LoG 2022

Proceedings of the First Learning on Graphs Conference

December 9–12, 2022

Virtual Event

Program Chairs:

Bastian Rieck & Razvan Pascanu

Advisory Board:

Regina Barzilay, Xavier Bresson, Michael Bronstein, Stephan Günnemann, Stefanie Jegelka, Shuiwang Ji, Thomas Kipf, Jure Leskovec, Pietro Liò, Jian Tang, Jie Tang, Petar Veličković, Soledad Villar, & Marinka Zitnik

Organizers:

Yuanqi Du, Hannes Stärk, Derek Lim, Chaitanya K. Joshi, Andreea Deac, Iulia Duta, Joshua Robinson, Gabriele Corso, Leonardo Cotta, Yanqiao Zhu, Kexin Huang, Michelle Li, Sofia Bourhim, & Ilia Igashov

Foreword

It is our great pleasure to welcome you to the first Learning on Graphs (LoG) conference, which is held virtually between December 9th and 12th, 2022.

This year we received 195 full paper submissions. After a rigorous reviewing process, we accepted 56 papers, which corresponds to an acceptance rate of 28.72%. Among them, we further selected 9 papers for oral presentation. Additionally, we received 71 extended abstract submissions, among which we accepted 27 extended abstracts including 3 oral presentations. These extended abstracts are not included in the proceedings.

We emphasized and encouraged high-quality review by a rigorous review process, a careful selection and vetting process of reviewers, and high monetary awards for excellent reviews. The initial review assignment was made by the bidding and matching system on OpenReview and manually adjusted for reassignments. The review process was double-blind. The final decisions were made by program chairs, taking into account the discussions from authors, reviewers, and meta-reviews from area chairs.

We have curated a list of exciting programs in our four-day conference, including 8 tutorials, 5 keynote talks, 9 oral presentations, 2 poster sessions, 2 social hours, along with 8 concurrent local meetups around the globe.

Putting together the LoG 2022 conference was the collective effort of the entire organizing committee, as well as the invaluable contributions of many volunteers who dedicated countless hours to LoG. We are deeply grateful to the Program Chairs, Bastian Rieck and Razvan Pascanu, for their dedication to the review process. We also extend our sincerest thanks to all of the advisors who provided invaluable guidance and support throughout the planning and execution of the conference.

We are honored to receive generous sponsorship from Pfizer, Genentech, Amazon, neo4j, Google, DeepMind, and Kumo in supporting the logistics and in particular reviewer awards of the conference.

It is our sincere hope that the inaugural LoG conference will prove to be a thought-provoking and intellectually stimulating experience, affording attendees the opportunity to engage in the sharing and exchange of ideas with esteemed colleagues from institutions around the globe, and serving as a valuable platform for the dissemination and discussion of research and best practices in the fields of machine learning on graphs and geometry.

LoG 2022 Organizers

Yuanqi Du, Hannes Stärk, Derek Lim, Chaitanya K. Joshi, Andreea Deac,
Iulia Duta, Joshua Robinson, Gabriele Corso, Leonardo Cotta, Yanqiao Zhu,
Kexin Huang, Michelle Li, Sofia Bourhim, and Ilia Igashov

Vision and Mission of the Learning on Graphs Conference

As the field of machine learning has grown very rapidly, so too have its many subfields. In the last decade, machine learning on graphs has taken off, especially with impressive advances in approaches to graph deep learning in recent years. This has been a major boon to the application areas that process graph structured data, such as computational chemistry, transportation networks, social networks, recommender systems, and healthcare. Graphs can also be seen as a generalization of other domains (e.g., grids or sets), and using graph-based ML architectures where established models such as CNNs and RNNs have traditionally been used is often advantageous.

However, growth also brings along a number of challenges. By now, there are many papers about learning on graphs that span a broad spectrum of objectives and methodological approaches; no one researcher can keep up with all of these aspects of the field. As such, more focused reviewer allocation and high-quality reviews are needed more than ever.

