

UniversAI : Exploring the Universe with Artificial Intelligence

Scientific Program

Scientific Organizing Committee (SOC)

SOC Chairs: **Ioannis Liodakis** *FORTH-IA*, **Vasilis Efthymiou** *HUA*

SOC Members: **Maria Dainotti** *NAOJ*, **Michico Fujii** *U. Tokyo*, **Oktie Hassanzadeh** *IBM*, **Lorena Hernandez Garcia** *MAS*, **Daniel Gruen** *LMU*, **Tomasz Kacprzak** *ETH*, **Jae-Young Kim** *UNIST*, **Catia Pesquita** *U Lisboa*, **Abdul Quamar** *Google*, **Hideaki Takeda** *NII*, **Risa Wechsler** *Stanford*

Local Organizing Committee (LOC)

Vasilis Efthymiou *Harokopio University of Athens*, **Fiori – Anastasia Metallinou** *National Observatory of Athens*, **Kostas Petrakis** *Netcompany*

Venue

Harokopio University of Athens: Amphitheater G. Karabatzos,
Thiseos 70, Kallithea 176 76, Athens, Greece



ΧΑΡΟΚΟΠΕΙΟ ΠΑΝΕΠΙΣΤΗΜΙΟ
HAROKOPIO UNIVERSITY



Monday, June 2nd, 2025

08:00-09:00

Registration

09:00-09:30

Welcome Chair: Vasilis Efthymiou, *Harokopio University of Athens*
Welcome Addresses

09:00-09:10

Vasilis Efthymiou, *Harokopio University of Athens*

09:10-09:20

Georgios Dedousis, *Rector of Harokopio University of Athens*

09:20-09:30

Spyros Basilakos, *President of National Observatory of Athens*

09:30-11:00

Session 1 Chair: Ethan Partington, *FORTH Institute of Astrophysics*

09:30-10:00

Keynote Lecture

Perspectives on the Past, Present, and Future of Astronomical Image Deconvolution
Jean-Luc Starck, *CEA-Saclay*

10:00-10:15

Combining machine learning and forward-modelling of Stage IV galaxy surveys for precise cosmological measurements

Luca Tortorelli, *LMU Munich*

10:15-10:30

Accelerating Astrophysical Simulations with Neural Operators: Precision and Efficiency Beyond Traditional Neural Networks

Lorenzo Branca, *University of Heidelberg*

10:30-10:45

Using CNNs for Precision Shear Measurement in Stage IV Surveys

Lisa Voigt, *University of Essex*

Monday, June 2nd, 2025

11:00-11:30

Coffee break/ Poster Session

11:30-12:30

Session 2 Chair: Christos Diou, *Harokopio University of Athens*

11:30-11:45

Bridging the Gap: Predicting Galaxy Spectra from Photometric Images Using Generative, AI Eva Sextl, *LMU Munich / University Observatory*

11:45-12:00

The use of ANNs for solving different physical and astrophysical phenomena, Yosry Azzam, *NRIAG*

12:00-12:15

UNEZ: An Unsupervised Physics-Informed Neural Network for Redshift and Line Strength Prediction, Asha Abd, *Swinburne University of Technology*

12:15-12:30

A Versatile Framework for Analyzing Galaxy Structures by Implanting Human-in-the-loop on a Foundation Vision Model, Nan Li, *National Astronomical Observatories of China*

12:30-14:00

Lunch break / Poster Session

14:00-15:15

Session 3 Chair: Themis Palpanas, *French University Institute*

14:00-14:30

Keynote Lecture

Using regional effect plots for machine learning model interpretation: The Effector python package, Christos Diou, *Harokopio University of Athens*

Monday, June 2nd, 2025

14:30-14:45

A Benchmark Dataset for Filament Extraction Using Generative Machine Learning, **Loris Berthelot**, *Laboratoire d'Informatique et Système*

14:45-15:00

A data-driven approach for star formation parameterization using symbolic regression, **Diane Salim**, *Rutgers University*

