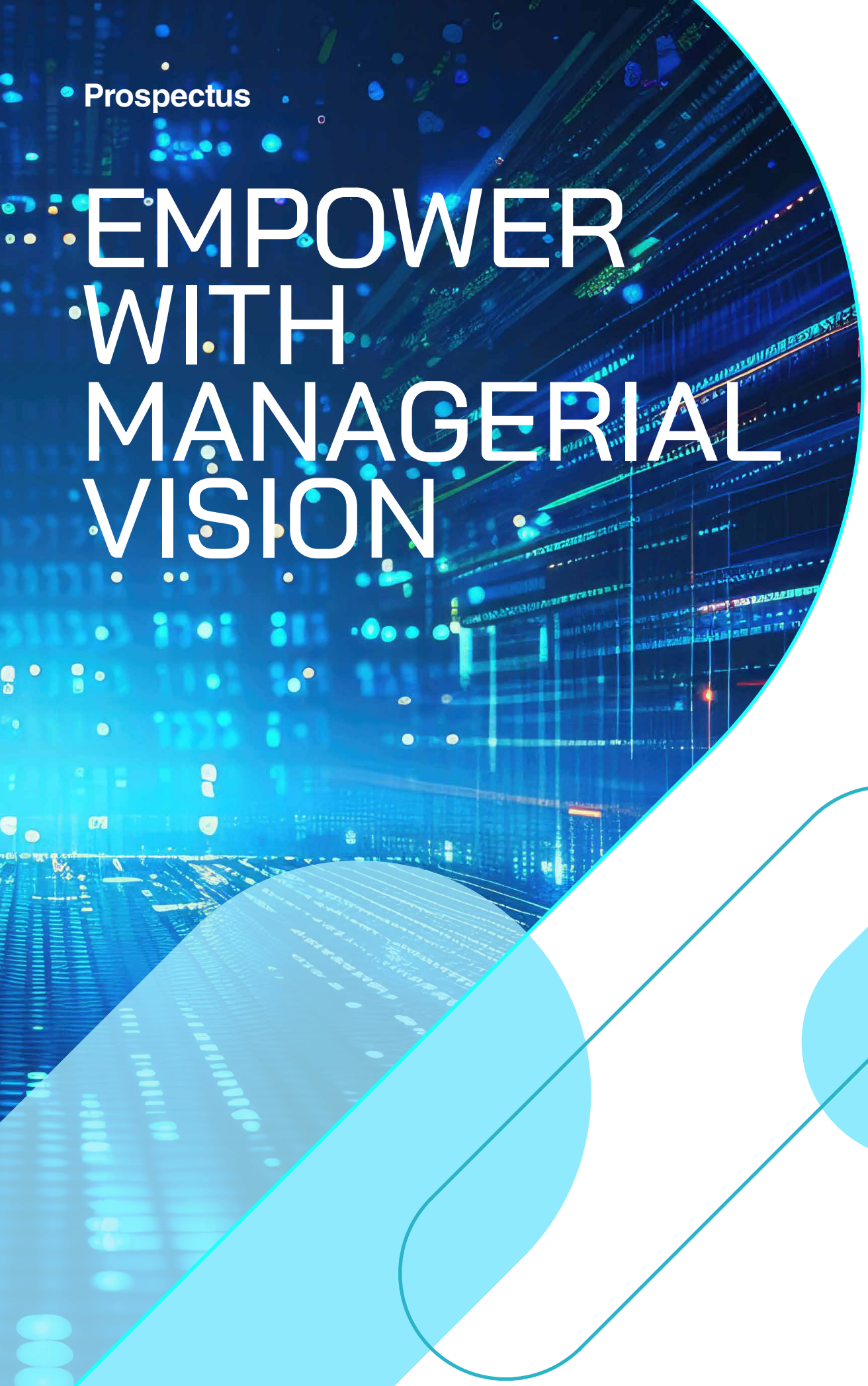
Prospectus

EMPOWER WITH MANAGERIAL VISION



DEPARTMENT OF
SYSTEMS ENGINEERING AND
ENGINEERING MANAGEMENT

香港中文大學
The Chinese University of Hong Kong

OUR MISSION

The Department's vision is to create and disseminate knowledge and technologies of systems engineering and engineering management for the ever-changing society.

Our goal is to develop novel analytic models and artificial intelligence techniques to derive managerial insights for optimal decision-making in complex environments.

To achieve the goal, the Department conducts innovative research with focus on Financial Engineering and FinTech, Information Systems, Logistics and Supply Chain Management, Operations Research, and Service Engineering.

