

FORUM ON DATA SCIENCE AND AI



PROGRAMME BOOKLET

Revised on 25/7/2022

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WELCOME MESSAGE

Welcome Message from the Chair

On behalf of the organizing committee of HK Tech Forum on Data Science and AI (DSAI) cum Data Science Day of City University of Hong Kong 2022, we would like to extend our warm welcome to all of the participants and express our sincere gratitude to our featured, keynote and invited speakers.

Forum on Data Science and AI (DSAI) cum Data Science Day 2022 is part of the HK Tech Forum series which gathers world-renowned scholars in data science and AI to address challenging issues in driving data science and AI technology for the benefit of the society. The two-day forum aims to exchange new ideas and spark technological development among DSAI scholars in Hong Kong and different continents. The first day of the forum features a plenary talk by Prof John Hopcroft of Cornell University on the topic of Math and Big Data Revolution. Keynote speakers include Profs Yi Ma of UC Berkeley and Dacheng Tao of JD Explore Academy among other world-leading invited speakers. The second day of the forum features another plenary by Dr Kai-Fu Lee of Sinovation Ventures on How AI will Transform Our World, followed by Profs Nick Sahinidis of Georgia Tech and Qiang Yang of HKUST among other world-leading invited speakers. The DSAI Forum cum Data Science Day is hosted by the City University of Hong Kong and organized by the Hong Kong Institute for Data Science and the School of Data Science of the City University of Hong Kong.

We hope you will enjoy the Forum programs.



Prof S. Joe Qin, Chair of DSAI
Dean and Chair Professor, School of Data Science
Director, Hong Kong Institute for Data Science, CityU

FORUM PROGRAMME

HK Tech Forum on Data Science and AI (DSAI)

Hong Kong, China

26-27 July 2022

Agenda

26 July 2022 (Tue)

Time*	Activity
09:00am – 9:30am	Opening Ceremony
09:30am – 10:30am	Featured Speaker Prof John E. HOPCROFT, Cornell University, USA Math for the Big Data Revolution
10:30am – 11:00am	Discussions
11:00am – 12:00nn	Keynote Speaker Prof Yi MA, University of California, Berkeley, USA CTRL: Closed-Loop Data Transcription via Rate Reduction
12:00nn – 12:30pm	Invited Speaker Prof Yiran CHEN, Duke University, USA Scalable, Heterogeneity-Aware and Trustworthy Federated Learning
12:30pm – 2:00pm	Lunch break
2:00pm – 2:30pm	Invited Speaker Prof Yingying FAN, University of Southern California, USA Asymptotic Properties of High-Dimensional Random Forests
2:30pm – 3:30pm	Keynote Speaker Prof Dacheng TAO, JD Explore Academy, China More Is Different: ViTAE elevates the art of computer vision
3:30pm – 3:45pm	Break
3:45pm – 4:15pm	Invited Speaker Prof Kay Chen TAN, The Hong Kong Polytechnic University, China Advances in Evolutionary Transfer Optimization
4:15pm – 4:45pm	Invited Speaker Dr Qingpeng ZHANG, City University of Hong Kong, China GraphSynergy: A Network-inspired Deep Learning Model for Anticancer Drug Combination Prediction
4:45pm – 5:15pm	Invited Speaker Prof Ruth MISENER, Imperial College London, UK OMLT: Optimization and Machine Learning Toolkit
5:15pm – 6:15pm	Lightning Talks Dr Clint HO, Dr Xinyue LI, Dr Linyan LI, Dr Yu YANG, Dr Xiao QIAO & Dr Xiangyu ZHAO City University of Hong Kong, China

*in Hong Kong Time (HKT)

27 July 2022 (Wed)

Time*	Activity
09:00am – 10:00am	Featured Speaker Dr Kai-Fu LEE, Chairman and CEO, Sinovation Ventures President, Sinovation Ventures Artificial Intelligence Institute How AI Will Transform Our World
10:00am – 10:30am	Discussions
10:30am – 11:30am	Keynote Speaker Prof Nick SAHINIDIS, Georgia Institute of Technology, USA Data-driven Optimization
11:30am – 12:00nn	Invited Speaker Prof Fengqi YOU, Cornell University, USA Quantum Computing for Optimization and Machine Learning: From Models and Algorithms to Use Cases
12:00nn – 12:30pm	Invited Speaker Dr Chuchu FAN, Massachusetts Institute of Technology, USA Building Certifiably Safe and Correct Large-scale Autonomous Systems
12:30pm – 2:00pm	Lunch break
2:00pm – 2:30pm	Invited Speaker Prof Yang SHI, University of Victoria, Canada Accelerated Dual Averaging Methods for Decentralized Constrained Optimization
2:30pm – 3:30pm	Keynote Speaker Prof Qiang YANG, Hong Kong University of Science and Technology, China Recent Advances in Trustworthy Federated Learning
3:30pm – 3:45pm	Break
3:45pm – 4:15pm	Invited Speaker Prof Jun WANG, City University of Hong Kong, China Advances in Collaborative Neurodynamic Optimization
4:15pm – 4:45pm	Invited Speaker Prof Peng SHI, University of Adelaide, Australia Cyber-physical Systems: Analysis and Design
4:45pm – 5:15pm	Invited Speaker Prof Qingfu ZHANG, City University of Hong Kong, China Multiobjective Evolutionary Computation based Decomposition
5:15pm – 5:20pm	Break
5:20pm – 6:15pm	Panel Discussion Moderator: Prof Sam KWONG, City University of Hong Kong, China Panelists: Prof Xiaohua JIA, City University of Hong Kong, China Prof S. Joe QIN, City University of Hong Kong, China Prof Hong YAN, City University of Hong Kong, China Prof Houmin YAN, City University of Hong Kong, China Prof Qiang YANG, Hong Kong University of Science and Technology, China

*in Hong Kong Time (HKT)

ABSTRACT

Math for the Big Data Revolution

Speaker: Prof John E. HOPCROFT

Turing Awardee (1986)

IBM Professor of Engineering and Applied Mathematics in Computer Science

Cornell University, USA

Abstract: The size of data has become enormous. One needs significant mathematical tools to process and abstract information from big data collections. We are living in an information revolution in which processing larger and larger data sets will become common. As the size of data sets increases, more subtle information can be extracted. This talk will illustrate the mathematical background needed to be successful in the information age.

Chair: Prof Xiaohua Jia, City University of Hong Kong

CTRL: Closed-Loop Data Transcription via Rate Reduction

Speaker: Prof Yi MA

Professor, Department of Electrical Engineering and Computer Sciences

University of California, Berkeley, USA

Abstract: In this talk we introduce a principled computational framework for learning a compact structured representation for real-world datasets. More specifically, we propose to learn a closed-loop transcription between the distribution of a high-dimensional multi-class dataset and an arrangement of multiple independent subspaces, known as a linear discriminative representation (LDR). We argue that the encoding and decoding mappings of the transcription naturally form a closed-loop sensing and control system. The optimality of the closed-loop transcription, in terms of parsimony and self-consistency, can be characterized in closed-form by an information-theoretic measure known as the rate reduction. The optimal encoder and decoder can be naturally sought through a two-player minimax game over this principled measure. To a large extent, this new framework unifies concepts and benefits of auto-encoding and GAN and generalizes them to the settings of learning a both discriminative and generative representation for multi-class visual data. This work opens many new mathematical problems regarding learning linearized representations for nonlinear submanifolds in high-dimensional spaces, as well as suggests potential computational mechanisms about how visual memory of

multiple object classes could be formed jointly or incrementally through a purely internal closed-loop feedback process.

Related papers can be found at: <https://arxiv.org/abs/2111.06636>, <https://arxiv.org/abs/2105.10446>, and <https://arxiv.org/abs/2202.05411>.