15:00-15:15

Coffee break/ Poster Session

15:15-16:00

Session 4 Chair: **Maria Giovanna Dainotti**, *National Astronomical Observatory of Japan*

15:15-15:30

Star-by-star Galaxy Simulations Accelerated by Surrogate Modeling for Supernova Feedback, **Keiya Hirashima**, *University of Tokyo*

15:30-15:45

Fast Spectral Energy Distribution Fitting with Radiative Transfer Models, **Klea Panayidou**, *European University Cyprus & FORTH*

15:45-16:00

Determining the time before or after a galaxy merger with deep learning, **William Pearson**, *Narodowe Centrum Badań Jądrowych*

16:00-16:15

Bridging observations and simulations: a machine learning approach to galaxy clusters, **Efrain Gatuzz**, *Max-Planck Institute for Extraterrestrial Physics (MPE)*

21:00

Public Talk in Greek & Stargazing @NOA, Thissio Visitor Center

Tuesday, June 3rd, 2025

8:00-9:00

Registration

9:00-10:30

Session 5 Chair: Grigoris Maravelias, *PeriAstron, IA-FORTH*

09:00-09:30

Keynote Lecture

Information Field Theory: Concepts and Astrophysical Applications, **Torsten Enslin**, *Max-Planck-Institute for Astrophysics*

09:30-09:45

EMBER-2: towards implicit emulators to constrain astrophysics in FIRE-based simulations, **Mauro Bernardini**, *University of Zurich*

09:45-10:00

AI4Astro: Exploring Star Formation and ISM through Artificial Intelligence, **Duo Xu**, *CITA, University of Toronto*

10:00-10:15

Detection of stellar wakes in the Milky Way: A deep learning approach, **Sven Pöder**, *National Institute of Chemical Physics and Biophysics*

10:15-10:30

Investigation of Galactic Populations and Merger Processes Using Machine Learning Methods, **Olcay Plevne**, *Istanbul University*

10:30-11:00

Coffee break/ Poster Session

Tuesday, June 3rd, 2025

11:00-12:30

Session 6 Chair: Torsten Enslin, *Max-Planck-Institute for Astrophysics*

11:00-11:30

Keynote Lecture

Easy, Accurate, and Fast Machine Learning on Very Large Data Series Collections: Similarity Search and Subsequence Anomaly Detection, **Themis Palpanas**, *French University Institute*

11:30-11:45

Recent Results in the Application of AI to Astronomy Problems, **Vicky Kalogera**, *Northwestern University*

11:45-12:00

Diffusion Models for Emulating the Large-Scale Structure of the Universe in Modified Gravity Cosmologies, **Jorge Enrique García Farieta**, *University of Córdoba*

12:00-12:15

Extracting Early Universe Physics from The First Lunar-Based Observations of the 21 Cm Signal with A Novel Memory-Based Emulator, **John Dorigo Jones**, *University of Colorado, Boulder*

12:15-12:30

Enhancing Photometric Redshift Catalogs Through Color-Space Analysis: Application to KiDS-Bright Galaxies, **Priyanka Jalan**, *Center for Theoretical Physics, Polish Academy of Sciences*

12:30-13:45

Lunch break/ Poster Session

Tuesday, June 3rd, 2025

13:45-14:30

Session 7 Chair: Eleni Vardoulaki, *National Observatory Athens*

13:45-14:00

Lux: A generative, multi-output, latent-variable model for astronomical data with noisy labels, **Daniel Horta Darrington**, *University of Edinburgh*

14:00-14:15

Towards Understanding the Milky Way's Matter Field and Dynamical Accretion History based on AI-GS³ Hunter, **Haifeng Wang**, *Padova university*

14:15-14:30

Comparison of Photometric and Spectroscopic Labels in Classifying Dusty Stellar Sources Using Machine Learning in the Magellanic Clouds, **Sepideh Ghaziasgar**, *Institute for Research in Fundamental Sciences (IPM)*