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THE DEPARTMENT

The Department of Systems Engineering and Engineering Management was established in the year 1991 (in the name of Department of Systems Engineering) as the first of its kind in tertiary educational institutions in Hong Kong. In August the same year, the Department was one of the 4 founding departments of the newly established Faculty of Engineering. In the past three decades, the Department not only has made itself become a regional and internationally renowned academic programme, but also has contributed significantly to the growth of the Faculty, by its vigorous pursuit in teaching, research and service.

The Department offers two undergraduate programmes. The Bachelor of Engineering in Systems Engineering and Engineering Management is currently organized around two focal areas: Business Information Systems and Decision Analytics, with applications in Big Data Processing and Analytics, Financial Engineering, Logistics and Supply Chain Management, and Service Engineering and Management. The Bachelor of Engineering in Financial Technology was newly launched in 2017 to meet foreseeable strong demands for FinTech professionals in the coming decades. At the graduate level, the Department offers research-based programmes leading to Master of Philosophy (M.Phil.) and Doctor of Philosophy (Ph.D.). The Department also offers two course-based programmes leading to the degree of Master of Science (M.Sc.). The first taught master programme, MSc programme in Systems Engineering and Engineering Management, was launched in 1996. In 1998, the Faculty started to offer MSc programme in E-Commerce (Technologies) which was administrated by the SEEM Department. The programme (renamed to MSc in E-Commerce and Logistics Technologies in 2006) is now affiliated with the Department since 2008.

SCOPE OF RESEARCH AND EDUCATION

THE SCOPE OF OUR WORK COVERS:

Financial Engineering: modelling, data analysis and decision making for financial services, risk management and financial regulations

Financial Technology: develop innovative solutions for financial services and business based on state-of-the-art technologies

Information Systems: data-intensive computing for information exchange and intelligence extraction to enable better decision-making and execution for complex systems in our changing society

Logistics and Supply Chain Management: develop models and methodologies to manage material, financial and information flow for improving efficiency and sustainability of supply chain operations

Operations Research: develop cutting-edge tools and methodologies that underpin intelligent decisions in complex systems and modern services

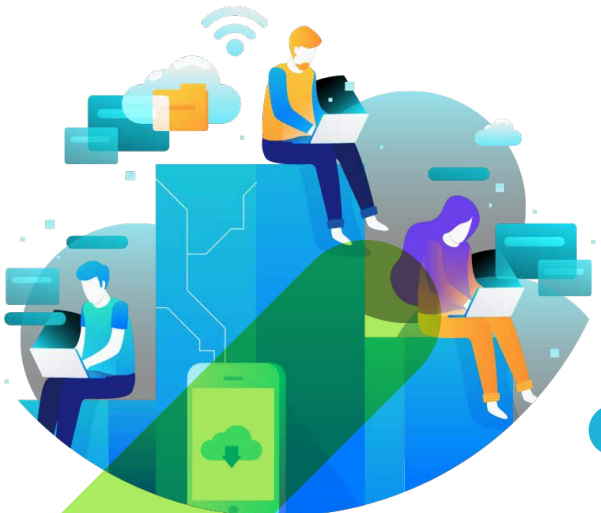
ACCOLADES

Our faculty members are leaders in their respective fields. In recognition of their leadership and contributions to research and innovations, they are invited or elected to serve as editors of top-tier professional journals, including:

- ACM Transactions on Asian Language Information Processing
- ACM Transactions on Database Systems
- Computational Management Science
- Computer Speech and Language
- Computers & Operations Research
- Data Science and Engineering (DSE) Journal
- Digital Finance
- EURO Journal on Computational Optimization
- EURO Journal on Transportation and Logistics
- Fuzzy Decision Making and Optimization
- IEEE Transactions on Audio, Speech and Language Processing
- IEEE Transactions on Automatic Control
- IEEE Transactions on Knowledge and Data Engineering
- IEEE Transactions on Signal Processing
- IIE Transactions on Operations Engineering
- IIE Transactions on Scheduling and Logistics
- Information and Decision Technologies
- International Journal of Computational Linguistics and Chinese Language Processing
- International Journal of Cooperative Information Systems
- International Journal on Computational Linguistics
- International Journal on Computer Processing of Oriental Languages
- Journal of Computing Science and Engineering
- Journal of Global Optimization
- Journal of Information Processing
- Journal of Scheduling
- Journal of the Operational Research Society
- Journal on Distributed and Parallel Databases
- Journal on Health Information Science and Systems
- Mathematics and Financial Economics
- Mathematical Finance
- Mathematical Programming
- Mathematics of Operations Research
- Naval Research Logistics
- Omega - International Journal of Management Science
- Operations Research
- Operations Research Letters
- Optimization Methods and Software
- Quantitative Finance
- Reliability Engineering and System Safety
- SIAM Journal on Control and Optimization
- SIAM Journal on Financial Mathematics
- SIAM Journal on Optimization
- Speech Communication
- The VLDB Journal
- Transportation Science
- World Wide Web Journ

