

# 9<sup>th</sup> International Conference on machine Learning, Optimization & Data science – LOD 2023

<https://lod2023.icas.cc/>

[lod@icas.cc](mailto:lod@icas.cc)

and

# 3<sup>rd</sup> International Advanced Course & Symposium on Artificial Intelligence & Neuroscience – ACAIN 2023

<https://acain2023.icas.cc/>

[acain@icas.cc](mailto:acain@icas.cc)

## from Deep Learning to Generative Artificial Intelligence *One Conference, a Course and a Symposium in a unique Event*

September 22 – 26, 2023

The Wordsworth Hotel & Spa – Grasmere, Lake District, England, UK

Program Ver. 0.6, Sept 15, 9 pages – This schedule is tentative and subject to change.

	Friday, Sept 22	Saturday, Sept 23	Sunday, Sept 24	Monday, Sept 25	Tuesday, Sept 26
08:30 – 09:00		Arrival tea, freshly brewed coffee and homemade biscuits			
09:00 – 09:45		<b>Karl Friston</b>	<b>Sven Giesselbach</b>	<b>Sven Giesselbach</b>	<b>Kenneth Harris</b>
09:45 – 10:30		<b>Karl Friston</b>	<b>Sven Giesselbach</b>	Sessions 6 & 7	<b>Kenneth Harris</b>
10:30 – 11:00		Tea & Coffee break	Tea & Coffee break	Tea & Coffee break	Tea & Coffee break
11:00 – 11:45		<b>Panos Pardalos</b>	Sessions 4 & 5	Sessions 8 & 9	<b>Kenneth Harris &amp; Closing</b>
11:45 – 12:30		Session 1			<b>Free</b>
12:30 – 14:00		Lunch	Lunch	Lunch	Lunch
14:00 – 14:45	Arrival tea, freshly brewed coffee and homemade biscuits & Registration	<b>Rosalyn Moran</b>	Alcock Tarn Walk*	Sessions 10 & 11	
14:45 – 15:30		<b>Rosalyn Moran</b>			
15:30 – 16:15	<b>Anthony G. Cohn</b>	Afternoon Tea			
16:15 – 16:45	<b>Free</b>	<b>Gabriel Barth Maron</b>		Afternoon Tea	
16:45 – 17:30		Session 2		Sessions 12 & 13	
17:30 – 18:30		Session 3			
20:00 – 21:30	Tea & <b>Opening</b> <b>Edmund T. Rolls</b>			<b>Gala Dinner**</b> (19:00 – 21:00)	

### In blue the Plenary Sessions (Conference room 1: Coleridge Suite)

Parallel Sessions:

Conference room 1: **Coleridge Suite**

Conference room 2: **The Lounge**

Conference room 3: **The Village Hall** (on Sept 25)

**Arrival:** September 22

**Departure:** September 26

**Registration:** Friday September 22 (14:00-15:30)

The registration desk will be located in the Wordsworth Hotel Reception/Lounge. Upon registration at the desk, you will receive your badge, vouchers, and conference materials. To facilitate the process please bring with you the *registration confirmation*. You are kindly requested to wear your name badge during all events of the conference.

**Gala Dinner and Walk:** For Extra Gala Dinner Ticket(s) and/or the Walk, please send an email to [lod@icas.cc](mailto:lod@icas.cc) AND [acain@icas.cc](mailto:acain@icas.cc) thanks.

**\* Alcock Tarn Walk: <https://www.nationaltrust.org.uk/visit/lake-district/allan-bank-and-grasmere/alcock-tarn-walk>**

*What to wear for walking in the Lake District fells*

- **Waterproof jacket and waterproof over-trousers** Always be prepared for a sudden change in the forecast.
- **Insulating and breathable layers** It's easy to cool down quickly while stopping on a walk so pack an extra layer just in case.
- **Comfortable trousers** Avoid fabrics which might take time to dry out if they get wet, such as cotton and denim.
- **Hat and gloves** Even in summer we recommend you keep these in your rucksack.
- **Walking boots** We recommend boots rather than walking shoes as a boot offers ankle protection. Always make sure your footwear has a good tread or sole pattern. There are different types of footwear available for summer and winter walking, so do check before you trek. **Please note that on many of our guided walk routes, walking boots are essential.**
- **Walking socks** A good breathable pair will help keep feet warm, cosy and comfy.