14:30-15:00

Coffee break/ Poster Session

15:00-16:15

Session 8 Chair: Georgios Vasilopoulos, *NKUA*

15:00-15:15

Machine Learning Unveils AGB Stars in Gaia DR3, **Tanya Kushwahaa**, *Cardiff University*

Tuesday, June 3rd, 2025

15:15-15:30

Leveraging Machine-Learning Methods to Study the Populations of Massive Evolved Stars in Various Galaxies, **Grigoris Maravelias**, *PeriAstron, IA-FORTH*

15:30-15:45

SpecCLIP: Combing and translating spectroscopic measurements for stars, **Yang Huang**, *University of Chinese Academy of Sciences*

15:45-16:00

Radio Galaxy Zoo EMU: Harnessing Citizen Science and AI to Advance Open Science Catalogs, **Eleni Vardoulaki**, *National Observatory Athens*

16:00-16:15

Transforming Astronomy Education and Science Communication: The Multifaceted Role of Artificial Intelligence, **Exodus Chun-Long Sit**, *IAU NAEC & NOC Hong Kong, China*

16:15-16:45

Keynote Lecture

The co-evolution of gravitational wave astrophysics and artificial intelligence
Tyson Littenberg, *Marshall Space Flight Center* (remote)

19:00 -20:00

Astrophotography and AI @ Ceremony Hall of Harokopio University

21:00

Stargazing @Harokopio University of Athens

Wednesday, June 4th, 2025

8:00-9:00

Registration

9:00-10:30

Session 9 Chair: Meghyn Bienvenu, *CNRS*

09:00-09:30

Keynote Lecture

Repairing Graphs with Users and AI, Angela Bonifati, *Lyon 1 University*

09:30-09:45

Automated development of an astrophysical semantic catalogue in PARSEC, Iosif Oikonomakis, *ICS FORTH*

09:45-10:00

EMUSE: Evolutionary Map of the Universe Search Engine, Minh Huynh, *CSIRO*

10:00-10:15

Learning the distribution of astrophysical spectra with generative models, Nikolas Frediani, *LMU Munich, University Observatory*

10:15-10:30

Explainability Of Astronomical Anomalies with Signatures, Emmanuel Gangler, *LPCA Université Clermont Auvergne*

10:30-11:00

Coffee break/ Poster Session

Wednesday, June 4th, 2025

11:00-12:15

Session 10 Chair: Grigoris Tsagatakis, *University of Crete*

11:00-11:30

Keynote Lecture

A brief introduction to ontology-based data access, **Meghyn Bienvenu**, *CNRS*

11:30-11:45

Centralized vs Decentralized Agencies in Space Missions: A Game-Theoretic Approach, **Konstantinos Varsos**, *FORTH*

11:45-12:00

Statistical pitfalls when mining large databases, and how to deal with them, **Chris Koen**, *University of the Western Cape*

12:00-12:15

aweSOM: an Open-source Python Package for Efficient Clustering of Intermittency in Magnetized Plasma Turbulence, **Trung Ha**, *University of Massachusetts Amherst*

12:15-13:30

Lunch break/ Poster Session

13:30-15:00

Session 11 Chair: Konstantinos Varsos, *FORTH*

13:30-14:00

Keynote Lecture

The Variable Universe with the Gaia Mission and AI Methods, **Laurent Eyer**, *Geneva Astronomical Observatory*

Wednesday, June 4th, 2025

14:00-14:15

SWAAT: An Automated Framework for Space Weather Data Analysis and Prediction, **Felipe Meza-Obando**, *Costa Rica Institute of Technology*

14:15-14:30

Servimon: Ai-driven Predictive Maintenance and Real-time Monitoring for Astronomical Observatories, **Kevin Munari**, *INAF - National Institute for Astrophysics*

14:30-14:45

Decoding Galaxy Evolution Models with cINNs via SDSS-like Spectrophotometric Data, **Nils Candebat**, *INAF - Arcetri Astrophysical Observatory*

14:45-15:00

Unlikely Pairs: A Reevaluation of CLIP Robustness, **Helen Qu**, *Flatiron Institute*