Chair: Prof S. Joe QIN, City University of Hong Kong

Scalable, Heterogeneity-Aware and Trustworthy Federated Learning

Speaker: Prof Yiran CHEN

Professor, Department of Electrical and Computer Engineering
Duke University, USA

Abstract: Federated learning has become a popular distributed machine learning paradigm for developing on-device AI applications. However, the data residing across devices is intrinsically statistically heterogeneous (i.e., non-IID data distribution) and mobile devices usually have limited communication bandwidth to transfer local updates. Such statistical heterogeneity and communication limitation are two major bottlenecks that hinder applying federated learning in practice. In addition, recent works have demonstrated that sharing model updates makes federated learning vulnerable to inference attacks and model poisoning attacks. In this talk, we will present our recent works on novel federated learning frameworks to address the scalability and heterogeneity issues simultaneously. In addition, we will also reveal the essential reason the of adversarial vulnerability of deep learning models and the privacy leakage in federated learning procedures, and provide the defense mechanisms accordingly towards trustworthy federated learning.

Chair: Prof S. Joe Qin, City University of Hong Kong

Asymptotic Properties of High-Dimensional Random Forests

Speaker: Prof Yingying FAN

Centennial Chair, Business Administration
Professor, Data Sciences and Operations Department
Marshall School of Business, University of Southern California, USA

Abstract: As a flexible nonparametric learning tool, random forests algorithm has been widely applied to various real applications with appealing empirical performance, even in the presence of high-dimensional feature space. Unveiling the underlying mechanisms has led to some important recent theoretical results on the consistency of the random forests algorithm and its

variants. However, to our knowledge, all existing works concerning random forests consistency in high dimensional setting were established for various modified random forests models where the splitting rules are independent of the response. In light of this, in this paper we derive the consistency rates for the random forests algorithm associated with the sample CART splitting criterion, which is the one used in the original version of the algorithm (Breiman2001), in a general high-dimensional nonparametric regression setting through a bias-variance decomposition analysis. Our new theoretical results show that random forests can indeed adapt to high dimensionality and allow for discontinuous regression function. Our bias analysis characterizes explicitly how the random forests bias depends on the sample size, tree height, and column subsampling parameter. Some limitations on our current results are also discussed.

Chair: Dr Qi WU, City University of Hong Kong

More Is Different: ViTAE elevates the art of computer vision

Speaker: Prof Dacheng TAO
Inaugural Director, JD Explore Academy
Senior Vice President of JD.com, China

Abstract: Big data contains a tremendous amount of dark knowledge. The community has realized that effectively exploring and using such knowledge is essential to achieving superior intelligence. How can we effectively distill the dark knowledge from ultra-large-scale data?

One possible answer is: "through Transformers". Transformers have proven their prowess at extracting and harnessing the dark knowledge from data. This is because more is truly different when it comes to Transformers. In this talk, I will showcase our recent work on transformers named ViTAE, on many dimensions of "more" including: model parameters, labeled and unlabeled data, prior knowledge, computing resource, tasks, and modalities.

Specifically, ViTAE has more model parameters and more input modality support; ViTAE can absorb and encode more data to extract more dark knowledge; ViTAE is able to adopt more prior knowledge in the form of biases and constraints; ViTAE can be easily adapted to larger-scale parallel computing resources to achieve faster training.

ViTAE has been applied to many computer vision tasks and has proven its promise, such as image recognition, object detection, semantic segmentation, image matting, pose estimation, scene text understanding, and remote sensing.

You can find the source code for this work at [https://urldefense.com/v3/https://github.com/ViTAE-Transformer_!!KjDnqvtlnNPT!i3k4KWhRFknZtFfMTpzLqUDfieMXqgmXkORXfmLHAcjGZvAv7BgfhKgV3Yw-Splx2SLPXR89JqAANOLPKK06dM6\\$](https://urldefense.com/v3/https://github.com/ViTAE-Transformer_!!KjDnqvtlnNPT!i3k4KWhRFknZtFfMTpzLqUDfieMXqgmXkORXfmLHAcjGZvAv7BgfhKgV3Yw-Splx2SLPXR89JqAANOLPKK06dM6$.).

Chair: Dr Qi WU, City University of Hong Kong

Advances in Evolutionary Transfer Optimization

Speaker: Prof Kay Chen TAN

Chair Professor (Computational Intelligence) and
Associate Head (Research and Developments), Department of Computing
The Hong Kong Polytechnic University, China

Abstract: It is known that the processes of learning and transfer of what has been learned are important to humans for solving complex problems. However, the study on optimization methodologies via learning from existing solutions and the transfer of what has been learned to help on solving related or unseen problems, has been under-explored in the context of evolutionary computation. This talk will give an overview of evolutionary transfer optimization (ETO), which is an emerging research direction that integrates evolutionary algorithm solvers with knowledge learning and transfer across different problem domains to achieve better optimization efficiency and performance. It will present some recent research work in ETO for solving multi-objective and large-scale optimization problems via high-performance computing. Some discussions on future ETO research directions, including topics such as theoretical analysis and real-world applications, will also be given.

Chair: Dr Lishuai LI, City University of Hong Kong

GraphSynergy: A Network-inspired Deep Learning Model for Anticancer Drug Combination Prediction

Speaker: Dr Qingpeng ZHANG

Associate Professor, School of Data Science
City University of Hong Kong, China

Abstract: In this talk, I will introduce an end-to-end deep learning framework based on a protein-protein interaction (PPI) network to make synergistic anticancer drug combination predictions. The framework, namely GraphSynergy, adapts a spatial-based Graph Convolutional Network component to encode the high-order topological relationships in the PPI network of protein

modules targeted by a pair of drugs, as well as the protein modules associated with a specific cancer cell line. The pharmacological effects of drug combinations are explicitly evaluated by their therapy and toxicity scores. An attention component is also introduced in GraphSynergy, which aims to capture the pivotal proteins that play a part in both PPI network and biomolecular interactions between drug combinations and cancer cell lines. GraphSynergy outperforms the classic and state-of-the-art models in predicting synergistic drug combinations on the 2 latest drug combination datasets. Specifically, GraphSynergy achieves accuracy values of 0.7553 (11.94% improvement compared to DeepSynergy, the latest published drug combination prediction algorithm) and 0.7557 (10.95% improvement compared to DeepSynergy) on DrugCombDB and Oncology-Screen datasets, respectively. Furthermore, the proteins allocated with high contribution weights during the training of GraphSynergy are proved to play a role in view of molecular functions and biological processes, such as transcription and transcription regulation. This research indicates that introducing topological relations between drug combination and cell line within the PPI network can significantly improve the capability of synergistic drug combination identification.

Chair: Dr Lishuai LI, City University of Hong Kong

OMLT: Optimization and Machine Learning Toolkit

Speaker: Prof Ruth MISENER

Professor, Computational Optimization, Department of Computing
Imperial College London, UK

Abstract: This talk introduces OMLT (<https://github.com/cog-imperial/OMLT>), an open source software package incorporating surrogate models, which have been trained using machine learning, into larger optimisation problems. Computer science applications include maximizing a neural acquisition function and verifying neural networks. Engineering applications include the use of machine learning models to replace complicated constraints in larger design/operations problems. OMLT 1.0 supports GBTs through an ONNX (<https://github.com/onnx/onnx>) interface and NNs through both ONNX and Keras interfaces. We discuss the advances in optimisation technology that made OMLT possible and show how OMLT seamlessly integrates with the python-based algebraic modeling language Pyomo (<http://www.pyomo.org>). The literature often presents different optimization formulations as competitors, but in OMLT, competing formulations become alternatives: users can select the best for a specific application. We provide examples including neural network verification, autothermal reformer optimization, and Bayesian optimization.

This work is joint with the Imperial Computational Optimisation Group (Francesco Ceccon, Ruth Misener, Alexander Thebelt, Calvin Tsay), Sandia National Laboratories (Jordan Jalving, Joshua Haddad), and Carnegie Mellon (Carl Laird).