**\* What to bring with you on a walk**

- **Comfortable day sack or rucksack** Adjusted to fit you and a size to suit the walk.
- **Walking poles** Poles can help you maintain a good balance and reduce stress on knees and backs. Be sure to know how to use them.
- **Gaiters** Not essential but useful if you want to keep your trousers and feet dry.
- **Food, water and a warm drink** There is little shelter on the fell tops so check the forecast and bring what you need to keep hydrated and your energy levels up.
- **Emergency food** Keep a high energy snack stashed in your pack.
- **Mobile phone** (fully charged) or a watch to keep an eye on the time.
- **Sun protection** Protect your skin and eyes.
- **Map and compass** Be sure to know how to use these. Your **GPS** might not work. We offer fun, informal basic navigation courses.
- **Whistle and torch** Remember the international distress signal: six short whistle blasts or flashes with your torch, repeated at one-minute intervals.

<https://www.lakedistrict.gov.uk/visiting/things-to-do/walking/top-walking-tips>

**\*\*** Please communicate your dietary needs (e.g., gluten-free, celiac, vegetarian, vegan, food allergies, and other dietary needs) asap, thank you. Please send an email to [ionela.oanea@inncollectiongroup.com](mailto:ionela.oanea@inncollectiongroup.com) AND [lod@icas.cc](mailto:lod@icas.cc) AND [acain@icas.cc](mailto:acain@icas.cc) thanks.

**Dress code** for the conference gala dinner: to dress formally (you should wear a suit or dress).

**Paper presentation:**

Each talk must compulsorily last no longer than 15 minutes (12 min Talk + 3 min Q&A).

To do the talk, each speaker must necessarily use their own laptop.

Inside Wordsword Hotel & SPA (and the Village Hall), badges must be worn at all times.

Certificates will be given out on the last day of the conference.

## LOD 2023 Keynote Speakers

**Gabriel Barth-Maron**, DeepMind, London, UK

*“Multimodal Foundation Models”*

**Anthony G. Cohn**, University of Leeds, UK & The Alan Turing Institute, UK

*“Evaluating the Commonsense Reasoning abilities of Foundation Models”*

**Sven Giesselbach**, Fraunhofer Institute -- IAIS, Germany

*“Foundation Models”*

*“GPT”*

*“OpenGPT-X and Application and Practical Training of Large Scale Language Models”*

## ACAIN 2023 Keynote Lecturers

**Karl Friston**, University College London, UK

*“Deep inference”*

*“Active inference and artificial curiosity”*

**Kenneth Harris**, University College London, UK

*“The large scale structure of neural activity in the neocortex”*

*“How cortical population activity relates to transcriptomic cell types”*

*“Geometrical constraints on high-dimensional population codes”*

**Rosalyn Moran**, King’s College London, UK

*“The Free Energy Principle: A Neurobiological Generative AI? 1/2”*

*“The Free Energy Principle: A Neurobiological Generative AI? 2/2”*

**Panos Pardalos**, University of Florida, USA

*“Network Analysis, Data Sciences and Control in Neuroscience”*

**Edmund T. Rolls**, University of Warwick, UK

*“Biologically plausible computational neuroscience: memory and navigation”*

*“Biologically plausible computational neuroscience: emotion and depression”*

## September 23

### Session 1

Conference Room 1: Coleridge Suite

Chair: Varun Ojha

11:45 – 12:00 Niall McGuire and Yashar Moshfeghi, “*On Ensemble Learning for Mental Workload Classification*”