Our programmes are led by a team of active, energetic and dynamic faculty members. Research outputs from our faculty and students have also won numerous international and regional awards and honours, including:

- Best Student Paper Award in the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2025
- Best Paper Award in ACL-SIGHAN 2024
- Best Paper Award (Research Track) in ACM SIGKDD Conference 2023
- Best Paper Award in the 2022 CSAMSE Conference
- Best Paper Award in the 14th International Conference of the Chinese Scholars Association for Management Science and Engineering (CSAMSE) 2022
- Best Paper Award in the 26th Australasian Database Conference (ADC'15) 2015
- Best Paper award of the 32nd IEEE International Conference on Data Engineering 2016
- CCF Natural Science Second Prize 2023
- CUHK Research Excellence Award 2016-17
- Distinguished Project Award of China Innovation and Entrepreneurship Fair 2016
- Elected Distinguished Lecturer of the International Speech Communication Association (ISCA)
- Elected Fellow of the Chartered Institute of Logistics and Transport (2014)
- Elected Fellow of the International Speech Communication Association (2016)
- Elected Member of IEEE Board of Governors
- Elected Member of IEEE Speech and Language Processing Technical Committee
- Fellow of HKIE
- Fellow of IEEE
- Finalist, POMS-HK Best Student Paper Award, 2025
- First Place, INFORMS Society on Location Analysis Best Student Paper Award, 2023
- Finalist in 2021 MSOM Best OM Paper in OR
- Hong Kong ICT Award Smart Inclusion Silver Award 2018
- Humboldt Distinguished Lecture 2013
- IBM Faculty Award 2016
- IEEE Communications Society Asia-Pacific Outstanding Paper Award 2014
- IEEE Signal Processing Society Signal Processing Magazine Best Paper Award 2015
- IEEE Signal Processing Society Best Paper Award 2018
- IEEE Signal Processing Society Leo L Beranek Meritorious Service Award 2019
- INFORMS Computing Society Prize 2024
- Inaugural Distinguished Lecturer of APSIPA (Asia- Pacific Signal and Information Processing Association) 2012-2014
- Invited Speaker of Okawa Prize 2012 Commemorative Symposium
- Keynote Speaker under the theme of "From Collaborative Research to Real World Impact at InnoHK Summit December 2023
- Keynote Speaker of ACL 2021
- Keynote Speaker of CLIC 2021
- Keynote Speaker of AFEKA 2021
- Microsoft Research Outstanding Collaborator Award 2016
- Most Successful Woman Award 2022
- Outstanding Paper Award in ACL 2024
- Outstanding Fellow of the Faculty of Engineering 2015 for five years
- Outstanding ICT Women Professional Award of the Hong Kong Computer Society 2015
- Plenary Speaker of CogInfoComm 2013
- Plenary Speaker of INTERSPEECH 2018
- Plenary Speaker of IEEE ICASSP 2021
- Plenary Speaker of the HKMA Annual Conference 2023
- Runner-up Prize of the Best Contributed Theoretical Paper Award at the INFORMS Winter Simulation Conference 2021
- Second Prize in the Best Paper Award at the 2024 CSAMSE Conference
- Saint Francis Prize in Techno-Humanities (2024)
- SIAM Review SIGEST Award
- Speaker at the 150 Years in the Making MIT and Women in STEM Event 2023
- The Chinese Institute of Electronics Nature Science Award (First Prize) 2020
- The Chinese Institute of Electronics Nature Science Award (First Prize) 2023
- The Best Student Paper of the 34th Australasian Database Conference (ADC'23), 2023
- 2022 年中國中文資訊學會科學技術獎：“錢偉長中文資訊處理科學技術獎” 一等獎



Our faculty members have been active in serving professional and societal roles that are related to their expertise:

- Academic Committee, The Chinese National Research Center of Mathematics and Cross-Disciplinary Science, Department of Finance and Economics
- Ad hoc reviewer of Mathematical Finance, Finance and Stochastics, Operations Research, Annals of Applied Probability, etc
- Associate editor, Journal of the Operational Research Society
- Award Committee, INFORMS Public Sector Operations Research Best Paper Award
- Chartered member of the Chartered Institute of Logistics and Transport in Hong Kong
- Chinese Language Interface Advisory Committee, appointed by the Deputy Government Chief Information Officer
- Convenor, Engineering Panel, University Grants Council's Competitive Research Funding for the Local Self-financing Degree Sector
- Convenor, Working Party on 2014 Manpower Survey of the Information Technology Sector, Committee on Information Technology Training and Development of the Vocational Training Council
- Council Member, Hong Kong Institution of Science
- Council Member, Hong Kong Productivity Council, appointed by the Secretary for Commerce and Economic Development
- Council Member, The Open University of Hong Kong
- Digital 21 Strategy Advisory Committee, appointed by the Secretary for Commerce, Industry and Technology
- Elected Board Member, International Speech Communication Association
- Elected Vice-President of Professional Development, Hong Kong Computer Society
- Engineering Panel Member, Research Grants Council
- General Chair, INTERSPEECH 2020
- General Chair, International Symposium on Chinese Spoken Language Processing
- HKIE Accreditation Committee for Computer Science Programs, The Hong Kong Institution of Engineers
- Honorable Advisor, IBM Collaborative Innovation Program
- IEEE Speech and Language Technical Committee
- Joint Committee on Information Technology for the Social Welfare Sector, appointed by the Director of Social Welfare
- Judging Panel Member, nominations to the State Scientific and Technological Progress Awards (SSTPA) and State Technological Invention Awards (STIA), The Hong Kong SAR Government
- Keynote Speaker of the International Symposium on Scheduling (2013), Tokyo, Japan
- Member, Enterprise Supporting Scheme (ESS) Assessment Panel (Information Technology Subgroup), Innovation & Technology Commission (ITC), Hong Kong SAR Government
- Member of Advisory Board, Cyber Security Lab, Applied Science & Technology Research Institute (ASTRI)
- Member of the Academic and Accreditation Advisory Committee (AAAC), Hong Kong Securities & Futures Commission
- Member of the Advisory Panel for Green and Sustainable Fintech Proof-of-Concept Funding Support Scheme, Financial Services and the Treasury Bureau (FSTB), Hong Kong SAR Government
- Member of the Advisory Panel for the FinTech Proofof- Concept Subsidy Scheme appointed by Financial Services and the Treasury Bureau
- Member of the Advisory Panel for Green and Sustainable Fintech Proof-of-Concept Funding Support Scheme, Financial Services and the Treasury Bureau (FSTB), Hong Kong SAR Government
- Member, Board of Directors, ASTRI
- Member of the Distance Business programme Vetting Committee appointed by the Innovation and Technology Bureau
- Member of the Enterprise Support Scheme Assessment Panel under the Innovation and Technology Fund (ITF) appointed by the Innovation and Technology Bureau
- Member, Executive Board, Hong Kong Institution of Science
- Member of the Executive Committee of the Operational Research Society of Hong Kong
- Member of the GenAI Sandbox Selection Committee, Hong Kong Monetary Authority (HKMA), Hong Kong SAR Government
- Member of the Industry Panel for Hong Kong Green Fintech Map, Hong Kong Securities & Futures Commission
- Member of the Innovation and Technology Fund Research Projects Assessment Panel, The Hong Kong SAR Government
- Member of the Lottery Funds Advisory Committee, appointed by the Secretary for Labour and Welfare
- Member of the Research Grants Council, The Hong Kong SAR Government
- Member of the Steering Committee in eHR (electronic Health Record) Sharing, appointed by the Secretary of Food and Health, The Hong Kong SAR Government
- Member of Technology Review Board, ASTRI
- Member of the Working Group on Competitive Research Funding for Local Self-financing Degree Sector, appointed by the RGC Chairman
- Mentor, ESF Science Fair, 2019, New York, US
- Panel of Assessors, The Innovation and Technology Support Programme, appointed by the Commissioner of Innovation and Technology
- Panel of Assessors, The Small Entrepreneur Research Assistance Programme, appointed by the Commissioner of Innovation and Technology
- Panel Member for Accreditation of The Hong Kong Institute of Bankers as Assessment Agency for Professional Qualifications (Associate Fintech Professional & Certified Fintech Professional), Hong Kong Council for Accreditation of Academic & Vocational Qualifications
- Panel Member for Learning Programme Accreditation for Master of Science in Financial Technology, Hong Kong Shue Yan University, Hong Kong Council for Accreditation of Academic & Vocational Qualifications
- President, Hong Kong Information Technology Joint Council
- Review Panel, INFORMS MSOM Conference
- Review Panel, National Centres of Competence in Research, Swiss National Science Foundation
- Review Panel, National Natural Science Foundation of China
- Review Panel, Natural Sciences and Engineering Research Council of Canada
- Review Panel, Swedish Research Council European Research Infrastructure Initiative
- Scientific Programme Chair, 19th Triennial Conference of the International Federation of Operational Research Societies, 2011, Melbourne, Australia
- Task Force on Facilitating the Adoption of Wireless and Mobile Services and Technology (FAWMST), appointed by the Government Chief Information Officer
- Technical Chair, Oriental Chapter of the International Committee for the Co-ordination and Standardization of Speech Databases and Assessment Techniques
- Technical Program Co-Chair, Interspeech
- Technology Consultant, Technology Services Division, The Hong Kong SAR Government
- The Central Committee on Information Technology for Rehabilitation Services, appointed by the Director of Social Welfare
- Workshop Chair, International Conference on Data Engineering 2022

Our students are a new generation of engineers who can solve real-world problems in innovative ways. They have received a variety of awards and recognitions from many international associations and competitions.