Chair: Dr Lishuai LI, City University of Hong Kong

How AI Will Transform Our World

Speaker: Dr Kai-Fu LEE

Chairman and CEO, Sinovation Ventures

President, Sinovation Ventures Artificial Intelligence Institute, China

Abstract: AI is fundamentally transforming every aspect of human life on an unimaginable scale, revolutionizing the making of goods to generating unprecedented wealth or creating brand new forms of interactions. Join internationally renowned AI expert Dr Kai-Fu Lee, bestselling author of AI Superpowers, as he introduces new predictions of the next five major technology trends of our century. In this illuminating talk, Dr Lee will guide us through most current breakthroughs in the fields of artificial intelligence, automation & robotics, life sciences, new energy, quantum computing and the cross pollination possibilities across these disciplines. Based on his predictions, AI and automation will change everything from how things are produced to how business decisions are made, leading up to the "age of plenty." AI coupled with other technology breakthroughs will benefit human well-being and longevity, accelerate new sources of clean energy and safer food. Dr Lee will also decipher the rise of China under the global technological paradigms on the trajectory to become a deep tech superpower.

Chair: Prof S. Joe QIN, City University of Hong Kong

Data-driven Optimization

Speaker: Prof Nick SAHINIDIS

Butler Family Chair and Professor

H. Milton Stewart School of Industrial & Systems Engineering and

School of Chemical & Biomolecular Engineering

Georgia Institute of Technology, USA

Abstract: This talk presents recent theoretical, algorithmic, and methodological advances for black-box optimization problems for which optimization must be performed in the absence of an algebraic formulation, i.e., by utilizing only data originating from simulations or experiments. We investigate the relative merits of optimizing surrogate models based on generalized linear models and deep learning. Additionally, we present new optimization algorithms for direct data-driven optimization. Our approach combines model-based search with a dynamic domain partition strategy that guarantees convergence to a global optimum. Equipped with a clustering

algorithm for balancing global and local search, the proposed approach outperforms existing derivative-free optimization algorithms on a large collection of problems.

Chair: Dr Matthias TAN, City University of Hong Kong

Quantum Computing for Optimization and Machine Learning: From Models and Algorithms to Use Cases

Speaker: Prof Fengqi YOU
Roxanne E. and Michael J. Zak Professor
Cornell University, USA

Abstract: Quantum computing is attracting growing interest due to its unique capabilities and disruptive potential. This presentation will briefly introduce quantum computing and its potential applications to systems optimization and machine learning. We will introduce several new algorithms and methods that exploit the strengths of quantum computing techniques to address the computational challenges of classically intractable optimization problems. Applications include molecular design, manufacturing systems operations, and supply chain optimization. In the second half of the presentation, we will focus on quantum machine learning and the emerging hybrid classical-quantum computing paradigm that exploit the strengths of quantum computing techniques to address the computational challenges of important AI-related problems. The presentation will conclude with a novel deep learning model and quantum computing algorithm for efficient and effective fault diagnosis in manufacturing and electric power systems.

Chair: Dr Zijun ZHANG, City University of Hong Kong

Building Certifiably Safe and Correct Large-scale Autonomous Systems

Speaker: Dr Chuchu FAN
Assistant Professor, Department of Aeronautics and Astronautics
Massachusetts Institute of Technology, USA

Abstract: The introduction of machine learning (ML) creates unprecedented opportunities for achieving full autonomy. However, learning-based methods in building autonomous systems can be extremely brittle in practice and are not designed to be verifiable. In this talk, I will present several of our recent efforts that combine ML with formal methods and control theory to enable the design of provably dependable and safe autonomous systems. I will introduce our techniques to generate safety certificates and certified decision and control for complex large-scale multi-

agent autonomous systems, even when the agents follow nonlinear and nonholonomic dynamics and need to satisfy high-level specifications.

Chair: Dr Zijun ZHANG, City University of Hong Kong

Accelerated Dual Averaging Methods for Decentralized Constrained Optimization

Speaker: Prof Yang SHI
Professor, Department of Mechanical Engineering
University of Victoria, Canada

Abstract: Decentralized optimization techniques offer high quality solutions to various engineering problems, such as resource allocation and distributed estimation and control. Advantages of decentralized optimization over its centralized counterpart lie in that it can provide a flexible and robust solution framework where only locally light computations and peer-to-peer communication are required to minimize a global objective function. In this work, we report the decentralized convex constrained optimization problems in networks. A novel decentralized dual averaging (DDA) algorithm is proposed. In the algorithm, a second-order dynamic average consensus protocol is tailored for DDA-type algorithms, which equips each agent with a provably more accurate estimate of the global dual variable than conventional schemes. Such accurate estimate validates the use of a large constant parameter within the local inexact dual averaging step performed by individual agents. Compared to existing DDA methods, the rate of convergence is improved to $\mathcal{O}(\frac{1}{t})$ where t is the time counter. Finally, numerical results are presented to demonstrate the efficiency of the proposed methods.

Chair: Prof Minghua CHEN, City University of Hong Kong

Recent Advances in Trustworthy Federated Learning

Speaker: Prof Qiang YANG
Chair Professor, CSE Department
Hong Kong University of Science and Technology, China

Abstract: Federated Learning is an important intersection of AI and privacy computing. How to make Federated Learning more safe, trustworthy and efficient is the focus of industry and academia in the future. In my lecture, I will systematically review the progress and challenges of Federated Learning, and look forward to several important development directions.

Chair: Prof Minghua CHEN, City University of Hong Kong

Advances in Collaborative Neurodynamic Optimization

Speaker: Prof Jun WANG

Chair Professor of Computational Intelligence
Department of Computer Science and School of Data Science
City University of Hong Kong, China

Abstract: The past four decades witnessed the birth and growth of neurodynamic optimization, which has emerged as a potentially powerful problem-solving tool for constrained optimization due to its inherent nature of biological plausibility and parallel and distributed information processing. Despite the success, almost all existing neurodynamic approaches a few years ago worked well only for optimization problems with convex or generalized convex functions. Effective neurodynamic approaches to optimization problems with nonconvex functions and discrete variables are rarely available. In this talk, a collaborative neurodynamic optimization framework will be presented. Multiple neurodynamic optimization models with different initial states are employed in the framework for scatter local search. In addition, a meta-heuristic rule in swarm intelligence (such as PSO) is used to reposition neuronal states upon their local convergence to escape local minima toward global optima. Experimental results will be elaborated to substantiate the efficacy of several specific paradigms in this framework for nonnegative matrix factorization, supervised learning, vehicle-task assignment, portfolio selection, and energy load dispatching.

Chair: Dr Xiang ZHOU, City University of Hong Kong

Cyber-physical Systems: Analysis and Design

Speaker: Prof Peng SHI

Professor, School of Electrical and Electronic Engineering
Director of Advanced Unmanned Systems Laboratory
University of Adelaide, Australia

Abstract: Cyber-physical systems (CPSs) are the mechanisms controlled or monitored by computer-based algorithms, tightly integrated with the internet and its users. CPSs are the central research topic in the era of Industrial 4.0, and continue to be in the forthcoming Industrial 5.0, which have attracted a lot attention in the past years. Undergoing an ever-enriching cognitive process, CPSs deeply integrates control, communication, computation, cloud and cognition. In this talk, we firstly review some basic knowledge with respect to the concepts, history, and some viewpoints on CPS security. Next, some commonly appeared malicious threats will be introduced.

Chair: Dr Xiang ZHOU, City University of Hong Kong

Multiobjective Evolutionary Computation based Decomposition

Speaker: Prof Qingfu ZHANG
Chair Professor of Computational Intelligence
Department of Computer Science
City University of Hong Kong, China

Abstract: Many optimization problems in the real world, by nature, have multiple conflicting objectives. Unlike a single optimization problem, multiobjective optimization problem has a set of Pareto optimal solutions (Pareto front) which are often required by a decision maker. Evolutionary algorithms are able to generate an approximation to the Pareto front in a single run, and many traditional optimization methods have been also developed for dealing with multiple objectives. Combination of evolutionary algorithms and traditional optimization methods should be a next generation multiobjective optimization solver. Decomposition techniques have been well used and studied in traditional multiobjective optimization. Over the last decade, a lot of effort has been devoted to build efficient multiobjective evolutionary algorithms based on decomposition (MOEA/D). In this talk, I will describe main ideas and techniques and some recent development in MOEA/D. I will also discuss some possible research issues in multiobjective evolutionary computation.