12:00 – 12:15 Moritz Lange, Noah Krystiniak, Raphael C. Engelhardt, Wolfgang Konen and Laurenz Wiskott, “*Improving Reinforcement Learning Efficiency with Auxiliary Tasks in Non-Visual Environments: A Comparison*”

12:15 – 12:30 Gerard Rinkus, “*A Radically New Theory of how the Brain Represents and Computes with Probabilities*”

### Session 2

Conference Room 1: Coleridge Suite

Chair: Varun Ojha

17:30 – 17:45 Kunjira Kingphai and Yashar Moshfeghi, “*On Channel Selection for EEG-based Mental Workload Classification*”

17:45 – 18:00 Niall McGuire and Yashar Moshfeghi, “*What Song Am I Thinking Of?*”

18:00 – 18:15 Habtom Kahsay Gidey, Peter Hillmann, Andreas Karcher and Alois Knoll, “*User-Like Bots for Cognitive Automation: A Survey*”

18:15 – 18:30 Yihe Lu, Rana Alkhoury Maroun and Barbara Webb, “*Robust visual route following by an embodied lateralised mushroom body model*”

### Session 3

Conference Room 1: Coleridge Suite

Chair: Emanuele La Malfa

20:00 – 20:15 José Diogo Marques dos Santos and José Paulo Marques dos Santos, “*Path-Weights and Layer-Wise Relevance Propagation for Explainability of ANNs with fMRI Data*”

20:15 – 20:30 Sruthi Srinivasan, Emilia Butters, Flavia Mancini and Gemma Bale, “*Investigating Inter-Network Dynamic Connectivity of Auditory Signals: A Large-Scale, Near-Infrared Spectroscopy Study*”

20:30 – 20:45 Akhila Atmakuru, Giuseppe Di Fatta, Giuseppe Nicosia, Ali Varzandian and Atta Badii, “*Sensitivity Analysis for Feature Importance in Predicting Alzheimer’s Disease*”

20:45 – 21:00 Vera Kalinichenko, “*Leverage Mathematics’ capability to compress and generalize as application of ML Embedding extraction from LLMs and its adaptation in the Automotive Space*”

## September 24

### Session 4

Conference Room 1: Coleridge Suite

Chair: Emanuele La Malfa

11:00 – 11:15 Andrea Martin and Kristen Brent Venable, “*Decision-making over compact preference structures*”

11:15 – 11:30 Johannes Varga, Emil Karlsson, Günther Raidl, Elina Rönnerberg, Fredrik Lindsten and Tobias Rodemann, “*Speeding up Logic-Based Benders Decomposition by Strengthening Cuts with Graph Neural Networks*”

11:30 – 11:45 Asma Atamna, Tobias Glasmachers, Abhijeet Pendyala and Justin Dettmer, “*ContainerGym: A Real-World Reinforcement Learning Benchmark for Resource Allocation*”

11:45 – 12:00 Jan Kronqvist, Boda Li, Jan Rolfes and Shudian Zhao, “*Alternating mixed-integer programming and neural network training for approximating stochastic two-stage problems*”

12:00 – 12:15 Sara Ceschia, Luca Di Gaspero, Roberto Maria Rosati and Andrea Schaerf, “*Reinforcement learning for multi-neighborhood local search in combinatorial optimization*”

12:15 – 12:30 Jong Ho Jhee, Jeongheun Yeon, Yoonshin Kwak and Hyunjung Shin, “*Multi-Scale Heat Kernel Graph Network for Graph Classification*”

### Session 5

Conference Room 2: The Lounge

Chair: Gabriele La Malfa

11:00 – 11:15 Alessio Bonfiglio, Marco Cannici and Matteo Matteucci, “*SoftCut: a fully differentiable relaxed graph cut approach for deep learning image segmentation*”

11:15 – 11:30 Raphael Engelhardt, Ralitsa Raycheva, Moritz Lange, Laurenz Wiskott and Wolfgang Konen, “*Ökolopoly: Case Study on Large Action Spaces in Reinforcement Learning*”