- Best Student Paper Award in the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2025
- Best Student Paper Award in the 13th IEEE Sensor Array and Multichannel Signal Processing Workshop (SAM 2024)
- Golden and Silver medals of 49th International Exhibation of Inventions Geneva 2024
- 2023 INTERSPEECH Best Student Paper Award
- INFORMS-Sim Best Student Paper Award at the 2023 Winter Simulation Conference
- 2nd Runner-up in CILTHK Student Day 2023
- First prize (Winner) in the 2022 Student Paper Competition of the INFORMS Section
- Best Student Paper Competition at the 2018 and 2022 INFORMS Annual Meeting
- Top Performance, 2022 DialDoc@ACL Challenge (developed a document grounded chatbot system)
- Top Performance in two of four tasks, International ACII Affective Vocal Bursts Competition, organized by a group from Hume AI, Berkeley and Imperial College 2022
- First Runner-up, IEEE ICASSP 2022 Multi-channel Multiparty Meeting Transcription Challenge (M2MeT) on Signal Separation
- Merit Award with the project of Aimimi in the Entrepreneurship category at The 7th Hong Kong University Student Innovation and Entrepreneurship Competition 2021
- Online Safety Prize Challenge organized by AI, Singapore, 2024
- Open Category Championship, Hong Kong's SciTech Challenge 2021 (based on the home-grown AI-enabled disordered speech reconstruction technology)
- Runner-up prize, Best Contributed Theoretical Paper Competition, Winter Simulation Conference 2021
- 1st Runner-up in the Citibank Disruptive Client Experience in the Digital Banking Era organized by HKGCC Business Case Competition 2020
- First Runner-Up in the Tencent Finance Academy Fintech Competition 2020
- Championship of openlab x FinTecubator Innovation Challenge 2019
- 1st Runner-up The HSBC Financial Innovation Case Study Competition 2019
- 2nd Runner-up in the Bizkathon@HKUST 2019
- Outstanding Team Award in the BEA 100 Fintech Challenge 2019
- Best Student Paper Award in the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2019
- Best Student Paper Award in the 19th IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC) 2018
- Championship in B4B Challenge 2018 student stream
- Gold Award in the 46th International Exhibition of Inventions of Geneva in 2018
- Best Paper Award in the IEEE International Conference on Multimedia and Expo 2016
- Championship of the case study competition in the 22nd CILTHK Student Day
- First Runner-Up Award at 2016 HKSQ Company Based Student Project Competition
- Honorable mention at the Best Student Paper Competition at the Seventh POMS-HK International Conference
- Microsoft Research Asia Fellowship, multiple years
- MSR Best Student Paper Award in the Fourth China Computer Federation(CCF) Conference on Natural Language Processing & Chinese Computing (NLPCC2015) 2015
- Second-Place Prize of Student Paper Competition at the 3rd Asia Quantitative Finance Conference 2015
- Second-Place Prize of Best Student Paper Competition at the 6th POMS-HK International Conference 2015
- 2nd Runner-up HKIE Manufacturing and Industrial Division Student Project Competition 2013-2014, 2014- 2015
- 第十屆中國運籌學會數學規劃分會研究生論壇優秀報告獎 2024
- 第九屆中國運籌學會數學規劃分會研究生論壇優秀報告獎 2023
- 第八屆中國運籌學會數學規劃分會研究生論壇優秀報告獎 2022
- 第七屆中國運籌學會數學規劃分會研究生論壇優秀報告獎 2021

WORLD-CLASS FACULTY MEMBERS

CHENG, Hong
程鴻

Chairman and Professor
BS (Zhejiang University)
MPhil (The Hong Kong University of Science and Technology)
PhD (University of Illinois at Urbana-Champaign)

Research Interests
- Graph Mining and Query Processing
- Social Network Analysis
- Data Mining for Software Reliability

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Hong Cheng received her B.S. degree and M.Phil. degree in Computer Science from Zhejiang University and Hong Kong University of Science and Technology in 2001 and 2003, respectively. She then received her Ph.D. in Computer Science from University of Illinois at Urbana- Champaign in 2008. She joined the Department of Systems Engineering and Engineering Management, The Chinese University of Hong Kong in 2008. Her main research area is data mining and information systems.

She received the Certificate of Recognition for the 2009 SIGKDD Doctoral Dissertation Award, the 2010 Vice-Chancellor's Exemplary Teaching Award of The Chinese University of Hong Kong, and the Best Paper Award (Research Track) in SIGKDD Conference 2023.