Chair: Dr Xiang ZHOU, City University of Hong Kong

DSAI-2022 ORGANIZING COMMITTEE

Name	Position	Affiliation
S. Joe QIN	Chair of Organizing Committee	City University of Hong Kong
Xiaohua JIA	Organizing Committee Member	City University of Hong Kong
Jun WANG	Organizing Committee Member	City University of Hong Kong
Minghua CHEN	Organizing Committee Member	City University of Hong Kong
Matthias TAN	Organizing Committee Member	City University of Hong Kong
Li ZENG	Organizing Committee Member	City University of Hong Kong
Qingpeng ZHANG	Organizing Committee Member	City University of Hong Kong
Zijun ZHANG	Organizing Committee Member	City University of Hong Kong
Xiang ZHOU	Organizing Committee Member	City University of Hong Kong
Linyan LI	Organizing Committee Member	City University of Hong Kong
Xiangyu ZHAO	Organizing Committee Member	City University of Hong Kong

BIOGRAPHY AND PHOTO

FEATURED SPEAKERS



John E. HOPCROFT

John E. Hopcroft is the IBM Professor of Engineering and Applied Mathematics in Computer Science at Cornell University. From January 1994 until June 2001, he was the Joseph Silbert Dean of Engineering. After receiving both his M.S. (1962) and Ph.D. (1964) in electrical engineering from Stanford University, he spent three years on the faculty of Princeton University. He joined the Cornell faculty in 1967, was named professor in 1972 and the Joseph C. Ford Professor of Computer Science in 1985. He served as chairman of the Department of Computer Science from 1987 to 1992 and was the associate dean for college affairs in 1993. An undergraduate alumnus of Seattle University, Hopcroft was honored with a Doctor of Humanities Degree, *Honoris Causa*, in 1990.

Hopcroft's research centers on theoretical aspects of computing, especially analysis of algorithms, automata theory, and graph algorithms. He has coauthored four books on formal languages and algorithms with Jeffrey D. Ullman and Alfred V. Aho. His most recent work is on the study of information capture and access.

He was honored with the A. M. Turing Award in 1986. He is a member of the National Academy of Sciences (NAS), the National Academy of Engineering (NAE), a foreign member of the Chinese Academy of Sciences, and a fellow of the American Academy of Arts and Sciences (AAAS), the American Association for the Advancement of Science, the Institute of Electrical and Electronics Engineers (IEEE), and the Association of Computing Machinery (ACM). In 1992, he was appointed by President Bush to the National Science Board (NSB), which oversees the National Science Foundation (NSF), and served through May 1998. From 1995-98, Hopcroft served on the National Research Council's Commission on Physical Sciences, Mathematics, and Applications.

In addition to these appointments, Hopcroft serves as a member of the SIAM financial management committee, IIT New Delhi advisory board, Microsoft's technical advisory board for research Asia, and the Engineering Advisory Board, Seattle University.

Kai-Fu LEE

Dr Kai-Fu Lee is the Chairman and CEO of Sinovation Ventures (www.sinovationventures.com/) and President of Sinovation Venture's Artificial Intelligence Institute. Sinovation Ventures, managing US\$3 billion dual currency investment funds, is a leading venture capital firm focusing on developing the next generation deep tech companies in China. Prior to founding Sinovation in 2009, Dr Lee was the President of Google China, and senior executives at Microsoft, SGI, and Apple. Dr Lee received his Bachelor degree from Computer Science from Columbia University, Ph.D. from Carnegie Mellon University, as well as Honorary Doctorate Degrees from both Carnegie Mellon and the City University of Hong Kong. He is the Co-Chair of Artificial Intelligence Council for World Economic Forum Center for the Fourth Industrial Revolution, Fellow of the Institute of Electrical and Electronics Engineers (IEEE), Times 100 in 2013, WIRED 25 Icons, and followed by over 50 million audience on social media.



In the field of artificial intelligence, Dr Lee built one of the first game playing programs to defeat a world champion (1988, Othello), as well as the world's first large-vocabulary, speaker-independent continuous speech recognition system. Dr Lee founded Microsoft Research China, later renamed Microsoft Research Asia, which was named as the hottest research lab by MIT Technology Review. While with Apple, Dr Lee led AI projects in speech and natural language, which have been featured on Good Morning America on ABC Television and the front page of Wall Street Journal. He has authored 10 U.S. patents, and more than 100 journal and conference papers. Altogether, Dr Lee has been in artificial intelligence research, development, and investment for more than 30 years. His New York Times and Wall Street Journal bestselling book *AI Superpowers: China, Silicon Valley, and the New World Order* (aisuperpowers.com) discusses US-China co-leadership in the age of AI as well as the greater societal impacts brought upon by the AI technology revolution. His new co-authored book *AI 2041* published in fall 2021 explores how artificial intelligence will change our world over the next twenty years.

KEYNOTE SPEAKERS



Yi MA

Yi Ma is a Professor at the Department of Electrical Engineering and Computer Sciences at the University of California, Berkeley. His research interests include computer vision, high-dimensional data analysis, and intelligent systems. Yi received his Bachelor's degrees in Automation and Applied Mathematics from Tsinghua University in 1995, two Masters degrees in EECS and Mathematics in 1997, and a PhD degree in EECS from UC Berkeley in 2000. He has been on the faculty of UIUC ECE from 2000 to 2011, the principal researcher and manager of the Visual Computing group of Microsoft Research Asia from 2009 to 2014, and the Executive Dean of the School of Information Science and Technology of ShanghaiTech University from 2014 to 2017. He then joined the faculty of UC Berkeley EECS in 2018. He has published about 60 journal papers, 120 conference papers, and three textbooks in computer vision, generalized principal component analysis, and high-dimensional data analysis. He received the NSF Career award in 2004 and the ONR Young Investigator award in 2005. He also received the David Marr prize in computer vision from ICCV 1999 and best paper awards from ECCV 2004 and ACCV 2009. He has served as the Program Chair for ICCV 2013 and the General Chair for ICCV 2015. He is a Fellow of IEEE, ACM, and SIAM.

Nick SAHINIDIS

Nick Sahinidis is Butler Family Chair and Professor of Industrial & Systems Engineering and Chemical & Biomolecular Engineering at the Georgia Institute of Technology. Dr Sahinidis previously taught at the University of Illinois at Urbana-Champaign (1991-2007) and Carnegie Mellon University (2007-2020). He has pioneered algorithms and developed widely used software for optimization and machine learning. He received the INFORMS Computing Society Prize in 2004, the Beale-Orchard-Hays Prize from the Mathematical Programming Society in 2006, the Computing in Chemical Engineering Award in 2010, the Constantin Carathéodory Prize in 2015, and the National Award and Gold Medal from the Hellenic Operational Research Society in 2016. He is a member of the US National Academy of Engineering, a fellow of INFORMS, a fellow of AIChE, and the Editor-in-Chief of Optimization and Engineering.





Dacheng TAO

Dacheng Tao is the Inaugural Director of the JD Explore Academy and a Senior Vice President of JD.com. He is also an advisor and chief scientist of the digital science institute in the University of Sydney. He mainly applies statistics and mathematics to artificial intelligence and data science, and his research is detailed in one monograph and over 200 publications in prestigious journals and proceedings at leading conferences. He received the 2015 Australian Scopus-Eureka Prize, the 2018 IEEE ICDM Research Contributions Award, and the 2021 IEEE Computer Society

McCluskey Technical Achievement Award. He is a fellow of the Australian Academy of Science, the World Academy of Sciences, the Royal Society of NSW, AAAS, ACM, IAPR and IEEE.

Qiang YANG

Qiang Yang is a Fellow of Canadian Academy of Engineering (CAE) and Royal Society of Canada (RSC), Chief Artificial Intelligence Officer of WeBank and Chair Professor of CSE Department of Hong Kong Univ. of Sci. and Tech. He is the Conference Chair of AAAI-21, President of Hong Kong Society of Artificial Intelligence and Robotics (HKS AIR), the President of Investment Technology League (ITL) and a former President of IJCAI (2017-2019). He is a fellow of AAAI, ACM, IEEE and AAAS. His research interests include transfer learning and federated learning. He is the founding EIC of two journals: IEEE



Transactions on Big Data and ACM Transactions on Intelligent Systems and Technology. His latest books are Transfer Learning, Federated Learning and Practicing Federated Learning.

