg VISTA

Virtual Initiative for Science & Technology in AI

People

Board



Prof. Nihat Ay
TUHH



Prof. Chris Biemann
UHH/HCDS



Prof. Gregor Kasieczka
UHH



Prof. Philipp Neumann
DESY



Prof. Oliver Niggemann
HSU

Members



Prof. Marcus Altfeld
LIV, UKE



Prof. Jan Baumbach
UHH



Prof. Marcus Brüggen
UHH



Prof. Martin Burger
DESY



Prof. Görschwin Fey
TUHH



Dr. Frank Gaede
DESY



Prof. Timo Gerkmann
UHH



Prof. Conny Hammer
UHH



Dr. Sarah Heim
DESY



Prof. Armin Iske
UHH



Prof. Anne Jung
HSU



Prof. Sören Laue
UHH



Prof. Anne Lauscher
UHH



Prof. Johannes Lederer
UHH



Prof. Luisa Lucie-Smith
UHH



Prof. Maria Maleshkova
HSU



Prof. Gary Schaal
HSU



Prof. Gerhard Schreiber
HSU



Prof. Stefan Schulte
TUHH



Prof. Maya Topf
LIV, UKE

Interested in **joining**? Write to
vista-board.hcds@lists.uni-hamburg.de

SCIENCE & TECHNOLOGY IN AI

VISTA-VISOR CALL

MATCHMAKING

Thursday February 27, 2025

10:00-13:00

ESA W-221, Universität Hamburg, Edmund-Siemers-Allee 1,
Flügelbau West, Hamburg

We would like to invite you to propose PhD projects on the development and application of AI in the natural sciences and engineering as part of Hamburg VISTA.

The goals of this VISTA-VISOR call are to:

Establish a cohort of PhD students working on cutting-edge AI topics jointly supervised by PIs from various institutions.

Facilitate interdisciplinary collaboration across UHH, DESY, TUHH, HSU, LIV and other partners.

Prepare the ground for major grant applications, such as DFG TRR or SFB with integrated graduate schools.

Conditions for the projects are:

On the topic of development or application of AI techniques in the natural sciences and engineering.

Example topics:

- Foundations/ Mathematics of AI
- AI for new materials
- AI for molecules
- AI for protein structures
- AI for scientific discovery
- AI and resilient economies
- AI and logistics
- AI on the edge
- AI and society
- AI and robustness
- AI and engineering

Typical duration 6-24 months, ideal to carry out towards the end of a PhD

Pairs of two supervisors, from different institutions, both associated with Hamburg VISTA (apply to become a member now!)

Existing PhD projects can be associated with the VISOR school, PIs and students can participate in all activities.

Conditions for funding:

VISOR provides co-funding

(typically 50% of the positions, funding currently restricted to PIs at UHH, TUHH, HSU)

A proposal, reviewed by the board, consisting of a supervision team, a short description of the envisioned research and a financing concept for the co-funding (max. 2 pages excluding references).

Proposals will be evaluated on the following criteria: appropriate financing to ensure successful completion of the PhD (incl. time plan), scientific quality, topical coherence with VISTA, and overall balance of application domains and partners.

<https://hamburg-vista.github.io/>

VISOR

(VISTA School Of graduate Research)

- Strengthen research via joint, co-founded projects
- 6-24 months, ideal towards end of PhD
- First submission until end of March

Safety

1. There will **never be test alarms** in that building, meaning that if the alarm goes off, it is a real alarm and everybody must leave the building immediately via the signposted emergency exits.

2. Meeting point is **behind the main university building** (looking from Edmund-Siemers-Allee).



Programme

10:00 → 10:30

Arrival and registration

🕒 30m

📍 ESA W-220

With coffee and cookies

10:30 → 10:35

Welcome and introduction to Hamburg VISTA

🕒 5m

📍 ESA W-221

Sprecher: Gregor Kasieczka (Universität Hamburg)

10:35 → 11:35

Invited talks

📍 ESA W-221

10:35

Cosmology in the deep learning era

🕒 30m

Machine learning has significantly improved the way cosmologists model and interpret cosmological data; yet, its "black box" nature often limits our ability to trust and understand its results. In this talk, I will discuss how we can apply deep learning techniques, including explainable AI methods, to tackle complex problems in cosmology. I will show how we can gain new insights into the formation of cosmological structures on small scales such as dark matter halos and galaxies. I will also show how we can retrieve the independent degrees of freedom to which cosmological data is sensitive, thus potentially highlighting the origin of current cosmological tensions.

Sprecher: Prof. Luisa Lucie-Smith (UHH)

11:05

Data Meets Physics: Physics-Informed Machine Learning and Learning-Informed Physics

🕒 30m

Almost all areas in the physical or engineering sciences rely on computational models. These models can be based on fundamental physical principles, typically formulated as a set of differential equations. Alternatively, machine learning can be used to infer input-output relations from vast datasets. Both approaches come with different strengths and weaknesses, thus, in recent years, there has been a growing interest in leveraging synergies between these paradigms. Examples include integrating machine learning as part of a numerical algorithm for solving the differential equations of a physics-based model, or incorporating physically motivated constraints to improve machine learning models. This talk will explore techniques to combine physics-based and data driven models, with applications spanning medical imaging and computational fluid dynamics.

Sprecher: Dr. Sebastian Götschel (TUHH)

11:35 → 13:00

Lunch and networking

🕒 1 h 25m

📍 ESA W-221