While there have been several successful workshops dedicated to learning on graphs (at NeurIPS, ICML, ICLR, KDD, WWW, WSDM, AAAI, and other venues), such workshops have grown very large. For instance, the last time a major graph representation learning workshop was held in person (NeurIPS 2019), there were more than 1,300 registered participants, which made it the second most popular workshop at the venue and likely larger than many conferences in machine learning. As such growth is not compatible with the resources available to workshops, recent top-tier workshops oriented toward graph machine learning generally do not encompass all subfields of learning on graphs. Examples of such focused events include workshops on algorithmic reasoning, molecule discovery, learning on knowledge graphs, graph ML in industry, and graph learning benchmarks. Ideally, research in all subfields of learning on graphs would have appropriate venues for presenting and discussing research while still sustaining collaborations and connections, which are important because key ideas are often reemerging between specialty subfields.

We believe that a new conference dedicated to learning on graphs could play an important role in the research community and allow the study of machine learning on graphs to progress beyond what it is now. This year, with the help of an international team of some of the world's top graph learning researchers, we are organizing the inaugural Conference for Learning on Graphs (the LoG conference).

The conference covers diverse subfields of learning on graphs, broadly defined. A non-exhaustive list of subject areas include

- Expressive graph neural networks
- GNN architectures (Transformers, new positional encodings, etc.)
- Equivariant architectures
- Statistical theory on graphs
- Causal inference (structural causal models, etc.)
- Algorithmic reasoning
- Geometry processing
- Robustness and adversarial attacks on graphs
- Combinatorial optimization and graph algorithms
- Graph kernels
- Graph signal processing/spectral methods
- Graph generative models
- Scalable graph learning models and methods
- Graphs for recommender systems

- Graph/geometric ML for computer vision
- Knowledge graphs
- Graph ML for natural language processing,
- Graph/geometric ML for molecules (small molecules, proteins, drug discovery, etc.)
- Graph ML for security
- Graph ML for healthcare
- Graph/geometric ML for physical sciences
- Graph ML platforms and systems
- Self-supervised learning on graphs
- Trustworthy graph ML (fairness, privacy, etc.)
- Graph/geometric ML infrastructures (datasets, benchmarks, libraries, etc.)

We welcome graph learning papers from both methodology and application areas. We expect to cover a wide-ranging mix of theory and application, as well as works of industrial and academic nature.

Review Process

Papers were commonly assigned four reviewers. Reviewers had the option to bid on papers. Whenever available, their OpenReview profile information, which includes their publication track record and relevant keywords, was used to improve assignments. Reviewers were given several days to check their assignments and, if need be, ask for reassignments. Several such reassignments were handled on a case-by-case basis, ensuring that no domain conflicts or other conflicts of interest appeared. Reviewing was double-blind, so that neither authors nor reviewers knew about the identities of the other party. Program chairs knew the identities of reviewers and are chairs, except for their own papers. Reviewers were shown the following short review text to help guide their writing:

> Be sure to: (1) summarize the contributions of this work, (2) list strong and weak points of the paper, (3) clearly state your recommendation (accept or reject) with key reasons, (4) provide supporting arguments for your recommendation, (5) ask questions to authors to help you clarify your understanding of the paper, (6) provide additional feedback with the aim to improve the paper, (7) check the type of this paper above (9 page or 4 page track). Please refer to the reviewer guidelines: `https://logconference.org/reviews`

Reviewers also had the option to flag papers for ethics review. Several papers were flagged because of suspected plagiarism. No papers were flagged for other reasons.

Program chairs monitored the review process, in collaboration with the area chairs, with both parties reminding reviewers about the review guidelines and pointing out reviews that could be improved to be helpful for the authors. Area chairs moderated the discussion period, asking reviewers for additional clarifications and potential updates during the rebuttal phase. They then provided a summary recommendation, together with a confidence score, for the program chairs to use in their final assessment.

The final decision involved program chairs discussing all submissions and reaching a consensus. Program chairs first flagged borderline papers, i.e., papers whose reviewers were not strongly suggesting acceptance or rejection, or papers whose summary decision was extremely different from the opinions of reviewers. The discussion for such borderline cases was used to calibrate decisions and agree on criteria for acceptance. Following the example of Transactions on Machine Learning Research, papers were accepted if (1) all their claims were supported by precise and clear evidence, and (2) the graph learning would be interested in the insights provided by the submission. After the initial calibration phase, program chairs went over all submissions (except their own papers) individually, providing their own recommendation. These recommendations were then synchronized in a joint session and found to be identical.