INVITED SPEAKERS

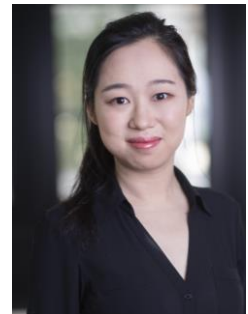


Yiran CHEN

Yiran Chen received B.S (1998) and M.S. (2001) from Tsinghua University and Ph.D. (2005) from Purdue University. After five years in industry, he joined University of Pittsburgh in 2010 as Assistant Professor and then was promoted to Associate Professor with tenure in 2014, holding Bicentennial Alumni Faculty Fellow. He is now the Professor of the Department of Electrical and Computer Engineering at Duke University and serving as the director of the NSF AI Institute for Edge Computing Leveraging the Next-generation Networks (Athena) and the NSF Industry–University Cooperative Research Center (IUCRC) for Alternative Sustainable and Intelligent Computing (ASIC), and the co-director of Duke Center for Computational Evolutionary Intelligence (CEI). His group focuses on the research of new memory and storage systems, machine learning and neuromorphic computing, and mobile computing systems. Dr Chen has published 1 book and about 500 technical publications and has been granted 96 US patents. He has served as the associate editor of a dozen international academic transactions/journals and served on the technical and organization committees of more than 60 international conferences. He is now serving as the Editor-in-Chief of the IEEE Circuits and Systems Magazine. He received seven best paper awards, one best poster award, and fifteen best paper nominations from international conferences and workshops. He received many professional awards and is the distinguished lecturer of IEEE CEDA (2018-2021). He is a Fellow of the ACM and IEEE and now serves as the chair of ACM SIGDA.

Chuchu FAN

Chuchu Fan an Assistant Professor in the Department of Aeronautics and Astronautics at MIT. Before that, she was a postdoc researcher at Caltech and got her Ph.D. from the Electrical and Computer Engineering Department at the University of Illinois at Urbana-Champaign in 2019. She earned her bachelor's degree from Tsinghua University, Department of Automation. Her group at MIT works on using rigorous mathematics including formal methods, machine learning, and control theory for the design, analysis, and verification of safe autonomous systems. Chuchu's dissertation work "Formal methods for safe autonomy" won the ACM Doctoral Dissertation Award in 2020.





Yingying FAN

Yingying Fan is Centennial Chair in Business Administration and Professor in Data Sciences and Operations Department of the Marshall School of Business at the University of Southern California. She received her Ph.D. in Operations Research and Financial Engineering from Princeton University in 2007. She was Lecturer in the Department of Statistics at Harvard University from 2007-2008 and Dean's Associate Professor in Business Administration at USC from 2018-2021. Her research interests include statistics, data science, machine learning, economics, big

data and business applications. Her latest works have focused on statistical inference for networks, and AI models empowered by some most recent developments in random matrix theory and statistical learning theory. She is the recipient of the Institute of Mathematical Statistics Medallion Lecture (2023), the International Congress of Chinese Mathematicians 45-Minute Invited Lecture (2022), Centennial Chair in Business Administration (2021, inaugural holder), NSF Focused Research Group (FRG) Grant (2021), Fellow of Institute of Mathematical Statistics (2020), Associate Member of USC Norris Comprehensive Cancer Center (2020), Fellow of American Statistical Association (2019), Dean's Associate Professor in Business Administration (2018), NIH R01 Grant (2018), the Royal Statistical Society Guy Medal in Bronze (2017), USC Marshall Dean's Award for Research Excellence (2017), the USC Marshall Inaugural Dr Douglas Basil Award for Junior Business Faculty (2014), the American Statistical Association Noether Young Scholar Award (2013), and the NSF Faculty Early Career Development (CAREER) Award (2012). She has served as an associate editor of *The Annals of Statistics* (2022-present), *Information and Inference* (2022-present), *Journal of the American Statistical Association* (2014-present), *Journal of Econometrics* (2015-2018), *Journal of Business & Economic Statistics* (2018-present), *The Econometrics Journal* (2012-present), and *Journal of Multivariate Analysis* (2013-2016).

Ruth MISENER

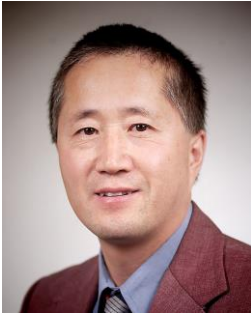
Ruth Misener is Professor in Computational Optimization in the Imperial College London Department of Computing. Ruth holds the BASF / Royal Academy of Engineering Research Chair in Data-Driven Optimization (2022 - 2027) and is also an Early Career Research Fellow (2017 - 2022) of the Engineering & Physical Sciences Research Council.

Ruth received an SB from MIT and a PhD from Princeton. Foundations of her research are in numerical optimization

algorithms. Applications include decision-making under uncertainty, energy efficiency, process



network design & operations, and scheduling. Ruth's research team makes their software contributions available open source (<https://github.com/cog-imperial>). Ruth received the 2017 Macfarlane Medal from the Royal Academy of Engineering and the 2020 Outstanding Young Researcher Award from the AIChE Computing & Systems Technology Division.



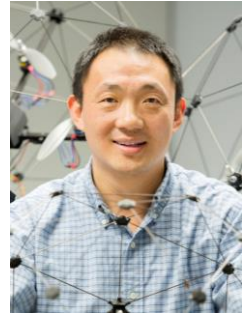
Peng SHI

Peng Shi received the PhD degree in Electrical Engineering from the University of Newcastle, Australia, and the PhD degree in Mathematics from the University of South Australia. He was awarded two higher doctorates -- Doctor of Science degree from the University of Glamorgan, UK, and the Doctor of Engineering degree from the University of Adelaide, Australia. He is now a Professor at the School of Electrical and Electronic Engineering, and the Director of Advanced Unmanned Systems Laboratory, at the University of Adelaide, Australia. His research interests include

systems and control theory and applications to network systems, robotic and autonomous systems, cyber-physical systems, and intelligent systems. He has been continuously recognized as a Highly Cited Researcher in both fields of engineering and computer science by Clarivate Analytics/Thomson Reuters from 2014 to 2021. He has also been acknowledged in the Lifetime Achiever Leader Board in engineering and information technology, and honored as the Field Leader by THE AUSTRALIAN, consecutively from 2019 to 2021. He has served on the editorial board for many journals, including *Automatica*, and *IEEE Transactions on (Automatic Control, Circuits and Systems, Fuzzy Systems)*, and *IEEE Control Systems Letters*. Now he serves as the Editor-in-Chief of *IEEE Transactions on Cybernetics*, Co-Editor of *Australian Journal of Electrical and Electronic Engineering*, and Senior Editor of *IEEE Access*. His professional services also include as the President of the International Academy for Systems and Cybernetic Sciences, the Vice President of IEEE SMC Society, and IEEE Distinguished Lecturer. He is a Member of the Academy of Europe, a Fellow of IEEE, IET, IEAust and CAA.

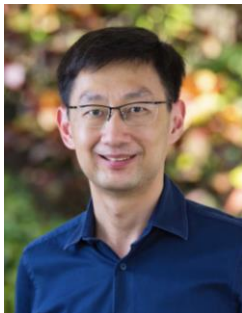
Yang SHI

Yang SHI received his B.Sc. and Ph.D. degrees in mechanical engineering and automatic control from Northwestern Polytechnical University, Xi'an, China, in 1994 and 1998, respectively, and the Ph.D. degree in electrical and computer engineering from the University of Alberta, Edmonton, AB, Canada, in 2005. From 2005 to 2009, he was an Assistant Professor and Associate Professor in the Department of Mechanical Engineering, University of Saskatchewan, Saskatoon, SK, Canada. In 2009, he joined the University of Victoria, and now he is a Professor in the Department of Mechanical Engineering, University of Victoria, Victoria, BC, Canada. His current research interests include networked and distributed systems, model predictive control (MPC), cyber-physical systems (CPS), robotics and mechatronics, navigation and control of autonomous systems (AUV and UAV), and energy system applications.