11:30 – 11:45 Jiří Novák and Peter Chudý, “*Dynamic Soaring in Uncertain Wind Conditions: Polynomial Chaos Expansion Approach*”

11:45 – 12:00 Maria Sliacka, Michael Mistry, Roberto Calandra, Ville Kyrki and Kevin Sebastian, “*Luck Co-Imagination of Behaviour & Morphology of Agents*”

12:00 – 12:15 Jose Aguilar Escamilla and Dimitrios I. Diochnos, “*Perceptrons Under Verifiable Random Data Corruption*”

12:15 – 12:30 Georgios Cheirmpos, Seyedamin Tabatabaei, Evangelos Kanoulas and Georgios Tsatsaronis, “*Benchmarking Named Entity Recognition Approaches for Extracting Research Infrastructure Information from Text*”

## September 25

### Session 6

Conference Room 1: Coleridge Suite

Chair: Emanuele La Malfa

09:45 – 10:00 Michael Hellwig and Steffen Finck, “*Joining Emission Data from Diverse Economical Activity Taxonomies with Evolution Strategies*”

10:00 – 10:15 Michael Mittermaier, Takfarinas Saber and Goetz Botterweck, “*Learning Graph Configuration Spaces with Graph Embedding in Engineering Domains*”

10:15 – 10:30 David Heik, Fouad Bahrpeyma and Dirk Reichelt, “*Application of multi-agent reinforcement learning to the dynamic scheduling problem in manufacturing systems*”

### Session 7

Conference Room 3: The Village Hall

Chair: Gabriele La Malfa

09:45 – 10:00 Fitria Wulandari Ramlan and James McDermott, “*Genetic Programming with Synthetic Data for Interpretable Regression Modelling and Limited Data*”

10:00 – 10:15 Vedat Dogan and Steven Prestwich, “*Bilevel Optimization by Conditional Bayesian Optimization*”

10:15 – 10:30 Panagiotis Anagnostou, Nicos G. Pavlidis and Sotiris Tasoulis, “*Ensemble Clustering for Boundary Detection in High-Dimensional Data*”

### Session 8

Conference Room 1: Coleridge Suite

Chair: Emanuele La Malfa

11:00 – 11:15 Steven Prestwich, “*Solving Mixed Influence Diagrams by Reinforcement Learning*”

11:15 – 11:30 Silvia Arellano, Beatriz Otero, Tomasz Piotr Kucner and Ramon Canal, “*A 3D Terrain Generator: Enhancing Robotics Simulations with GANs*”

11:30 – 11:45 Bruce Kwong-Bun Tong, Wing Cheong Lau, Chi Wan Sung and Wing Shing Wong, “*Accelerating Random Orthogonal Search for Global Optimization using Crossover*”

11:45 – 12:00 Sahib Julka and Michael Granitzer, “*Knowledge distillation with Segment Anything (SAM) model for Planetary Geological Mapping*”

12:00 – 12:15 Ang Li, Peter Stuckey, Sven Koenig and T. K. Satish Kumar, “*A FastMap-Based Framework for Efficiently Computing Top-K Projected Centrality*”

12:15 – 12:30 Ameya Haridas Gujar, Tanu Gupta and Sudip Roy, “*Hybrid Model for Impact Analysis of Climate Change on Droughts in Indian Region*”

## Session 9

### Conference Room 3: The Village Hall

Chair: Gabriele La Malfa

11:00 – 11:15 Alexander Nasuta, Marco Kemmerling, Daniel Lütticke and Robert Schmitt, “*Reward Shaping for Job Shop Scheduling*”

11:15 – 11:30 Gabriel Turinici, “*Diversity in deep generative models and generative AI*”

11:30 – 11:45 Srijoni Majumdar and Evangelos Pournaras, “*Consensus-based Participatory Budgeting for Legitimacy: Decision Support via Multi-agent Reinforcement Learning*”

11:45 – 12:00 Sven Beckmann and Bernhard Bauer, “*Evaluation of Selected Autoencoders in the Context of End-User Experience Management*”

