2025

Tsinghua University
Beijing · China

THE FIFTH GLOBAL FORUM ON DEVELOPMENT OF COMPUTER SCIENCE

第五届全球计算机学科发展论坛

PREFACE

WELCOME TO THE FIFTH GLOBAL FORUM ON DEVELOPMENT OF COMPUTER SCIENCE

The Global Forum on the Development of Computer Science is a high-level international forum held by the Department of Computer Science and Technology, Tsinghua University. It aims to bring together leaders of the world's most prestigious computer science departments and schools in order to discuss the fundamentals of computer science, improve the quality of talent cultivation, and promote the development of the computer science discipline as a whole.

ORGANIZER

The Department of Computer Science and Technology

Tsinghua University

ORGANIZING COMMITTE CHAIRS

Andrew Yao, Xia Yin

LOCAL CHAIRS

Jia Jia

Guoliang Li

Yang Liu



SCHEDULE

Theme: The Development of Computer Science in the AI Era

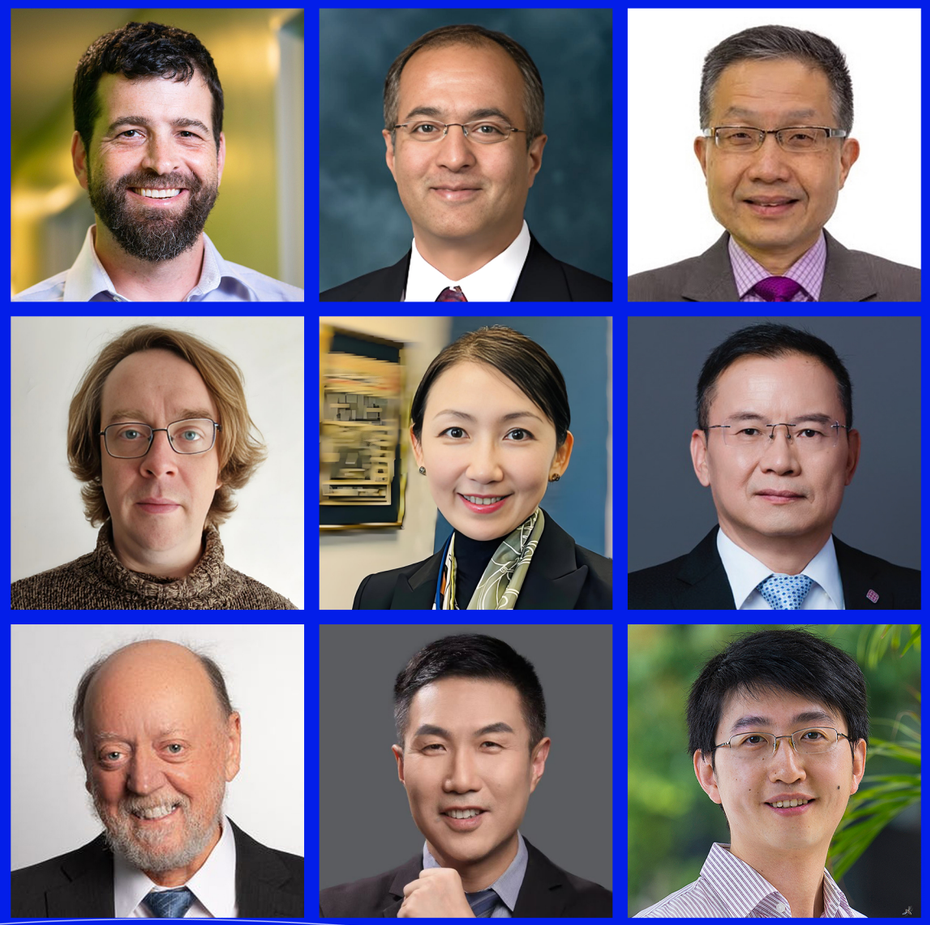
Time: 9:00 -17:30, April 12, 2025

Location: Lecture Hall, 13th Floor, Building 1, Ziqiang Science and Technology Building, Tsinghua University

Host: **Xia Yin**, Dean, Department of Computer Science and Technology, Tsinghua University