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Invited Talks

Graph Neural Networks for Molecular Systems

Presenter: Stephan Günnemann (Professor, Technische Universität München)

Bio: Stephan Günnemann conducts research in the area of machine learning and data analytics. His main research focuses on how to make machine learning techniques reliable, thus, enabling their safe and robust use in various application domains. Prof. Günnemann is particularly interested in studying machine learning methods targeting complex data domains such as graphs/networks and temporal data.

He acquired his doctoral degree in 2012 at RWTH Aachen University in the field of computer science. From 2012 to 2015 he was an associate of Carnegie Mellon University, USA; initially as a postdoctoral fellow and later as a senior researcher. Prof. Günnemann has been a visiting researcher at Simon Fraser University, Canada, and a research scientist at the Research & Technology Center of Siemens AG. In 2015, Prof. Günnemann set up an Emmy Noether research group at TUM Department of Informatics. He has been a professor at TUM since 2016.

Categories and Causality

Presenter: Taco Cohen (Research Scientist, Principal Engineer, Qualcomm AI Research)

Bio: Taco Cohen is a machine learning researcher at Qualcomm AI Research in Amsterdam. He was a co-founder of Scyfer, a company focused on deep active learning, acquired by Qualcomm in 2017. He received a BSc in theoretical computer science from Utrecht University, and a MSc in artificial intelligence and PhD in machine learning (with prof. Max Welling) from the University of Amsterdam (all three cum laude). His research is focused on equivariant networks and geometric deep learning, causality and interactive learning. He has interned at Google Deepmind (working with Geoff Hinton) and OpenAI. He received the 2014 University of Amsterdam MSc thesis prize, a Google PhD Fellowship, ICLR 2018 best paper award for "Spherical CNNs", was named one of 35 innovators under 35 by MIT Tech Review, and won the 2022 Kees Schouhamer Immink prize for his PhD research.

Random Graph Models and Graph Neural Networks

Presenter: Soledad Villar (Assistant Professor, Johns Hopkins University)

Bio: Soledad Villar is an Assistant Professor at the Department of Applied Mathematics and Statistics, and Mathematical Institute for Data Science at Johns Hopkins University.

She received her PhD in mathematics from The University of Texas at Austin and was a research fellow at New York University as well as the Simons Institute in University of California at Berkeley. Her mathematical interests are in computational methods for extracting information from data. In particular, she studies optimization for data science, machine learning, equivariant representation learning and graph neural networks.

Graph AI to Enable Precision Medicine

Presenter: Marinka Zitnik (Assistant Professor, Harvard University)

Bio: Marinka Zitnik investigates machine learning for science and medicine. Her methods leverage biomedical data at the scale of billions of interactions among millions of entities, blend machine learning with statistics and data science, and infuse biomedical knowledge into deep learning. Problems she investigates are motivated by network biology and medicine, genomics, drug discovery, and health.

Dr. Zitnik's research vision is that in the future data science and artificial intelligence will be routinely used to give clinicians diagnostic recommendations; give scientists testable hypotheses they can confirm experimentally and offer them insights into safe and precise treatments; and give patients guidance on self-care, e.g., how to lead a healthy lifestyle and recognize disease early. To realize this vision, Dr. Zitnik develops methods to reason over rich interconnected data and translates the methods into solutions for biomedical problems.

Before joining Harvard, Dr. Zitnik was a postdoctoral fellow in Computer Science at Stanford University and was involved in projects at Chan Zuckerberg Biohub. She received her Ph.D. in Computer Science from University of Ljubljana while also researching at Imperial College London, University of Toronto, Baylor College of Medicine, and Stanford University.

Graph Representation Learning for Drug Discovery (Sponsor Talk)

Presenter: Djork-Arné Clevert (Vice President, Machine Learning Research, Computational Sciences within Medicinal Sciences, Pfizer)

Bio: Dr. Djork-Arné Clevert has a background in computer science and received his doctorate on machine learning for computational biology. In 2022 he accepted a global role as VP, Head of Machine Learning Research within Pfizer Research. Prior to that, he was seven years in pharmaceutical research at Bayer and became Director, Head of Machine Learning Research in 2019.

He was a senior scientist in the prestigious Hochreiter Lab at the Institute of Bioinformatics at Johannes Kepler University from 2007 to 2015. He has been Co-PI in several large projects with pharma industry, in particular, transcriptome analysis and statistical genetics with Johnson and Johnson and Merck Serono Geneva, respectively. His research has mainly been concerned with microarray data in earlier years. Later he shifted this research focus to the prediction of biological effects of compounds with methods, such as, deep neural networks. A highlight of his Marie Curie fellowship was the introduction of the Exponential Linear Units (ELUs), which has become a de-facto standard in the field of deep learning. Dr. Clevert is the author of over 60 research articles, scientific reviews, and book chapters with more than 9000 citations in total and released the Open Source software packages FARMS, cn.FARMS, RFN and Img2Mol.