15:00-15:30

Coffee break/ / Poster Session

15:30-16:30

Session 12 Chair: **Laurent Eyer**, *Geneva Astronomical Observatory*

15:30-15:45

Accelerating SED Modeling of Astrophysical Objects Using Neural Networks, **Georgios Vasilopoulos**, *National and Kapodistrian University of Athens*

15:45-16:00

Evaluating small vision-language models as AI assistants for radio astronomical source analysis tasks, **Simone Riggi**, *Istituto Nazionale di Astrofisica (INAF)*

16:00-16:15

Estimating Fluxes Densities of Extended Cosmological Radio Sources Exploiting Vision Transformers, **Nicoletta Sanvitale**, *INAF - Institute for Radioastronomy*

16:15-16:30

Simulating realistic radio continuum survey maps with diffusion models, **Tobias Vicanek Martinez**, *Hamburg Observatory*

21:00

Public Talk in Greek& Stargazing @N.O.A., Thissio Visitor Center

Thursday, June 5th, 2025

8:00-9:00

Registration

9:00-10:30

Session 13 Chair: Dragana Ilic, *University of Belgrade*

09:00-09:30

Keynote Lecture

Do Androids Dream of Exploding Stars and Receding Galaxies, **Federica Bianco**, *University of Delaware*

09:30-09:45

Metalearning and AI for Time-Domain Astrophysics of AGNs in the Era of Large-Scale Surveys, **Andjelka Kovacevic**, *University of Belgrade*

09:45-10:00

Casting a wide net in the search for supermassive black hole binaries with null-signal templates, **Ethan Partington**, *FORTH Institute of Astrophysics*

10:00-10:15

The ALeRCE Broker, **Lorena Hernandez Garcia**, *University of Valparaiso*

10:15-10:30

Early Identification of Optical Tidal Disruption Events with The Fink Broker, **Miguel Llamas Lanza**, *Fink broker*

10:30-11:00

Coffee break / Poster Session

Thursday, June 5th, 2025

11:00-12:30

Session 14 Chair: Federica Bianco,

11:00-11:30

Keynote Lecture

Cosmic Conversations: Unleashing the Power of Natural Language Interfaces in Science and Astrophysics, **Georgia Koutrika**, *Athena Research Center*

11:30-11:45

There they are! Identifying outliers in source catalogues, **Holger Stiele**, *Jülich Supercomputing Centre*

11:45-12:00

Harnessing the power of future surveys with AI, **Miguel Llamas Lanza**, *Fink broker*

12:00-12:15

Application of Ensemble Learning Algorithms for Robust Identification of Wolf-Rayet Stars, **Rajorshi Bhattacharya**, *University of New Mexico*

12:15-12:30

Tracing Galactic Mergers: A Data-Driven Search for Enceladus Stars in the Solar Neighborhood, **Olcay Plevne**, *Istanbul University*

12:30-13:30

Lunch break / Poster Session

13:30-15:45

Session 15 Chair: Georgia Koutrika, *Athena Research Center*

13:30-13:45

MUSE@M33: Classifying Spectra of Emission-Line Regions with Neural Networks, **Caterina Bracci**, *University of Florence / INAF*

Thursday, June 5th, 2025

13:45-14:00

Extending the EVA Platform with LLM+RAG Capabilities to Infer Astronomical Object Types from Scientific Publications within ESASky, **Miguel Doctor Yuste**, *Telespazio UK for ESA*

14:00-14:15

Modern Deep Learning Approaches to Galaxy Classification, **Dimitrios Katsaros**, *University of Thessaly*

14:15-14:30

Application Of Machine Learning Methods to The Identification of Star-Forming Regions, **Karolina Plakitina**, *Institute of Astronomy of the Russian Academy of Sciences*

14:30-14:45

Coffee break / Poster Session

14:45-15:00

Unsupervised Classification of Gamma-Ray Bursts from Blazars (GRBBLs) with Machine Learning, **Matteo Cerruti**, *Université Paris Cité - Astroparticles and Cosmology (APC)*