Time	Topic	Speaker
09:00-09:30	Opening Remarks	Invited Speakers
09:30-10:00	**Keynote 1** Advances in Computer Science and AI in the MIT EECS Department	**Samuel Madden** Head, Computer Science Massachusetts Institute of Technology
10:00-10:30	**Keynote 2** CS Ethics in the Age of AI	**H. V. Jagadish** Director, Michigan Institute for Data and AI in Society University of Michigan
10:30-10:50	Break	
10:50-11:20	**Keynote 3** Computing and Data Science in the Age of AI: Building a College for the Future	**Luke Ong** Vice President (AI and Digital Economy) Dean, College of Computing and Data Science Nanyang Technological University
11:20-12:20	**Panel:** The Development of Computer Science in the AI Era **Chair:** Andrew Yao **Participants:** Jack Dongarra, Samuel Madden, H. V. Jagadish, Luke Ong	
12:20-14:30	Break & Lunch	
14:30-15:00	**Keynote 4** Qualitative Evaluation of Academic Careers in Computer Science at CNRS	**Pierre Senellart** Director, Graduate Program of Computer Science PSL University
15:00-15:30	**Keynote 5** Attainable Education for All (AedA)	**Ping Ji** Executive Officer, Computer Science PhD Program, Director, Data Science Master's Program, Graduate School and John Jay College City University of New York
15:30-16:00	**Keynote 6** KCUBE: A KG-based University	**Qing Li** Head, Department of Computing Hong Kong Polytechnic University
16:00-16:30	Break	
16:30-17:30	**Panel:** Talent Development in the AI Era **Chair:** Xiangyang Li **Participants:** Pierre Senellart, Ping Ji, Qing Li, Cong Wang	

SPEAKER



Chair

Andrew Yao

Dean of Institute for Interdisciplinary Information Sciences
Tsinghua University



BIOGRAPHY:

Professor Yao is Dean of Institute for Interdisciplinary Information Sciences at Tsinghua University. He received a PhD in Physics from Harvard University, and a PhD in Computer Science from the University of Illinois. Professor Yao served on the faculty of MIT, Stanford, UC Berkeley and Princeton University before joining Tsinghua in

Kyoto Prize in 2021. At Tsinghua, Professor Yao founded an elite undergraduate CS program (Yao Class) in 2005. Professor Yao is a member of the Chinese Academy of Sciences, and foreign member of the US Academy of Sciences.



Samuel Madden

ADVANCES IN COMPUTER SCIENCE AND AI IN THE MIT EECS DEPARTMENT

ABSTRACT

In this talk, I will discuss recent research directions in CS and AI in the EECS department at MIT, focusing on the role of academia in an increasingly AI-driven world. Specific directions I will mention include the Science of AI, i.e., exploring fundamental questions in representation learning, in-context learning, LLM capabilities, and new architectures like gated linear attention; Systems for AI and AI for Systems, i.e., advancing distributed computing, data management and AI; Secure and Private Computing, leveraging breakthroughs in cryptography to build more secure and private software; New Systems and Architectures for the Cloud, i.e., improved management and efficiency in cloud systems across OSes, networks, and databases; AI and Society, addressing algorithmic fairness and societal impacts, AI-human alignment, and agency of humans in the presence of AI models; and AI for Scientific Discovery, accelerating breakthroughs in areas like cancer diagnosis and protein design through new AI models.

BIOGRAPHY

Samuel Madden is a the College of Computing Distinguished Professor of Computing at MIT. His research interests include databases, distributed computing, and networking. Research projects include learned database systems, the C-Store column-oriented database system, and the CarTel mobile sensor network system. Madden heads the Data Systems Group at MIT and the Data Science and AI Lab (DSAIL), an industry supported collaboration focused on developing systems that use AI and machine learning.

Madden received his Ph.D. from the University of California at Berkeley in 2003 where he worked on the TinyDB system for data collection from sensor networks. Madden was named one of Technology Review's Top 35 Under 35 in 2005 and an ACM Fellow in 2020, and is the recipient of several awards, including an NSF CAREER award, a Sloan Foundation Fellowship, and "test of time" awards from VLDB, SIGMOD, SIGMOBILE, and SenSys. He is the co-founder and Chief Scientist at Cambridge Mobile Telematics, which develops technology to make roads safer and drivers better.