Tutorials

Complex Reasoning Over Relational Databases

Organizers: Hongyu Ren, Hanjun Dai, Jiani Huang, Ziyang Li, and Jure Leskovec

Date: December 10, 2022

Length: 90 minutes

Abstract: Combining reasoning with deep learning techniques has received increasing attention in the community nowadays. Among recent works, graph-structured relational databases serve as the fundamental component in many reasoning tasks. However, designing effective neural methods for reasoning tasks could be challenging, as typically it would involve two problems – learning and reasoning over representations. One motivating example is to understand image content through scene graph representations. The challenges involved in the two stages are 1) learning the representation for objects to obtain scene graphs in a weakly supervised manner; and 2) handling the noisy links when executing symbolic queries on scene graphs. These two stages are complementary while also coupled to each other for a reasoning task. In this tutorial, we will cover the reasoning over relational databases in these two stages through 1) learning representations with symbolic reasoning and 2) learning to reason over symbolic queries. For each of these two, we will present the corresponding preliminaries and recent advances in research, and provide hands-on experience on the recently open-sourced toolkits Scallop and Smore, respectively. The main goal of this tutorial is to introduce the background and recent works in the graph reasoning topic, provide demos of recent toolkits, and cover the challenges and possible future directions in the research.

Website: `https://snap.stanford.edu/logtutorial/`

Graph Neural Networks in TensorFlow: A Practical Guide

Organizers: Bryan Perozzi, Sami Abu-el-Haija, Arno Eigenwillig, and Brandon Mayer

Date: December 10, 2022

Length: 90 minutes

Abstract: Graphs are general data structures that can represent information from a variety of domains (social, biomedical, online transactions, and many more). Graph Neural Networks (GNNs) are quickly becoming the de-facto Machine Learning models for learning from Graph data and hereby infer missing information, such as, predicting labels of nodes or imputing missing edges. The main goal of this tutorial is to help practitioners and researchers to implement GNNs in a TensorFlow setting. Specifically, the tutorial will be mostly hands-on, and will walk the audience through a process of running existing GNNs on heterogeneous graph data, and a tour of how to implement new GNN models. The hands-on portion of the tutorial will be based on TF-GNN1, a new framework that we open-sourced.

Website: `https://github.com/tensorflow/gnn/tree/main/examples/tutorials/log_2022`

Scaling GNNs in Production: A Tale of Challenges and Opportunities

Organizers: Da Zheng, Vassilis N. Ioannidis, and Soji Adeshina

Date: December 10, 2022

Length: 90 minutes

Abstract: Graph Neural Networks (GNNs) have seen a lot of academic interest in recent years and have shown a lot of promise for many real-world applications from fraud and abuse detection to recommendations. Yet, industry-wide adoption of GNN techniques to these problems have been lagging behind. As such, there is a strong need for tools and frameworks that help researchers develop GNNs for large scale graph machine learning problems, and help machine learning practitioners deploy these models for production use cases. The relatively slow adoption of GNNs in industry is a result of the unique set of challenges that need to be solved to scale GNNs for industrial applications. In this tutorial, we detail these challenges, including i) scaling GNNs to giant graphs, including distributed training on billion node graphs ii) scaling GNNs with rich and heterogeneous node level features, including joint training for GNNs and large language models (LLMs) and iii) scaling GNNs within a busi- ness driven machine learning (ML) workflow for real time inference and batch predictions with graph databases. We discuss how we tackle these challenges at Amazon using frameworks like DGL, Dist-DGL and Neptune ML that take away the undifferentiated heavy lifting necessary for productionizing GNNs.