Selected Publications

Haihong Zhao, Aochuan Chen, Xiangguo Sun, Hong Cheng, Jia Li. "All in One and One for All: A Simple yet Effective Method towards Cross-domain Graph Pretraining", Proceedings of the 30th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 24), Barcelona, Spain, August 2024.

Wen Deng, Weiguo Zheng, Hong Cheng. "Accelerating Maximal Clique Enumeration via Graph Reduction", Proceedings of the VLDB Endowment (PVLDB), 17, 2024.

Zijin Feng, Miao Qiao, Hong Cheng. "Modularity-based Hypergraph Clustering: Random Hypergraph Model, Hyperedge-cluster Relation, and Computation", Proceedings of the 2024 ACM SIGMOD Internatio nal Conference on Management of Data (SIGMOD 24) , Santiago, Chile, June 2024.

Xiangguo Sun, Hong Cheng, Jia Li, Bo Liu, Jihong Guan. "All in One: Multi- Task Prompting for Graph Neural Networks", Proceedings of the 29th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 23), Long Beach, CA, USA, August 2023.

Chengzhi Piao, Tingyang Xu, Xiangguo Sun, Yu Rong, Kangfei Zhao, Hong Cheng. "Computing Graph Edit Distance via Neural Graph Matching", Proceedings of the VLDB Endowment (PVLDB), 16(8):1817-1829, 2023.

Yuli Jiang, Yu Rong, Hong Cheng, Xin Huang, Kangfei Zhao, Junzhou Huang. "Query Driven-Graph Neural Networks for Community Search: From Non-Attributed, Attributed, to Interactive Attributed", Proceedings of VLDB Endowment (PVLDB), 15(6): 1243-1255, 2022.

Zijin Feng, Miao Qiao, Hong Cheng. "Clustering Activation Networks", Proceedings of the 2022 IEEE International Conference on Data Engineering (ICDE 22), 2022.

Jia Li, Jiajin Li, Yang Liu, Jianwei Yu, Yueting Li, Hong Cheng. "Deconvolutional Networks on Graph Data", Proceedings of the thirty-fifth Conference on Neural Information Processing Systems (NeurIPS 21), 2021.

Yuli Jiang, Xin Huang, Hong Cheng. "I/O Efficient K-truss Community Search in Massive Graphs", The VLDB Journal, 2021.

Jia Li, Mengzhou Liu, Honglei Zhang, Pengyun Wang, Yong Wen, Lujia Pan, Hong Cheng. "Mask-GVAE: Blind Denoising Graphs via Partition", Proceedings of the 2021 Web Conference (WWW 21), April 2021.

Jia Li, Jianwei Yu, Jiajin Li, Honglei Zhang, Kangfei Zhao, Yu Rong, Hong Cheng, Junzhou Huang. "Dirichlet Graph Variational Autoencoder", Proceedings of the thirty-fourth Conference on Neural Information Processing Systems (NeurIPS 20), 2020.

Chengzhi Piao, Weiguo Zheng, Yu Rong, Hong Cheng. "Maximizing the Reduction Ability for Near-maximum Independent Set Computation", Proceedings of the VLDB Endowment (PVLDB), 13(11):2466-2478, 2020.

Jia Li, Honglei Zhang, Zhichao Han, Yu Rong, Hong Cheng, Junzhou Huang. "Adversarial Attack on Community Detection by Hiding Individuals", Proceedings of the 2020 Web Conference (WWW 20), Taipei, April 2020

Jia Li, Zhichao Han, Hong Cheng, Jiao Su, Pengyun Wang, Jianfeng Zhang, Lujia Pan. "Predicting Path Failure in Time-Evolving Graphs", Proceedings of the 25th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 19), Anchorage, AK, USA, August 2019.

Jia Li, Yu Rong, Hong Cheng, Helen Meng, Wenbing Huang, Junzhou Huang. "Semi-supervised Graph Classification: A Hierarchical Graph Perspective", Proceedings of the 2019 Web Conference (WWW 19), San Francisco, CA, USA, May 2019.

Weiguo Zheng, Chengzhi Piao, Hong Cheng, Jeffrey Xu Yu. "Computing A Near-Maximum Independent Set in Dynamic Graphs", Proceedings of the 2019 IEEE International Conference on Data Engineering (ICDE 19), Macau, April 2019.

Weiguo Zheng, Jeffrey Xu Yu, Lei Zou, Hong Cheng. "Question Answering Over Knowledge Graphs: Question Understanding Via Template Decomposition", Proceedings of the VLDB Endowment (PVLDB), 11(11):1373-1386, 2018.

Jia Li, Yu Rong, Helen Meng, Zhihui Lu, Timothy Kwok and Hong Cheng. "TATC: Predicting Alzheimer's Disease with Actigraphy Data", Proceedings of the 24th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 18), London, United Kingdom, August 2018.