15:00-15:15

Detection of lensed quasars with ALeRCE, **Consuelo Núñez**, *Universidad de Valparaíso*

Thursday, June 5th, 2025

15:15-15:30

FALCO: a Foundation model of Astronomical Light Curves for time domain astronomy, Xiaoxiong Zuo, *University Observatory Munich / National, Astronomical Observatories of Chinese Academy of Sciences*
Yihan Tao, *National Astronomical Observatories, Chinese Academy of Sciences*

15:30-15:45

CLONES: Digital Twins of the Local Universe for Bias-Free Inference, Jenny Sorce, *CNRS CRISTAL / IAS*

18:00-23:00

Tour & Gala Dinner
@National Observatory of Athens, Thissio Visitor Center

Friday, June 6th, 2025

8:00-9:00

Registration

9:00-10:30

Session 16 Chair: Andjelka Kovacevic, *University of Belgrade*

09:00-09:30

Keynote Lecture

To CLEAN or not to CLEAN: Data Processing in the ngVLA era, **Hendrik Mueller**, *NRAO*

09:30-09:45

Reinforcement Learning for Radio Interferometry Data Processing, **Brian Kirk**, *New Mexico Institute of Mining and Technology/ NRAO*

09:45-10:00

Maria Goes Nifty - Simulation, Gaussian Process-Based Reconstruction and Denoising of (Sub-)Millimetre Single-Dish Telescope Data, **Jonas Würzinger**, *Technical University of Munich*

10:00-10:15

Learning from the present for the future: the Jülich LOFAR Long-term Archive, **Holger Stiele**, *Jülich Supercomputing Centre*

10:15-10:30

DIRECT - Deep learning Image Reconstruction with Closure Terms for Very Long Baseline Interferometry, **Samuel Lai**, *CSIRO*

10:30-11:00

Coffee break / Poster Session

Friday, June 6th, 2025

11:00-12:15

Session 17 Chair: Jean-Luc Starck,

11:00-11:30

Keynote Lecture

Uncertainty-Aware Machine Learning for Astronomical Data Analysis,
Grigoris Tsagatakis, *University of Crete*

11:30-11:45

Inferring the redshift of Gamma-Ray Bursts with Machine learning tools,
Maria Giovanna Dainotti, *National Astronomical Observatory of Japan*

11:45-12:00

From Noise to Knowledge: Diffusion Models for Probabilistic Interpolation of
Sagittarius A*'s Multi-Wavelength Data, **Gabriel Sasseville**, *University of Montreal*

12:00-12:15

Potential of Feature Extraction Methods Using Kernel PCA and Kernel SHAP in
Astronomy, **Hiroma Okubo**, *University of Tsukuba*

12:15-13:30

Lunch break / Poster Session

Friday, June 6th, 2025

13:30-14:30

Session 18 Chair: Hendrik Mueller, *NRAO*

13:30-13:45

An optical gamma-ray burst catalogue with measured redshift - I. Data release of 535 gamma-ray bursts and colour evolution, **Maria Giovanna Dainotti**, *National Astronomical Observatory of Japan*

13:45-14:00

A Natural Language Interface for Efficient Data Retrieval in SDSS, **Prathamesh Tamhane**, *University of Alabama in Huntsville*

14:00-14:15

Neural Networks for Spectral Analysis: Continuum Reconstruction and Metal Absorber Identification in Quasar Observations, **Francesco Pistis**, *Università degli studi di Milano-Bicocca*

14:15-14:30

Hyperspectral fusion with surrogate model fitting for X-ray astrophysics, **Julia Lascar**, *CEA / University Paris Saclay*