Parallel and Distributed Graph Neural Networks: An In-Depth Concurrency Analysis

Organizers: Torsten Hoefler and Maciej Besta

Date: December 10, 2022

Length: 90 minutes

Abstract: Graph neural networks (GNNs) are among the most powerful tools in deep learning. Accelerating and scaling GNN computations to much larger graph and model sizes are critical to advance the field. For example, while the largest graph covered in the Open Graph Benchmark's Large-Scale challenge has fewer than 2 billion edges, modern graphs can have more than tens of trillions of edges. However, both inference and training of GNNs are complex, and they uniquely combine the features of irregular graph processing with dense and regular computations. Thus, it is very challenging to execute and scale GNNs efficiently on modern massively parallel architectures. To alleviate this, we first design a taxonomy of parallelism in GNNs, considering data, model, and pipeline parallelism. We use this taxonomy to investigate the amount of parallelism in numerous GNN models, GNN-driven machine learning tasks, software frameworks, or hardware accelerators. We use the work-depth model, and we also assess communication/synchronization. We specifically focus on the sparsity/density of the associated tensors to understand how to effectively apply techniques such as vectorization. We also formally analyze GNN pipelining, and we generalize the established Message-Passing class of GNNs to cover arbitrary pipeline depths, facilitating future optimizations. Finally, we investigate different forms of

asynchronicity, navigating the path for future asynchronous parallel GNN pipelines. To conclude, we synthesize a set of insights that help to maximize GNN performance, and a comprehensive list of challenges/opportunities for further research into efficient GNN computations. Our work will help to advance the design of future GNNs.

Neural Algorithmic Reasoning

Organizers: Petar Veličković, Andreea Deac, and Andrew Dudzik

Date: December 10, 2022

Length: 180 minutes

Abstract: Neural networks that are able to reliably execute algorithmic computation may hold transformative potential to both machine learning and theoretical computer science. On one hand, they could enable the kind of extrapolative generalization scarcely seen with deep learning models. On another, they may allow for running classical algorithms on inputs previously considered inaccessible to them. Both of these promises are shepherded by the neural algorithmic reasoning blueprint, which has been recently proposed in a position paper by Petar Veličković and Charles Blundell. On paper, this is a remarkably elegant pipeline for reasoning on natural inputs which carefully leverages the tried-and-tested power of deep neural networks as feature extractors. In practice, how far did we actually take it? In this tutorial, we aim to provide the foundations needed to answer three key questions of neural algorithmic reasoning: how to develop neural networks that execute algorithmic computation, how to deploy such neural networks in real-world problems, and how to deepen their theoretical links to classical algorithms. Our tutorial will be presented from the ground up, in a way that is accessible to anyone with a basic computer science background. Hands-on coding segments will also be provided, showing how attendees can directly develop their ideas in graph representation learning on relevant algorithmic reasoning datasets (such as CLRS), and then deploy them in downstream agents (e.g., in reinforcement learning).

Website: `https://algo-reasoning.github.io/`

Graph Rewiring Tutorial: From Theory to Applications in Fairness

Organizers: Adrian Arnaiz-Rodriguez, Francisco Escolano, and Nuria Oliver

Date: December 11, 2022

Length: 180 minutes

Abstract: Graph Neural Networks (GNNs) have been shown to achieve competitive results to tackle graph-related tasks, such as node and graph classification, link prediction and node and graph clustering in a variety of domains. Most GNNs use a message passing framework and hence are called MPNNs. Despite their promising results, MPNNs have been reported to suffer from over-smoothing, over-squashing and under-reaching. Graph rewiring and graph pooling have been proposed in the literature as solutions to address these limitations. Many graph rewiring methods rely on edge sampling strategies: first, the edges are assigned new weights according to a relevance function

and then they are re-sampled according to the new weights to retain the most relevant edges (i.e. those with larger weights). Edge relevance might be computed in different ways, including randomly, based on similarity or on the edge's curvature. This tutorial provides an overview of the most relevant techniques proposed in the literature for graph rewiring based on diffusion, curvature or spectral concepts. It will explain their relationship and will present the most relevant state-of-the-art techniques and their application to different domains. The tutorial will outline open questions in this field, both from a theoretical and ethical perspective. The tutorial will end with a panel which will give the opportunity to attendees to engage in a discussion with a diverse set of scientists with different technical perspectives, levels of seniority, and institutional and geographic affiliations.