CS ETHICS IN THE AGE OF AI



H. V. Jagadish

ABSTRACT

Computer Science has long had many issues of professionalism and ethics, and many accrediting agencies require a course on such topics in the undergraduate curriculum. Both the nature and importance of such student exposure has been transformed due to AI and Data Science. I will discuss some issues that deserve consideration in this regard, and my own work towards this end.

BIOGRAPHY

H. V. Jagadish is Edgar F Codd Distinguished University Professor and Bernard A Galler Collegiate Professor of Electrical Engineering and Computer Science at the University of Michigan, and Director of the Michigan Institute for Data and AI in Society. He is well known for his broad-ranging research on information management, and has 300 major papers and 38 patents, with an H-index of 104. He is a Fellow of the ACM (since 2003) and of AAAS (since 2018). He currently chairs the board of the Academic Data Science Alliance and in a member of the National Academies' Committee on National Statistics. His popular MOOC on Data Science Ethics is available on both EdX and Coursera.



Luke Ong

COMPUTING AND DATA SCIENCE IN THE AGE OF AI: BUILDING A COLLEGE FOR THE FUTURE

ABSTRACT

This talk is about Nanyang Technological University's newest academic college, College of Computing and Data Science (CCDS). I will begin with a brief historical background of (computing at) NTU and then present an overview of CCDS, focussing on the educational offerings of the College. I will conclude with reflections on the near and long-term challenges facing CCDS, as we seek to produce future-proof graduates in AI and Computing.

BIOGRAPHY

Professor Ong holds a B.A. in Mathematics (1984, Triple First), a Postgraduate Diploma in Computer Science (1985, Distinction) from Trinity College, University of Cambridge; and a PhD in Computer Science (1988) from Imperial College, University of London. He joined NTU as a Distinguished University Professor in August 2022 and was Vice President (Research) from January 2023 to April 2024. In May 2024, Professor Ong was appointed Vice President (AI and Digital Economy) and Founding Dean of the College of Computing and Data Science. Professor Ong is the Chief Scientist of AI Singapore and is responsible for AI Singapore s fundamental research into Artificial Intelligence. Prior to joining NTU, he was Lecturer then Professor of Computer Science at the University of Oxford (1994-2022); Fellow of Merton College, Oxford (1994-2022); and Prize Research Fellow, Trinity College, Cambridge (1988- 1994).

Professor Ong's research in computing is broad, ranging across semantics of computation, programming languages, verification, logic and algorithms. He is known for his solution to the Full Abstraction Problem in the semantics of programming languages, and pioneering contributions to higher-order model checking in algorithmic verification. His current research interests include security, Bayesian statistical probabilistic programming and AI Safety.

Professor Ong was General Chair (2013-2015) of the ACM / IEEE Logic in Computer Science (LiCS). He is the joint winner of the ACM / EATCS Alonzo Church Award 2017 for Outstanding Contributions to Logic and Computation and an ACM Distinguished Paper Award. He is a recipient of the President of the Republic of Singapore Scholarship (1981).

QUALITATIVE EVALUATION OF ACADEMIC CAREERS IN COMPUTER SCIENCE AT CNRS



Pierre Senellart

ABSTRACT

France's National Centre for Scientific Research, or CNRS, is the largest fundamental science agency in Europe, employing 11 000 tenured full-time researchers. Their hiring, evaluation, and promotion are managed by France's National Committee for Scientific Research, an independent body of elected and appointed scientists, divided into sections by academic fields. We report on how its Computer Science section implements this evaluation process in a qualitative manner,

discuss in particular how to go beyond bibliometrics or prestige of conferences or journals in evaluating publications; how to account for the diversity of publishing practices in different research areas and among different researchers; how to ensure a balance of profiles and scientific topics; how to value other scientific contributions such as software, datasets, or collaborative projects; and how to assess service and supervision activities.

