European Commission
Marie Skłodowska-Curie Actions

AIPHY
Challenging AI with Challenges from Physics: How to solve fundamental problems in Physics by AI and vice versa

9 PhD Fellowships in the fields of particle physics and computer science

Artificial intelligence not only pushes the boundaries of efficiency and precision in data analysis but transforms the way we think about data in scientific contexts. At the same time high energy physics is building on decades of experience in high quality data analysis combining rigorous uncertainty treatments with a fundamental understanding of data from quantum field theory.

The **AIPHY** program brings together experts from particle physics and computer science to **develop new AI methods in the context of particle physics**. The program builds an interdisciplinary PhD network between universities and research institutes in **Copenhagen, Geneva, Heidelberg, Milan and Paris**.

In this context we invite applications for **9 three-year PhD fellowships** open to doctoral students recruited internationally. Candidates are expected to have a Master's degree in Physics, Computer Science or closely related fields like mathematics. Excellent communication skills (including proficiency in English) as well as enthusiasm for interdisciplinary work are essential for all projects.

The successful applicant will enroll in the graduate program of the respective university starting the academic year 2024-2025 (fall 2024) and will be expected to complete the requirements for a PhD by the end of the academic year 2026-2027.
He will also be expected to work co-operatively within the network, participate in European training events, and spend several months at the partner institutes as well as a secondment in a private-sector partner of the network.

The research topics focus on the development of new physics inspired AI methods for inverse problems, uncertainty estimation and explainable AI. Computer science based projects will focus on the method development while physics based projects will include an application theoretical or experimental physics. While the main supervisor will be either from computer science, experimental or theoretical physics, one co-supervisor will be from the complementary field.

Job Information

Type of Contract: Temporary
Job Status: Fellowship
Starting Date: 1 Oct 2024
Funding: EU Research Framework Programme - Horizon Europe - MSCA

Specific Research Topics

Copenhagen
Title: General searches with (GNN) AutoEncoders
Supervisor: Troels Christian Petersen <petersen@nbi.dk>
Institution: NBI, University of Copenhagen
Field: Experimental Particle Physics

Geneva
Title: Foundational models
Supervisor: Tobias Golling <Tobias.Golling@unige.ch>
Institution: DPNC, University of Geneva
Field: Experimental particle physics

Title: Denoising diffusion probabilistic models
Supervisor: Svyatoslav Voloshynovskyy <svyatoslav.voloshynovskyy@unige.ch>
Institution: Department of Computer Science, University of Geneva
Field: Computer Science

Heidelberg
Title: Comprehensive uncertainties for generative models
Supervisor: Tilman Plehn <plehn@uni-heidelberg.de>
Institution: ITP, Heidelberg University
Field: Theoretical Particle Physics

Title: Physics Model-Based AI for Rare Events
Supervisor: Juergen Hesser <Juergen.Hesser@medma.uni-heidelberg.de>
Institution: IWR, MIISM, Heidelberg University
Field: Computer Science

Milan
Title: New Generative Models for Parton Distributions
Supervisor: Stefano Forte <Stefano.Forte@mi.infn.it>, Stefano Carrazza <stefano.carrazza@mi.infn.it>
Institution: Department of Physics, University of Milan
Field: Theoretical Particle Physics

Title: Explainable AI for Online and Transferable Learning
Supervisor: Vincenzo Piuri <vincenzo.piuri@unimi.it>
Institution: Department of Computer Science, University of Milan
Field: Computer Science

Paris
Title: Transfer Learning for jet energy scales
Supervisor: Anja Butter <anja.butter@lpnhe.in2p3.fr>, Bertrand Laforge <laforge@lpnhe.in2p3.fr>
Institution: LPNHE, CNRS
Field: Theoretical/Experimental Particle Physics

Title: Extrapolation in ML

Supervisor: Gérard Biau <gerard.biau@sorbonne-universite.fr>
Institution: SCAI, Sorbonne University
Field: Computer Science

Work Locations

Number of offers available: 1
Company/Institute: ITP, Heidelberg University
Country: Germany

Number of offers available: 1
Company/Institute: IWR, MIISM, Heidelberg University
Country: Germany

Number of offers available: 1
Company/Institute: SCAI, Sorbonne University
Country: France

Number of offers available: 1
Company/Institute: LPNHE, CNRS
Country: France

Number of offers available: 1
Company/Institute: Department of Physics, University of Milan
Country: Italy

Number of offers available: 1
Company/Institute: Department of Computer Science, University of Milan
Country: Italy

Number of offers available: 1
Company/Institute: NBI, University of Copenhagen
Country: Denmark

Number of offers available: 1
Company/Institute: DPNC, University of Geneva
Country: Switzerland

Number of offers available: 1
Company/Institute: Department of Computer Science, University of Geneva
Country: Switzerland

Applications

Formal application for all positions will have to be sent through the HGSFP:
https://www.physik.uni-heidelberg.de/hgsfp/login.php

The application requires a CV, research statement and at least two letters of recommendation

However, interested candidates should contact their preferred institutes by mail before the application deadline.

Where to apply
Website
https://www.physik.uni-heidelberg.de/hgsfp/login.php

Application Deadline
1 Nov 2024 - 23:59 (Europe/Paris)

Requirements

For the Research Field: Physics
Education Level: Master Degree or equivalent

For the Research Field: Computer science
Education Level: Master Degree or equivalent

Languages: ENGLISH
Level: Excellent

Contact

City: Heidelberg
Website: https://www.thphys.uni-heidelberg.de/
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