Miao Qiao, Hao Zhang, Hong Cheng. "Subgraph Matching: on Compression and Computation". Proceedings of the VLDB Endowment (PVLDB), 11(2): 176-188, 2017.

Qiankun Zhu, Hong Cheng, Xin Huang. "I/O-efficient algorithms for top-k nearest keyword search in massive graphs", The VLDB Journal (VLDBJ), Vol.26, Issue 4, pages 563-583, 2017.

Lujia Pan, Jianfeng Zhang, Patrick P. C. Lee, Hong Cheng, Cheng He, Caifeng He, Keli Zhang. "An Intelligent Customer Care Assistant System for Large-Scale Cellular Network Diagnosis", Proceedings of the 23rd ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 17), Canada, August 2017.

Xiaofei Zhang, Hong Cheng, Lei Chen. Bonding Vertex Sets Over Distributed Graph: A Betweenness Aware Approach. Proceedings of the VLDB Endowment (PVLDB), 8(12): 1418-1429, 2015.

Xin Huang, Laks V. S. Lakshmanan, Jeffrey Xu Yu, Hong Cheng. Approximate Closest Community Search in Networks. Proceedings of the VLDB Endowment (PVLDB), 9(4): 276-287, 2015.

Zechao Shang, Feifei Li, Jeffrey Xu Yu, Zhiwei Zhang, Hong Cheng. Graph Analytics Through Fine-Grained Parallelism. Proceedings of the 2016 ACM SIGMOD International Conference on Management of Data (SIGMOD 16).

CHEN, Nan
陳南

Vice-Chairman (Graduate) and Professor
BSc, MSc (Peking University)
MPhil, PhD (Columbia University)

Research Interests
- Quantitative Methods in Finance and Risk Management
- Monte Carlo Simulation
- Applied Probability

EMAIL: nchen@se.cuhk.edu.hk

Professor Chen Nan graduated from the Department of Probability and Statistics at Peking University in 1998, and he received his M.Sc. degree in Probability and Statistics in 2001 at Peking University, his M.Phil. and Ph.D. degrees in 2006 at Columbia University, USA. He joined the Department of Systems Engineering and Engineering Management at The Chinese University of Hong Kong in 2006. He served as associate editor for Operations Research Letters from 2007-2008. He is now an associate editor of International Review of Finance, Digital Finance and has chaired/been a member of the program committees of several international conferences on quantitative finance and Monte Carlo simulation.

Prof. Chen now serves as director of the Bachelor of Engineering Program in Financial Technology at CUHK. The program is the first of its kind in Hong Kong to offer comprehensive undergraduate education in FinTech. He is also director of Master of Science Program in Financial Engineering at CUHK Shenzhen.

Awards and Grants

- Best Student Research Paper Award (Second Place), Financial Services Section, INFORMS, 2006.
- General Research Fund (GRF): Exact Simulation Method for Stochastic Differential Equations and Its Applications in Financial Engineering, 2008-2010, HK$358,000.
- GRF: Computational Methods for Option Pricing under Stochastic Volatility Jump Diffusion Models, 2009-2011, HK$716,000.
- Exemplary Teaching Award, Faculty of Engineering, The Chinese University of Hong Kong, 2009.
- GRF: Monte Carlo Simulation in Financial Risk Management of Derivative Portfolios, 2010-2012, HK$668,000.
- GRF: Financial Systemic Risk, 2014-2016, HK$500, 000.(Co-PI: David D. Yao, Columbia University)
- GRF: A Computational Approach for Stochastic Dynamic Programming and Its Applications in Financial Engineering, 2015-2017, HK$717, 000.
- GRF: Simulation from Characteristic Functions, 2016-2018, HK$744,000.
- GRF: Dynamic Portfolio Selection and Option Pricing with Market Frictions, 2018-2021, HK$7632, 421.

Selected Publications

A New Delta Expansion for Multivariate Diffusions via the Ito-Taylor Expansion(with N. Yang and X. Wan). Journal of Econometrics, Vol. 209, pp. 256-288, 2019

Contingent Capital,Tail Risk, and Debt-induced Collapse (with P. Glasserman, B. Nouri and M. Pelger). Review of Financial Studies, Vol. 30, pp. 3921-3969, 2017.

An Optimization View of Financial Systemic Risk Modeling: The Network Effect and the Market Liquidity Effect (with X. Liu and D.D.Yao). Operations Research, Vol. 64, pp. 1089-1108, 2016.

American Option Sensitivity Estimation via a Generalized IPA Approach (with Y. Liu). Operations Research, Vol. 62, pp. 616-632, 2014.