BIOGRAPHY

Pierre Senellart is a Professor of Computer Science at École normale supérieure, PSL University, Paris, France, a member of the Institut Universitaire de France, and the director of the Graduate Program in Computer Science of PSL University. His research interests focus on practical and theoretical aspects of data management, including Web mining, information extraction, and uncertainty and provenance management. He holds a chair at the PR[AI]RIE Paris School of AI institute and serves as the President of the Computer Science section of France's National Committee for Scientific Research, in charge of the hiring and evaluation of CNRS researchers. Additionally, he advises the scientific and ethical committee monitoring university admission platforms in France.



Ping Ji

ATTAINABLE EDUCATION FOR ALL (AEDA)

ABSTRACT

While the world has been reshaped by advances in computing and communication, the most traditional institution of passing on knowledge – Schools remains unchanged with old modalities. Further, because of inequity in resources and awareness, digital divides between those who are privileged and those who struggle educationally and economically are even widened. In this work, we aim to address the challenges of Attainability and Equity in Education, particularly we would like to design a new education ecosystem – Attainable Education for All (AeDA) – that rides on digital technologies and services to redefine, transform, and foster modern educational practices in a model that college level curriculum are structured with digital economy job market demands in mind.

BIOGRAPHY

Dr. Ping Ji received her B.Sc. degree in Computer Science and Technology from Tsinghua University (Beijing, China), and her Ph.D. in Computer Science from the University of Massachusetts at Amherst. Since graduated from UMass Amherst in year 2003, Dr. Ji has been working in the City University of New York and received her Tenure and Full Professor title in Mathematics and Computer Science of John Jay College of Criminal Justice within 7 years after joined CUNY. Currently, at the City University of New York, Dr. Ji also serves as the Executive Officer of the Computer Science PhD Program and the Director of the Data Science Master's Program at CUNY's Graduate Center. Throughout her 22 years career at CUNY, Dr. Ji has pioneered many initiatives on both academic and administration sides. Dr. Ji is a founding faculty and a key contributor of John Jay College's Digital Forensics Master's program, and the founding director of CUNY Graduate Center's Master's program in Data Science.

Dr. Ji's research interests include Network Measurements and Data Analysis, Security Monitoring Strategies for Computer & Wireless Networks, Network Security, Mobile Networks, and Internet of Things (IoT). Her work has been published in well recognized professional journals and conference proceedings including IEEE/ACM Transaction on Networking (ToN), ACM SigComm, ACM SigKDD, Performance Evaluation, etc. Dr. Ji is the recipient of a number of research fundings and awards from the National Science Foundation and other government agencies and is CUNY's leading PI of a $3.2 million award from Google for Cybersecurity research and education. She created the First Annual ACM Northeast Digital Forensics Exchange, and has been a program committee member for numerous computer networking conferences, and a guest editor for a number of professional journals. Dr. Ji's current research is funded by Google and NSF.

KCUBE: A KG-BASED UNIVERSITY CURRICULUM FRAMEWORK FOR STUDENT ADVISING AND CAREER PLANNING



Qing LI

ABSTRACT

Knowledge representations and interactions are at the forefront of teaching, learning, and career planning activities in all endeavors of education and career development. University students are increasingly faced with a myriad of interdisciplinary topics that are seemingly unrelated when unstructured knowledge representations are presented, especially during advising and career orientation sessions. This is especially challenging in fast-changing technical domains such as Computer and Data Science where university curricula are reviewed on an annual basis. This makes it increasingly difficult for instructors and administrators to present both the big picture as well as the detailed knowledge components of degree programs to students who face problems in choosing a career and/or establishing a plan of study and assessment. In this talk, I shall introduce the KCUBE project, a knowledge graph (KG) framework equipped with virtual reality for structuring and presenting both the overviews of the Computer Science curriculum taught at the Department of Computing in the Hong Kong Polytechnic University, as well as for students to develop their study with the help of virual tutor/mentor. We employ computational information storage and retrieval methods, machine learning, and interactive virtual reality to facilitate users (instructors and students) to better understand, manipulate, and visualize abstract concepts and relationships in the development of teaching and learning activities in our department.