Website: `https://ellisalicante.org/tutorials/GraphRewiring/`

Exploring the Practical and Theoretical Landscape of Expressive Graph Neural Networks

Organizers: Fabrizio Frasca, Beatrice Bevilacqua, and Haggai Maron

Date: December 11, 2022

Length: 180 minutes

Abstract: In an effort to overcome the expressiveness limitations of Graph Neural Networks (GNNs), a multitude of novel architectures has been recently proposed, aiming to balance expressive power, computational complexity, and domain-specific empirical performance. Several directions and methods are involved in this recent surge, ranging from Graph Theory and Topology to Group Theory and theoretical Computer Science. As a result, researchers who wish to work on this critical topic are exposed to an unsystematic collection of seemingly independent approaches whose relations remain poorly understood. In an effort to address this issue, the pro- posed tutorial reviews the most prominent expressive GNNs, categorizes them into different families, and draws interesting connections between them. This is accomplished through a series of practical coding sessions and an organic overview of the literature landscape. We aim to convey the importance of studying the expressive power of GNNs and make this field more accessible to our community, especially practitioners and newcomers.

Organizing Committee

Advisory Board

- Regina Barzilay, Professor, Massachusetts Institute of Technology (MIT)
- Xavier Bresson, Head of Graph ML, Sea Group
- Michael Bronstein, Professor, University of Oxford & Head of Graph ML, Twitter
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- Pietro Liò, Full Professor, University of Cambridge
- Jian Tang, Associate Professor, HEC Montréal & Mila
- Jie Tang, Professor, Tsinghua University
- Petar Veličković, Staff Research Scientist, DeepMind
- Soledad Villar, Assistant Professor, Johns Hopkins University (JHU)
- Marinka Zitnik, Assistant Professor, Harvard University

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- Razvan Pascanu, Research Scientist, DeepMind

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- Kexin Huang, PhD Student, Stanford University
- Michelle Li, PhD Student, Harvard University
- Sofia Bourhim, PhD Student, École Nationale Supérieure d'Informatique et d'Analyse des Systèmes (ENSIAS)
- Ilia Igashov, PhD Student, École Polytechnique Fédérale de Lausanne (EPFL)

Accompanying Research

The organizing committee is indebted to *Dr. Corinna Coupette*, Max Planck Institute for Informatics and CISPA Helmholtz Center for Information Security, for conducting accompanying research around the conference, including, but not limited to, setting up a survey for participants and authors. The feedback will be used and shared with the organizing committee to improve future versions of LoG.

Awards

Best Paper Awards

- *You Can Have Better Graph Neural Networks by Not Training Weights at All: Finding Untrained GNNs Tickets*

  By Tianjin Huang, Tianlong Chen, Meng Fang, Vlado Menkovski, Jiaxu Zhao, Lu Yin, Yulong Pei, Decebal Constantin Mocanu, Zhangyang Wang, Mykola Pechenizkiy, and Shiwei Liu

- *Neighborhood-aware Scalable Temporal Network Representation Learning*

  By Yuhong Luo and Pan Li

Best Area Chair Awards

- Haggai Maron
- Petar Veličković
- Ben Chamberlain

Best Reviewer Awards

- Aseem Baranwal
- Pascal Welke
- David van Dijk
- Jian Kang
- Paul Scherer
- Simon V Mathis
- Yunan Luo
- Bernhard C Geiger
- Yong Liang Goh
- Joshua Southern
- Gonzalo Mateos
- Nikolaos Karalias
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Hanjun Dai, Google Research

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Yongfeng Zhang, Rutgers University

Liang Zhao, Emory University

Marinka Zitnik, Harvard University

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Tiago Azevedo, University of Cambridge

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Yihong Chen, University College London

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Jeongwhan Choi, Yonsei University

Sutanay Choudhury, Pacific Northwest National Lab

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Luca Costabello, Accenture

Corinna Coupette, Max Planck Institute for Informatics

Páidí Creed, Cambridge Epigenetix

Hejie Cui, Emory University

Niharika Shimona D'Souza, International Business Machines

Enyan Dai, Pennsylvania State University

Lorenzo Dall'Amico, Grenoble INP

Victor-Alexandru Darvariu, University College London

Abhishek Das, Facebook AI Research

George Dasoulas, Harvard University

Chenhui Deng, Cornell University

Songgaojun Deng, Stevens Institute of Technology

Vishal Dey, Ohio State University, Columbus

Tobias Diez, Shanghai Jiaotong University

David van Dijk, Yale University

Mucong Ding, University of Maryland, College Park

Wei Dong, Xi'an University of Architecture and Technology

Yingtong Dou, University of Illinois, Chicago

Mohammed Haroon Dupty, National University of Singapore

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