12:00 – 12:15 Tarek Salhi and John Woodward, “*SMBOX: A Scalable and Efficient Method for Sequential Model-Based Parameter Optimization*”

12:15 – 12:30 Akhila Atmakuru, Giuseppe Di Fatta, Giuseppe Nicosia and Atta Badii, “*Improved Filter-Based Feature Selection Techniques Based on Correlation and Clustering Techniques*”

## Session 10

### Conference Room 1: Coleridge Suite

Chair: Varun Ojha

14:00 – 14:15 Sahib Julka, Rodion Ishmukhametov and Michael Granitzer, “*Deep Active Learning with Concept Drifts for detection of Mercury's Bow Shock and Magnetopause Crossings*”

14:15 – 14:30 Louis Falissard, Severine Affeldt and Mohamed Nadif, “*Attentive perturbation: extending prefix tuning to large language models inner representations*”

14:30 – 14:45 Silvia Arellano, Beatriz Otero and Ruben Tous, “*Exploring Image Transformations with Diffusion Models: A Survey of Applications and Implementation Code Parameters*”

14:45 – 15:00 Ousmane Touat, Julian Stier, Michael Granitzer and Pierre-Edouard Portier, “*GRAN is superior to GraphRNN: node orderings, kernel- and graph embeddings-based metrics for graph generators*”

15:00- 15:15 Nicolò Bellarmino, Riccardo Cantoro and Giovanni Squillero, “*U-FLEX: Unsupervised Feature Learning with Evolutionary eXploration*”

15:15 – 15:30 Riccardo Ughi, Eugenio Lomurno and Matteo Matteucci, “*Two Steps Forward and One Behind: Rethinking Time Series Forecasting with Deep Learning*”

15:30 – 15:45 Kevin Bui, Fanghui Xue, Fredrick Park, Yingyong Qi and Jack Xin, “*A Proximal Algorithm for Network Slimming*”

15:45 – 16:00 Piotr Pomorski and Denise Gorse, “*Improving Portfolio Performance Using a Novel Method for Predicting Financial Regimes*”

16:00 – 16:15 Taehwan Yun, Myung Jun Kim and Hyunjung Shin, “*Accelerated Graph Integration with Approximation of Combining*”

## Session 11

### Conference Room 3: The Village Hall

Chair: Emanuele La Malfa

14:00 – 14:15 Filippo Velardocchia, Guido Perboli and Maria Elena Bruni, “*LSTM noise robustness: a case study for heavy vehicles*”

14:15 – 14:30 Maria Alexandra Oliveira, Luís Guimarães, José Luís Borges and Bernardo Almada-Lobo, “*A data-driven monitoring approach for diagnosing quality degradation in a glass container process*”

14:30 – 14:45 Dennis Maier, Matthias Hemmje, Zoran Kikic and Frank Wefers, “*Real-Time Emotion Recognition in Online Video Conferences for Medical Consultations*”

14:45 – 15:00 Giacomo Boldini, Alessio Diana, Vincenzo Arceri, Vincenzo Bonnici and Roberto Bagnara, “*A Machine Learning Approach for Source Code Similarity via Graph-focused Features*”

15:00- 15:15 Punit Kumar Chaubey and Shyam Sundar, “*A hybrid steady-state genetic algorithm for the minimum conflict spanning tree problem*”

15:15 – 15:30 Omaimah Al Hosni and Andrew Starkey, “*Can Complexity Measures and Instance Hardness Measures Reflect the Actual Complexity of Microarray Data?*”

15:30 – 15:45 Gail Gilboa Freedman, “*The Price of Data Processing*”

15:45 – 16:00 Zijun Liu, Xinxin Wu and Wei Yao, “*Social Media Analysis: The Relationship between Private Investors and Stock Price*”

16:00 – 16:15 Zoltán Tasnádi and Noémi Gaskó, “*Heaviest and densest subgraph computation for binary classification. A case study*”