Dr Shi received the University of Saskatchewan Student Union Teaching Excellence Award in 2007, and the Faculty of Engineering Teaching Excellence Award in 2012 at the University of Victoria (UVic). He is the recipient of the JSPS Invitation Fellowship (short-term) in 2013, the UVic Craigdarroch Silver Medal for Excellence in Research in 2015, the 2017 IEEE Transactions on Fuzzy Systems Outstanding Paper Award, the Humboldt Research Fellowship for Experienced Researchers in 2018. He is VP on Conference Activities IEEE IES and the Chair of IEEE IES Technical Committee on Industrial Cyber-Physical Systems. Currently, he is Co-Editor-in-Chief for IEEE Transactions on Industrial Electronics; he also serves as Associate Editor for Automatica, IEEE Transactions on Automatic Control, etc.

He is a Fellow of IEEE, ASME, CSME, and Engineering Institute of Canada (EIC), and a registered Professional Engineer in British Columbia, Canada.



Kay Chen TAN

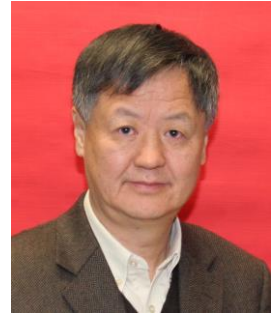
Kay Chen Tan is currently a Chair Professor (Computational Intelligence) and Associate Head (Research and Developments) of the Department of Computing, The Hong Kong Polytechnic University. He has co-authored 7 books and published over 230 peer-reviewed journal papers. Prof Tan is currently the Vice-President (Publications) of IEEE Computational Intelligence Society, USA. He was the Editor-in-Chief of IEEE Transactions on Evolutionary Computation from 2015-2020 (IF: 11.554), and IEEE Computational Intelligence Magazine from 2010-2013 (IF: 11.356). Prof Tan is an

IEEE Fellow, an IEEE Distinguished Lecturer Program (DLP) speaker, and an Honorary Professor

at the University of Nottingham in UK. He also serves as the Chief Co-Editor of Springer Book Series on Machine Learning: Foundations, Methodologies, and Applications.

Jun WANG

Jun Wang is the Chair Professor of Computational Intelligence in the Department of Computer Science and School of Data Science at City University of Hong Kong. Prior to this position, he held various academic positions at Dalian University of Technology, Case Western Reserve University, University of North Dakota, and the Chinese University of Hong Kong. He also held various short-term visiting positions at USAF Armstrong Laboratory, RIKEN Brain Science Institute, and Shanghai Jiao Tong University. He received a B.S. degree in electrical engineering and an M.S. degree from Dalian University of Technology and his Ph.D. degree from Case Western Reserve University. He was the Editor-in-Chief of the IEEE Transactions on Cybernetics. He is an IEEE Life Fellow, IAPR Fellow, and a foreign member of Academia Europaea. He is a recipient of the APNNA Outstanding Achievement Award, IEEE CIS Neural Networks Pioneer Award, and IEEE SMCS Norbert Wiener Award, among other distinctions.



Fengqi YOU

Fengqi You is the Roxanne E. and Michael J. Zak Professor at Cornell University (Ithaca, New York). He also serves as Chair of Ph.D. Studies in Cornell Systems Engineering, Associate Director of Cornell Energy Systems Institute, and Associate Director of Cornell Institute for Digital Agriculture. His research focuses on fundamental theory and methods in systems engineering and artificial intelligence, as well as their applications to smart manufacturing, digital agriculture, quantum computing, energy systems, and sustainability. He is an award-winning scholar and teacher, having received around 20 major national/international awards over the past six years from the American Institute of Chemical Engineers (AIChE), American Chemical Society (ACS), Royal Society of Chemistry (RSC), American Society for Engineering Education (ASEE), American Automatic Control Council (AACC), in addition to a number of best paper awards. Fengqi is an elected Fellow of the Royal Society of Chemistry (FRSC) and Fellow of the American Institute of Chemical Engineers (AIChE Fellow). For more information about his research group: www.peese.org

Qingfu ZHANG

Qingfu Zhang is a Chair Professor of Computational Intelligence with the Department of Computer Science, City University of Hong Kong. He is an IEEE fellow. His main research interests include evolutionary computation, optimization, neural networks, machine learning and their applications.

His multiobjective optimization evolutionary algorithm based on decomposition (MOEA/D) has been one of the most researched and used algorithms in the field of evolutionary computation and many application areas.



Qingpeng ZHANG

Qingpeng Zhang is an Associate Professor with the School of Data Science at CityU. He received the B.S. degree in Automation from Huazhong University of Science and Technology in 2009, and the Ph.D. degrees in Systems and Industrial Engineering from The University of Arizona in 2012. Prior to joining CityU, he worked as a Postdoctoral Research Associate with The Tetherless World Constellation at Rensselaer Polytechnic Institute. His research interests include healthcare data analytics, medical informatics, network science, and artificial intelligence. His research has been

published in leading journals such as Nature Human Behaviour, Nature Communications, JAMIA and MIS Quarterly, as well as featured in press such as The Washington Post, The New York Times, New York Public Radio, The Guardian, The Daily Mail, and Global News.

LIGHTNING TALK SPEAKERS

Clint HO

Clint Chin Pang Ho received a BS in Applied Mathematics from the University of California, Los Angeles (UCLA), an MSc in Mathematical Modeling and Scientific Computing from the University of Oxford, and a PhD in computational optimization from Imperial College London. Before joining CityU, Clint was a Junior Research Fellow (now known as Imperial College Research Fellow) in the Imperial College Business School.



Clint's current research focuses on decision making under uncertainty. He studies optimization algorithms and computational methods for structured problems, as well as their applications in machine learning and operations research.



Linyan LI

Linyan received her B.Eng. degree from the Department of Building Science at Tsinghua University, and her doctoral degree from the Department of Environmental Health at Harvard University, working with Prof John Spengler. During her doctoral study, She led a retrospective observational study that aimed at identifying risk factors of asthma and obesity in China. After graduation, She works at a machine learning company, where she has been using cutting-edge data science methods on a variety of projects using large databases in the healthcare industry. Meanwhile, She remains an active research fellow at Harvard to continue developing research partnerships in China. Linyan's research focus is on population health and health services research.

Xinyue LI

Dr Li received her PhD in Biostatistics from Yale University. Prior to Yale University, she spent one year at Peking University and three years at the University of Chicago, receiving her B.A. and M.S. in Statistics from the University of Chicago.

Her research interests are statistical methods for wearable device data, electronic health records, large population studies, genetics and precision medicine.



Xiao QIAO

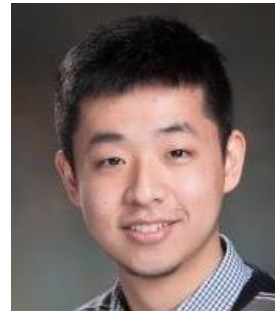
Dr Qiao is a financial economist and he conducts research on financial markets. His research interests include asset pricing, financial econometrics, investments, commodities, and return predictability, and his work has been covered by Forbes and Institutional Investor. He is on the editorial board of the Journal of Portfolio Management and the Global Commodities Applied Research Digest.

He received a PhD in Finance from the University of Chicago Booth School of Business. He also holds a Bachelor of Science in Economics and a Bachelor of Science in Engineering from the University of Pennsylvania's Wharton School and School of Engineering and Applied Sciences.

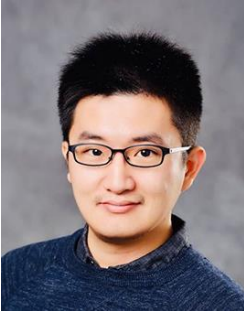
Yu YANG

Yu Yang obtained his Ph.D. in Computing Science from Simon Fraser University in Feb. 2019. Before that, he obtained his M.E. from University of Science and Technology of China in 2013, and his B.E. from Hefei University of Technology in 2010, both in Computer Science.