14:30

Closing Chair: Yannis Liodakis, *Institute of Astrophysics - FORTH*

POSTER SESSION LIST

- P01** Machine Learning-Enhanced Radio Footprint Analysis for Improved Cosmic Ray Detection in the GRAND Experiment, **Luana Melnek dos Anjos**, *San Francisco State University*
- P02** Exploring the outskirts of galaxies with the Minkowski functionals and machine learning, **Li Wen Liao**, *Institute of Space Science-CSIC; IEEC*
- P03** Super-Resolution Imaging in the Mid-Infrared: A CycleGAN Approach for the Galactic Center, **Jiwon Han**, *Ewha Womans University*
- P04** Characterization of Polycyclic Aromatic Hydrocarbons in the Local Universe using Machine Learning Techniques, **Subhajit Kar**, *S.N. Bose National Centre for Basic Science*
- P05** Machine-Assisted Anatomy of Galactic Environments: Deep Insights into Galaxy Distributions with the Variational Autoencoder, **Eun Taek Gim**, *Yonsei University*
- P06** Optimized Multi-messenger Follow-up With The Zwicky Transient Facility, **Kira Nolan**, *CALTECH*
- P07** Improving Tidal Disruption Event Classification with Multimodal Learning Using Late-Time Photometric Plateaus, **Vysakh Anilkumar**, *Leiden university*

POSTER SESSION LIST

- P08** AI for primary students using spreadsheets, **Size Leung Cheung**, *Stardusts*
- P09** Emulating redshift-dependent blending in cosmic shear with boosted trees, **Zekang Zhang**, *LMU Munich*
- P10** Sequencing Spectra of Young Planetary Systems to Decipher Planet Formation: Methodology for Unsupervised Clustering and CLUES Software Demonstration, **Cicero Lu**, *NOIRLab/ Gemini Observatory*
- P11** GANexo v2.0: Enhancing Exoplanetary Transit Signal Analysis with Real Data Integration, **Felipe Meza-Obando**, *Costa Rica Institute of Technology*
- P12** Unfolding Stellar Properties with Deep Learning, **Ilay Kamai**, *Israel Institute of Technology*
- P13** Interacting Winds and Giant Eruptions in Massive Binaries, and the Effect they have on the Erupting and Accreting Stars, **Amit Kashi**, *Ariel University*
- P14** Denoising and Signal Restoration for Multi-instrument astrophysical Observations: From Simulations to Real Data, **Arnab Lahiry**, *Foundation for Research and Technology - Hellas*

POSTER SESSION LIST

- P15** FLAME: Fitting LyAlpha Absorption lines using Machine Learning, **Priyanka Jalan**, *Center for Theoretical Physics, Polish Academy of Sciences*
- P16** Comparing DDPMs and Unets for scientific hydrodynamical emulations, **Alessandro Ruzza**, *Università degli studi di Milano*
- P17** AI-Powered Simulations and Deblending Strategies for CASTOR: Preparing for Next-Generation UV Space Observations, **Teimoorinia Hossen**, *NRC/CADC*
- P18** Machine learning for the automatic identification of Planetary Nebulae and Symbiotic Stars using the Gaia DR3 spectra, **Luis José Corral Escobedo**, *Universidad de Guadalajara*

Information

Proceedings

All accepted abstracts are granted a place in the proceedings, published by Cambridge University Press. These proceedings will be indexed by NASA ADS, Google Scholar

The length of the paper depends on your presentation format:

- for poster presentations, papers may be up to 2 pages
- for oral presentations, papers can be up to 4 pages long.

Paper submission Deadline: **September 1st, 2025**

How to get to Venue Harokopio University of Athens

- METRO: Line 1 Station TAVROS - EL. VENIZELOS
- TROLLEY BUSES: Line 1 & Line 5 (Both pass from Syntagma Square). Get off: Karagiannis Stop or Harokopou Stop
- BUS: Number 040 [Athens/ (Departure from Syntagma Square/ Phillelinon St). - Piraeus]. Get off: Harokopou Stop. Note: You may get on Bus 040 also in front of Metro Station "Syngrou/ Fix".
- TAXI: FREE NOW Greece's taxi app is available to download free of charge

How to get to National Observatory of Athens - Thissio Visitors Center

- METRO: Line 1 station Thissio, or Line 3 station Monastiraki, followed by a 10-minute walk up the hill to Lofos Nymphon , PO Box 20048, 11810, Athens

UniversAI : Exploring the Universe with Artificial Intelligence