## Session 12

### Conference Room 1: Coleridge Suite

Chair: Gabriele La Malfa

16:45 – 17:00 Simon Frieder and Thomas Lukasiewicz, “*(Non-)Convergence Results for Predictive Coding Networks*” OBS

17:00 – 17:15 Eric Paquet, Gabriel St-Pierre Lemieux, Herna Viktor and Wojtek Michalowski, “*ProVolOne – Protein Volume Prediction Using a Multi-Attention, Multi-Resolution Deep Neural Network and Finite Element Analysis*”

17:15 – 17:30 Silviu Marc, Roman Belavkin, David Windridge and Xiaohong Gao, “*An Evolutionary Approach to Automated Class-Specific Data Augmentation for Image Classification*”

17:30 – 17:45 Filipe Ferraz, Diogo Ribeiro, Marta B. Lopes, Sónia Pedro, Susana Vinga and Alexandra M. Carvalho, “*Comparative analysis of machine learning models for time-series forecasting of Escherichia coli contamination in Portuguese shellfish production areas*”

17:45 – 18:00 Mosayeb Shams and Ahmed H. Elsheikh, “*Gym-Precise: Reinforcement Learning Environments for Active Flow Control*”

18:00 – 18:15 Alireza Hajebrahimi, Michael Evan Santoso, Mate Kovacs and Victor Kryssanov, “*Few-Shot Learning for Character Recognition in Persian Historical Documents*”

18:15 – 18:30 Jiye Li, Yun Yin, Daniel Lafond, Alireza Ghasemi, Claver Diallo and Eric Bertrand, “*Integrated Human-AI Forecasting for Preventive Maintenance Task Duration Estimation*”

18:30 – 18:45 Evangelos Pournaras, Mark Christopher Ballandies, Stefano Bennati and Chien-Fei Chen, “*Collective Privacy Recovery: Data-sharing Coordination via Decentralized Artificial Intelligence*”

18:45 – 19:00 Nuno Marques, Gonçalo Figueira and Luís Guimarães, “*Dynamically selecting dispatching rules for the job shop scheduling problem*”

### **Session 13**

#### Conference Room 3: The Village Hall

Chair: Varun Ojha

16:45 – 17:00 Lakshmi Sree Vindhya, Gnana Prasanna Ravula, Rakesh Sengupta and Anuj Shukla, “*Modeling Primacy, Recency, and Cued recall in serial memory task using on-center off-surround recurrent neural network*” ObS

17:00 – 17:15 Stanislav Selitskiy, “*It Looks All the Same to Me*”: Cross-index Training for Long-term Financial Series Prediction”

17:15 – 17:30 Rodica Ioana Lung and Mihai Suciuc, “*An Evolutionary Approach to Feature Selection and Classification*”

17:30 – 17:45 Margarita Zaleshina and Alexander Zaleshin, “*Flocking Method for Identifying of Neural Circuits in Optogenetic Datasets*”

17:45 – 18:00 Erdem Ünal, Uğur Aydın, Murat Koraş, Barış Akgün and Mehmet Gönen, “*Geolocation Risk Scores for Credit Scoring Models*”

18:00 – 18:15 Nándor Bándi and Noémi Gaskó, “*Solving Continuous Optimization Problems with a new Hyperheuristic Framework*”

18:15 – 18:30 Renato De Leone, Francesca Maggioni and Andrea Spinelli, “*A Multiclass Robust Twin Parametric Margin Support Vector Machine with an Application to Vehicles Emissions*” ObS

18:30 – 18:45 Rakesh Sengupta, Bapi Raju Surampudi and Anindya Pattanayak, “*Exploring emergent properties of recurrent neural networks using novel energy function formalism*” ObS

18:45 – 19:00 Leonid Sheremetov, Luis A. Lopez-Peña, Gabriela B. Díaz-Cortes, Dennys A. Lopez-Falcon and Erick E. Luna-Rojero, “*Deep learning model of two-phase fluid transport through fractured media: a real-world case study*” ObS