His research interests lie in the algorithmic aspects of data science, with an emphasis on devising effective and efficient



algorithmic tools for mining data of combinatorial structures (such as graphs, sets and sequences) and data-driven operations management. He also has strong interests in machine learning theory, especially in applying learning theory to accelerate data processing.



Xiangyu ZHAO

Xiangyu Zhao is a tenure-track assistant professor of Data Science at City University of Hong Kong (CityU). Prior to CityU, he completed his Ph.D. under the advisory of Prof Jiliang Tang at MSU, his M.S. under the advisory of Prof Enhong Chen at USTC, and his B.Eng. under the advisory of Prof Ming Tang and Prof Tao Zhou at UESTC.

His current research interests include data mining and machine learning, especially

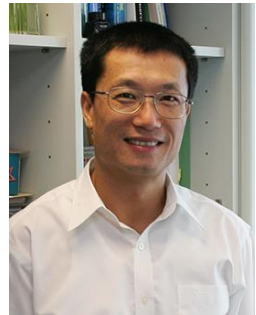
Personalization, Recommender System, Online Advertising, Search Engine, and Information Retrieval, Urban Computing, Smart City, GeoAI, Spatio-Temporal Data Analysis, and Location-Based Social Networks, Deep Reinforcement Learning, Automated Machine Learning, Graph Learning, Trustworthy AI, and Multimodal AI for Social Computing, Finance, Education, Ecosystem, and Healthcare.

His research has been awarded ICDM'21 Best-ranked Papers, Global Top 100 Chinese New Stars in AI, CCF-Tencent Open Fund, Criteo Faculty Research Award, Bytedance Research Collaboration Award, MSU Dissertation Fellowship, and nomination for Joint AAAI/ACM SIGAI Doctoral Dissertation Award (one per institution). He serves as top data science conference (senior) program committee members, session chairs and journal reviewers. He serves as the organizers of DRL4KDD and DRL4IR workshops at KDD'19, WWW'21 and SIGIR'20/21/22, and a lead tutor at WWW'21/22 and IJCAI'21. He also serves as the founding academic committee member of MLNLP, the largest AI community in China with 800,000 members/followers. The models and algorithms from his research have been launched in the online system of many companies, such as Amazon, Google, Facebook, LinkedIn, Criteo, Lyft, JD.com, Kuaishou, Tencent, and Bytedance.

PANELISTS

Xiaohua JIA

Prof Jia is IEEE Fellow (Computer Society) and ACM distinguished member. He received his BSc (1984) and Meng (1987) from University of Science and Technology of China, and his DSc (1991) from Tokyo University. His research interests include wireless networking, sensor networks, distributed systems and Cloud computing, Internet and web technologies. He is on the editorial board of IEEE Trans. On Parallel and Distributed Systems (2006-2009), Wireless Networks, Journal of World Wide Web, Journal of Combinatorial Optimization, etc. He is the General Chair of ACM MobiHoc 2008, TPC Co-Chair of IEEE MASS 2009, International Vice-Chair of INFOCOM 2005, TPC Area-Chair of INFOCOM 2010 and TPC Co-Chair of GLOBECOM 2010 - Ad-hoc and Sensor Networking Symposium.



S. Joe QIN

Dr S. Joe Qin obtained his B.S. and M.S. degrees in Automatic Control from Tsinghua University in Beijing, China, in 1984 and 1987, respectively, and his Ph.D. degree in Chemical Engineering from University of Maryland at College Park in 1992. He began his professional career in 1992 as a principal engineer at Emerson Process Management, a subsidiary of Emerson Electric, to work on advanced process control. After having developed two advanced control products, he joined the University of Texas at Austin as an assistant professor in 1995. He was promoted to associate professor and professor in 2000 and 2003, respectively, and was the holder of the Paul D. and Betty Robertson Meek and American Petrofina Foundation Centennial Professorship in Chemical Engineering until 2007. From 2007 to 2019 he was the Fluor Professor at the Viterbi School of Engineering of the University of Southern California. He was co-director the Texas-Wisconsin-California Control Consortium (TWCCC) where he was Co-PI for 24 years to conduct research on industry-sponsored projects. His research has directly impacted around 50 corporations who have been members of the Consortium. He is currently Chair Professor of Data Science at the City University of Hong Kong.

Dr Qin's research interests include data analytics, machine learning, latent variable methods; high-dimensional time series latent variable modeling, process monitoring and fault diagnosis, model predictive control, system identification, semiconductor manufacturing control, and data-driven control and optimization. He has over 400 publications in international journals, book chapters, conference papers, and conference presentations with peer-reviewed abstracts. He delivered over 50 invited plenary or keynote speeches and over 120 invited technical seminars worldwide.

He is a recipient of the National Science Foundation CAREER Award, the 2011 Northrop Grumman Best Teaching award at Viterbi School of Engineering, the DuPont Young Professor Award, Halliburton/Brown & Root Young Faculty Excellence Award, NSF-China Outstanding Young Investigator Award, and recipient of the IFAC Best Paper Prize for a model predictive control survey paper published in Control Engineering Practice. He served as Senior Editor of Journal of Process Control, Editor of Control Engineering Practice, Member of the Editorial Board for Journal of Chemometrics, and Associate Editor for several other journals.

Hong YAN

Hong Yan received his Ph.D. degree from Yale University. He was Professor of Imaging Science at the University of Sydney and currently is Wong Chun Hong Professor of Data Engineering and Chair Professor of Computer Engineering at City University of Hong Kong (CityU) and the Director of Center for Intelligent Multidimensional Data Analysis (CIMDA) Limited. He is a former Dean of the College of Science and Engineering at CityU.





Houmin YAN

Professor Houmin Yan is Chair Professor of Management Sciences and Dean of the College of Business at the City University of Hong Kong. Prior to joining CityU he served as Professor at the Chinese University of Hong Kong, and as Associate Director and Science Advisor for the Hong Kong R&D Center for Logistics and Supply Chain Management Enabling Technologies. He has also worked as a tenured Associate Professor at the School of Management, University of Texas at Dallas.

Professor Yan's main research areas are stochastic models, simulations, and supply chain management. He has published in journals such as Operations Research, Manufacturing and Service Operations Management, IIE Transactions, Production and Operations Management, Journal of Optimization: Theory and Applications, and IEEE Transactions. Professor Yan's work has won widespread recognition. In 2004, his paper (co-authored with Gan and Sethi) "Coordination of Supply Chains with Risk-Averse Agents" (POM, Vol. 13, 2004, 135-149) received the Wickhan-Skinner Best paper Award from the 2nd World Conference on Production and Operations Management and the Society of Production and Operations Management (POMs). In 2005, his paper (co-authored with Lee and Tan) "Designing An Assembly Process with Stochastic Material Arrivals" (IIE Transactions, Vol. 35, 2003, 803-815) has been awarded the Best Paper Award for "the focus issues on Operations Engineering for 2003-2004" from the Institute of Industrial Engineers(IIE). In 2012, his paper (co-authored with Buzacott and Zhang) "Risk Analysis of Commitment-Option Contracts with Forecast Updates" (IIE Transactions, Vol. 43, 2011, 415-431) has been awarded the Best Paper Prize in in Scheduling and Logistics from the Institute of Industrial Engineers(IIE). He received his B.S. and M.S. from Tsinghua University and his Ph.D. from the University of Toronto.

Qiang YANG

Please refer to [P.19](#) for biography and photo.

COMMITTEE MEMBERS & SESSION CHAIRS

Minghua CHEN

Prof Chen received his B.Eng. and M.S. degrees from the Department of Electronic Engineering at Tsinghua University. He received his Ph.D. degree from the Department of Electrical Engineering and Computer Sciences at University of California Berkeley. He was with Microsoft Research Redmond and Department of Information Engineering, the Chinese University of Hong Kong, before joining the School of Data Science, City University of Hong Kong.



