

Session Program

27–31 Jan 2025



UNIVERSITY OF DELAWARE
BARTOL RESEARCH
INSTITUTE

Workshop on Machine Learning for Analysis of High-Energy Cosmic Particles

Talks

University of Delaware, Clayton Hall
Clayton Hall, 100 David Hollowell Dr, Newark, DE 19716, United States

Tuesday 28 January

11:00

Talks

Session | **Location:** University of Delaware, Clayton Hall, Clayton Hall, 100 David Hollowell Dr, Newark, DE 19716, United States | **Convener:** Aswathi Balagopal V

11:00–11:45 **Deep Learning in Astroparticle Physics**

Speaker
Jonas Glombitza

11:45–12:15

A Hybrid Approach to Event Reconstruction for Atmospheric Cherenkov Telescopes Combining Machine Learning and Likelihood Fitting (Remote)

Speaker
Mr Georg Schwefer

12:15–12:30

Deep Learning applied to CTAO LST-1 and the difficulty to go from simulated to real data (Remote)

Speaker
Thomas Vuillaume

12:30

14:00

Talks

Session | **Location:** University of Delaware, Clayton Hall, Clayton Hall, 100 David Hollowell Dr, Newark, DE 19716, United States | **Convener:** Dr Matthias Plum

14:00–14:45 **Machine Learning Techniques for Neutrino Reconstructions in IceCube**

Speaker
Philip Weigel

14:45–15:30 **Interpretable Deep Learning for Event Reconstruction in IceCube**

Speaker
Mirco Huennefeld

15:30

16:00

Talks

Session | **Location:** University of Delaware, Clayton Hall, Clayton Hall, 100 David Hollowell Dr, Newark, DE 19716, United States | **Convener:** Agnieszka Leszczynska

16:00–16:45 **Towards improving efficiency of machine learning techniques in neutrino telescopes**

Speaker
Felix Yu

16:45–17:30

Machine learning-based analyses using surface detector data of the Pierre Auger Observatory

Speaker
Steffen Traugott Hahn

17:30

Wednesday 29 January

09:00

Talks

Session | **Location:** University of Delaware, Clayton Hall, Clayton Hall, 100 David Hollowell Dr, Newark, DE 19716, United States | **Convener:** Steffen Traugott Hahn

09:00–09:30 Machine Learning at Telescope Array (Remote)

Speaker

Ivan Kharuk

09:30–10:00

Evaluation of energy reconstruction performance of the Telescope Array surface detector using a deep neural network and hybrid data (Remote)

Speaker

Anton Prosekin

10:00–10:30

Reconstruction of energy and arrival directions of UHECRs registered by fluorescence telescopes with a neural network (Remote)

Speaker

Mikhail Zotov

10:30

11:00

Talks

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11:00–11:20 Generative Neural Networks for Simulating Radio Emission from Air Showers (Remote)

Speaker

Pranav Sampathkumar

11:20–11:40

Detection of Radio Signals from Cosmic Rays Using Convolutional Neural Networks with Data from SKALA antennas at IceTop

Speaker

Paula Gálvez Molina

11:40–12:00

Direction and energy reconstruction with uncertainty quantification for GRAND using graph neural network (Remote)

Speakers

Arsène Ferrière, Aurélien Benoit-Lévy, for the GRAND Collaboration

12:00–12:15 Denoising Radio Pulses from Air Showers Using Machine Learning Methods (Remote)

Speaker

Mr Zhisen Lai

12:15–12:30

Convolutional Neural Network Processing of Radio Emission for Nuclear Composition Classification of Ultra-High-Energy Cosmic Rays (Remote)

Speakers

Mrs Cosmina Mihoreanu, Dr Paula Gina Isar, Mr Tudor Alexandru Calafeteanu

12:30

14:00

Talks

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Convener: Abdul
 Rehman

14:00–14:20

UHE Cosmic Ray Candidate Identification in RNO-G Deep Antennas Using Machine Learning**Speaker**

Bryan Hendricks

14:20–14:40

In-situ pulser depth reconstruction for RNO-G using Neural Network**Speaker**

Sanyukta Agarwal

14:40–14:55

A Simulation-Based Inference Method for Electric Field Reconstruction (Remote)**Speaker**

Mr Thomas McKinley

14:55–15:10

Reconstructing the Direction of Ultra-High-Energy Cosmic Rays Using a Simulation-Based Inference Method**Speaker**

Mr Zach Mason

15:10–15:30

The Radar Echo Telescope for Cosmic rays**Speaker**

Krishna Nivedita Gopinath

15:30

16:00

Talks

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Convener: Andrea
 Parenti

16:00–16:30

A graph neural network reconstruction for the IceAct telescopes**Speaker**

Larissa Paul

16:30–16:50

Gamma/Hadron Separation using Machine Learning Methods with the IceAct Telescopes**Speaker**

Logan Molchany

17:00

Thursday 30 January

09:00

Talks

Session | **Location:** University of Delaware, Clayton Hall, Clayton Hall, 100 David Hollowell Dr, Newark, DE 19716, United States | **Convener:** Dr Jonas Glombitza

09:00–09:20 **Mass composition study with machine learning on KASCADE archival data (Remote)**

Speaker

Nikita Petrov

09:20–09:40 **Improving Gamma-ray Angular Resolution with Convolutional Neural Network De-noiser**

Speaker

Dr Ruo-Yu Shang

09:40–10:05 **Modeling IACT Gamma-ray Background using Singular Value Decomposition**

Speaker

Dr Ruo-Yu Shang

10:05–10:30

Stereograph: stereoscopic event reconstruction using graph neural networks applied to CTAO (Remote)

Speaker

Mrs Hana Ali Messaoud

10:30

11:00

Talks

Session | **Location:** University of Delaware, Clayton Hall, Clayton Hall, 100 David Hollowell Dr, Newark, DE 19716, United States | **Convener:** Stef Verpoest

11:00–11:30

Fast Generation of Realistic Data-Driven Stereoscopic Shower Images using Generative Adversarial Networks (Remote)

Speaker

Dr Kameswara Bharadwaj Mantha

11:30–12:00 **AI Agents for Ground-Based Gamma Astronomy (Remote)**

Speaker

Dmitriy Kostunin

12:00–12:30

Application of graph networks to a next generation wide-field gamma-ray observatory in the southern sky

Speaker

Franziska Leidl

12:30

14:00

Talks

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14:00–14:20

Graph Neural Networks for Photon Search with the Underground Muon Detector of the Pierre Auger Observatory (Remote)

Speaker

Ezequiel Rodríguez

14:20–14:40

IceTop gamma-hadron separation and angular error estimation using machine learning techniques**Speaker**

Sebastian Vergara Carrasco

14:40–15:00

IceTop-CNN: Cosmic-Ray Reconstruction in IceTop using a Convolutional Neural Network with Low-Level Inputs (Remote)**Speaker**

Ethan Dorr

15:00–15:20

Optimizing a Cosmic-ray Energy Estimator with Machine learning for the HAWC observatory (Remote)**Speaker**

Tomás Capistrán

15:20

15:50

Talks**Session** | **Location:** University of Delaware, Clayton Hall, Clayton Hall, 100 David Hollowell Dr, Newark, DE 19716, United States |**Convener:** Spencer Axani

15:50–16:35

Searching for Rare Astrophysical Events with Rare AI**Speaker**

Prof. Aobo Li

16:35–17:05

Machine learning using NuDot**Speaker**

Masooma Sarfraz

17:05