BIOGRAPHY

Qing Li is a Chair Professor and Head of the Department of Computing, the Hong Kong Polytechnic University. He received his B.Eng. from Hunan University (Changsha), and M.Sc. and Ph.D. degrees from the University of Southern California (Los Angeles), all in computer science. His research interests include multi-modal data management, conceptual data modeling, social media, Web services, and e-learning systems. He has authored/co-authored over 500 publications in these areas, with over 46,400 citations and H-index of 89 (source: Google Scholars). He is actively involved in the research community and has served as Editor-in-Chief of Computer & Education: X Realitty (CEXR) by Elsevier, associate editor of IEEE Transactions on Artificial Intelligence (TAI), IEEE Transactions on Cognitive and Developmental Systems (TCDS), IEEE Transactions on Knowledge and Data Engineering (TKDE), ACM Transactions on Internet Technology (TOIT), Data Science and Engineering (DSE), and World Wide Web (WWW) Journal, in addition to being a Conference and Program Chair/Co-Chair of numerous major international conferences. He also sits/sat in the Steering Committees of DASFAA, ER, ACM RecSys, IEEE U-MEDIA, and ICWL. Prof. Li is a Fellow of IEEE and IET.



Jack Dongarra

BIOGRAPHY

Jack Dongarra specializes in numerical algorithms in linear algebra, parallel computing, the use of advanced computer architectures, programming methodology, and tools for parallel computers. He holds appointments at the University of Manchester, Oak Ridge National Laboratory, and the University of Tennessee, where he founded the Innovative Computing Laboratory. In 2019 he received the ACM/SIAM Compu-

the IEEE-CS Computer Pioneer Award. He is a Fellow of the AAAS, ACM, IEEE, and SIAM; a foreign member of the British Royal Society, a member of the US National Academy of Sciences, and the National Academy of Engineering. Most recently, he received the 2021 ACM A.M. Turing Award for his pioneering contributions to numerical algorithms and software that have driven decades of extraordinary progress in computing performance and applications.

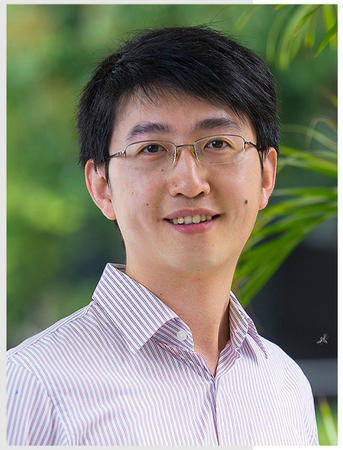
Xiangyang Li

BIOGRAPHY

Dr. Xiangyang Li is a professor and the Executive Dean at School of Computer Science and Technology, University of Science and Technology of China. He was elected as ACM Fellow (2019), IEEE Fellow (class 2015), and ACM Distinguished Scientist (class 2015). He was a full professor at Computer Science Department of Illinois Institute of Technology, and served as an EMC Visiting Chair Professor at Tsing-

degree at Department of Computer Science from University of Illinois at Urbana-Champaign. He received a Bachelor degree at Department of Business Management from Tsinghua University, P.R. China, both in 1995. Dr. Li research interest spans AIOT, edge computing, data sharing and trading, and Industrial Intelligence. Dr. Li and his students won more than ten best paper awards (e.g., IEEE GlobeCom 2015, IEEE HPCCC 2014, ACM MobiCom 2014), and ACM SenSys Test of Time Awards at 2024.





Cong Wang

BIOGRAPHY

Cong Wang is a Professor and Head of the Department of Computer Science at the College of Computing, City University of Hong Kong. His research encompasses data security and privacy, AI systems and security, and blockchain with decentralized applications. He has made prolific contributions to these fields, witnessed by 30,000+ citations on Google Scholar and multiple best paper awards, including

IEEE Fellow, an HK RGC Research Fellow, and a Founding Member of the Young Academy of Sciences of Hong Kong. He has served as the Editor-in-Chief for the IEEE Transactions on Dependable and Secure Computing (late 2022 - early 2025), a premier security journal under the IEEE Computer Society.