Prof Chen received the Eli Jury award from UC Berkeley in 2007 (presented to a graduate student or recent alumnus for outstanding achievement in the area of Systems, Communications, Control, or Signal Processing) and The Chinese University of Hong Kong Young Researcher Award in 2013. He also received several best paper awards, including IEEE ICME Best Paper Award in 2009, IEEE Transactions on Multimedia Prize Paper Award in 2009, ACM Multimedia Best Paper Award in 2012, and IEEE INFOCOM Best Poster Award in 2021. He also co-authors several papers that are Best Paper Award Runner-up/Finalist/Candidate of flagship conferences including ACM MobiHoc in 2014 and ACM e-Energy in 2015, 2016, 2018, and 2019. Prof Chen serves as TPC Co-Chair, General Chair, and Steering Committee Chair of ACM e-Energy in 2016, 2017, and 2018 - 2021, respectively. He also serves as Associate Editor of IEEE/ACM Transactions on Networking in 2014 - 2018. He receives the ACM Recognition of Service Award in 2017 for the service contribution to the research community. He is currently a Senior Editor for IEEE Systems Journal (2021-present), an Area Editor of ACM SIGEnergy Energy Informatics Review (2021 - present), and an Executive Committee member of ACM SIGEnergy (2018 - present). He is an ACM Distinguished Member and an IEEE Fellow.

Prof Chen's recent research interests include online optimization and algorithms, machine learning in power system operations, intelligent transportation systems, distributed optimization, delay-constrained network coding, and capitalizing the benefit of data-driven prediction in algorithm/system design.

Xiaohua JIA

Please refer to [P.29](#) for biography and photo.



Tak Wu Sam KWONG

Sam Kwong received his B.Sc. degree from the State University of New York at Buffalo, M.A.Sc. in electrical engineering from the University of Waterloo in Canada, and Ph.D. from Fernuniversität Hagen, Germany. Before joining the City University of Hong Kong (CityU), he was a Diagnostic Engineer with Control Data Canada. He was responsible for designing diagnostic software to detect the manufacturing faults of the VLSI chips in the Cyber 430 machine. He later joined Bell-Northern Research as a Member of Scientific Staff working on the Integrated Services Digital Network (ISDN) project.

Kwong is currently Chair Professor at the CityU Department of Computer Science, where he previously served as Department Head and Professor from 2012 to 2018. Prof Kwong joined CityU as a lecturer in the Department of Electronic Engineering in 1989. Prof Kwong is currently the associate editor of leading IEEE transaction journals, including IEEE Transactions on Evolutionary Computation, IEEE Transactions on Industrial Informatics, and IEEE Transactions on Cybernetics.

Kwong is actively engaged in knowledge exchange between academia and industry. In 1996, he was responsible for designing the first handheld GSM mobile phone consultancy project at the City University of Hong Kong, one of the largest. He has filed 19 US patents, of which 11 have been granted.

Kwong has a prolific research record. He has co-authored three research books, eight book chapters, and over 300 technical papers. According to Google Scholar, his works have been cited more than 23,000 times with an h-index of 67. He has been the distinguished lecturer of IEEE SMCS since 2018 and delivers two DL lectures yearly to promote IEEE SMC Society and cutting-edge cybernetics technology. He also frequently delivers keynote speeches in IEEE supported conferences. In 2014, he was elevated to IEEE Fellow for his contributions to optimization techniques in cybernetics and video coding.

Kwong's involvement in the multiple facets of IEEE has been extensive and committed throughout the years. For IEEE Systems, Man and Cybernetics Society (SMCS), he serves as Hong Kong SMCS Chapter Chairman, Board Member, Conference Coordinator, Membership Coordinator and Member of the Long Range Planning and Finance Committee, Vice President of Conferences and Meetings, Vice President of Cybernetics. He led the IEEE SMC Hong Kong Chapter to win the Best Chapter Award in 2011 and was awarded the Outstanding Contribution Award for his contributions to SMC 2015. He was the President-Elect of the IEEE SMC Society in 2021. Currently, he serves as the President of the IEEE SMC Society.

Linyan LI

Please refer to [P.26](#) for biography and photo.

Lishuai LI

Dr Lishuai Li focuses on interdisciplinary research of intelligent transportation systems and data science. She has developed analytical methods using large-scale operational data for airline safety management and operations improvement, air traffic management, and health monitoring of train systems. She has recently developed path-finding methods for drone delivery networks to overcome infrastructural challenges in urban air mobility.



Dr Li received a Ph.D. and an M.Sc. in Air Transportation Systems from the Department of Aeronautics and Astronautics at Massachusetts Institute of Technology (MIT). She obtained a B.Eng. in Aircraft Design and Engineering from Fudan University.

S. Joe QIN

Please refer to [P.29](#) for biography and photo.



Matthias TAN

Matthias Hwai Yong Tan received his B.Eng. degree in mechanical-industrial engineering from the Universiti Teknologi Malaysia, an M.Eng. degree in industrial and systems engineering from the National University of Singapore and a Ph.D. degree in industrial and systems engineering from Georgia Institute of Technology. His research interests include uncertainty quantification and applied statistics. In particular, his research aims to develop rigorous statistical methods for engineering simulation models with the goal of solving engineering uncertainty quantification problems. This

often involves the use of a statistical model for time consuming simulations such as solving time-dependent 3D PDE's via the finite element method, solving the Navier-Stokes equation via the finite volume method, and computing the expectation of a simulator output with respect to noise factor inputs.

Jun WANG

Please refer to [P.24](#) for biography and photo.

Qi WU

Qi WU is an associate professor in the School of Data Science of City University of Hong Kong. His research interests center on financial engineering and quantitative finance. His earlier work include term structure modeling, stochastic volatility, tail risk analysis, and fixed income markets. He is currently researching semi-parametric risk forecast, negative interest rate models, pricing and matching in sharing platforms, and data-driven models for credit risk.



His past industrial experience includes developing pricing models for managing correlation exposure between sovereign credit risk and currency risk at Lehman Brothers; pricing & risk-managing portfolios of interest rate derivative consisting of vanilla swaptions and callable exotics in a market-marking capacity at UBS; as well as methodology team lead of fixed income analytics for central clearing of USD cash securities and lightly structured debt instruments at

the world largest clearing house DTCC. Most recently, he engages with leading global fintech companies on developing data-driven financial services.



Li ZENG

Dr Li Zeng received her B.E. in Precision Instruments and M.S. in Optical Engineering from Tsinghua University, and M.S. in Statistics and Ph.D. in Industrial Engineering from University of Wisconsin-Madison. Before joining CityU, she was an Associate Professor in the Wm Michael Barnes '64 Department of Industrial and Systems Engineering at Texas A&M University.

Dr Zeng's research interests are statistical machine learning and quality engineering, with applications in manufacturing and biomedical engineering. Her research integrates data science and domain science for better modelling and prediction, with the goal of knowledge discovery and quality improvement.

Qingpeng ZHANG

Please refer to [P.25](#) for biography and photo.

Zijun ZHANG

Dr Zijun Zhang received his Ph.D. and M.S. degrees in Industrial Engineering from the University of Iowa, Iowa City, IA, USA, in 2012 and 2009, respectively, and B.Eng. degree in Systems Engineering and Engineering Management from the Chinese University of Hong Kong, Hong Kong, China, in 2008.

Dr Zhang's research focuses on data mining and computational intelligence with applications in modeling, monitoring, optimization and operations of systems in the renewable energy, energy saving, and intelligent transportation.



Xiangyu ZHAO

Please refer to [P.28](#) for biography and photo.



Xiang ZHOU

Dr Xiang Zhou received his BSc from Peking University and PhD from Princeton University. Before joining City University in 2012, he worked as a research associate at Princeton University and Brown University. His major research area is the study of rare event. His research interests include the development and analysis of algorithms for transitions in nonlinear stochastic dynamical systems, the efficient Monte Carlo simulation of rare events, the numerical methods for saddle point and the exploration of high dimensional non-convex energy landscapes in physical models and machine learning models. His research results have turned into peer-reviewed papers in SIAM journals, Journal of Computational Physics, Journal of Chemical Physics, Nonlinearity and Annals of Applied Probability, etc.