Localization and Exact Simulation of Brownian Motion Driven Stochastic Differential Equations (with Z. Huang). Mathematics of Operations Research, Vol. 38, pp. 591-616, 2013

Occupation Times of Jump-Diffusion Processes with Double Exponential Jumps and the Pricing of Options (with N. Cai and X. Wan). Mathematics of Operations Research, Vol. 35, pp. 412-437, 2010.

A Non-Zero-Sum Game Approach for Convertible Bonds: Tax Benefits, Bankrupt Cost and Early/Late Call (with M. Dai and X. Wan). Mathematical Finance, Vol. 23, pp. 57-93, 2010.

Credit Spread, Implied Volatility, and Optimal Capital Structures with Jump Risk and Endogenous Defaults (with S. Kou). Mathematical Finance, Vol. 19, pp. 343-378, 2009.

Malliavin Greeks without Malliavin Calculus (with P. Glasserman). Stochastic Processes and their Applications, Vol. 117, pp. 1689-1723, 2007.

Additive and Multiplicative Duals for American Option Pricing (with P. Glasserman). Finance and Stochastics, Vol. 11, pp. 153-179, 2007.Operations Research, 57(5), 1236-1249, 2009.

X. Cai, X.Y. Wu, and X. Zhou, "Single-machine scheduling with general costs under compound-type distributions". Journal of Scheduling, 10(1), 77-84, 2007.

X. Cai, X.Y. Wu and X. Zhou, "Dynamically Optimal Policies for Stochastic Scheduling Subject to Preemptive-Repeat Machine Breakdowns". IEEE Transactions on Automation Science and Engineering, 2 (2),158-172, 2005.

X. Cai, X.Q. Sun, and X. Zhou, "Stochastic Scheduling Subject to Machine Breakdowns: The Preemptive-Repeat Model with Discounted Reward and Other Criteria", Naval Research Logistics, 51, 800-817, 2004.

X. Cai, K.L. Teo, X.Q. Yang, and X.Y. Zhou, "Portfolio Optimization under a Minimax Rule", Management Science, 46, 957-972, 2000.

X. Cai, C.-Y. Lee, and T.L. Wong, "Multi-Processor Task Scheduling to Minimize the Maximum Tardiness and the Total Completion Time". IEEE Transactions on Robotics and Automation, 16, 824-830, 2000.

X. Cai and S. Zhou, "Stochastic Scheduling on Parallel Machines Subject to Random Breakdowns to Minimize Expected Costs for Earliness and Tardy Jobs", Operations Research, 47, 422-437, 1999.

LI, Lingfei
李凌飛

Vice-Chairman (Undergraduate) and Professor
BS (Peking University)
MS, PhD (Northwestern University)

Research Interests
- Financial Engineering
- Mathematical Finance
- Computational Finance

EMAIL: lfli@se.cuhk.edu.hk

Professor Lingfei Li received his B.S. in Applied Mathematics from Peking University, China in 2007, and his M.S. and Ph.D. in Industrial Engineering and Management Sciences from Northwestern University, USA in 2008 and 2012. He joined the Department of Systems Engineering and Engineering Management, The Chinese University of Hong Kong in June 2012. His research interests include financial engineering, mathematical finance and computational finance. He worked as a quant in the commodity strategies group at Morgan Stanley in the summer of 2009.

Selected Publications

Z. Dai and L. Li (2024). Deep learning for enhanced index tracking. Quantitative Finance 24(5), 569-591.

B. Wu and L. Li (2024). Reinforcement learning for continuous-time mean-variance portfolio selection in a regime-switching market. Journal of Economic Dynamics and Control 158, 104787.

G. Zhang and L. Li (2023). A general approach for Parisian stopping times under Markov processes. Finance and Stochastics 27(3), 769-829.

Q. Lai, X. Gao and L. Li (2023). A data-driven deep learning approach for options market making. Quantitative Finance 23(5), 777-797.

W. Zhang, L. Li and G. Zhang (2023). A two-step framework for arbitrage-free prediction of the implied volatility surface. Quantitative Finance 23(1), 21-34.

G. Zhang and L. Li (2023). A general method for analysis and valuation of drawdown risk under Markov models. Journal of Economic Dynamics and Control 152, 104669.

G. Zhang and L. Li (2022). Analysis of Markov chain approximation for diffusion models with non-smooth coefficients. SIAM Journal on Financial Mathematics 13(3), 1144-1190.

G. Zhang and L. Li, "Analysis of Markov chain approximation for option pricing and hedging: grid design and convergence behavior", Operations Research 67(2):407-427, 2019.

L. Li and G. Zhang, "Error analysis of finite difference and Markov chain approximations for option pricing", Mathematical Finance, 28(3), 877-919, 2018.

J. Li, L. Li and G. Zhang, "Pure jump models for pricing and hedging VIX derivatives", Journal of Economic Dynamics and Control 74(1), 28-55, 2017.

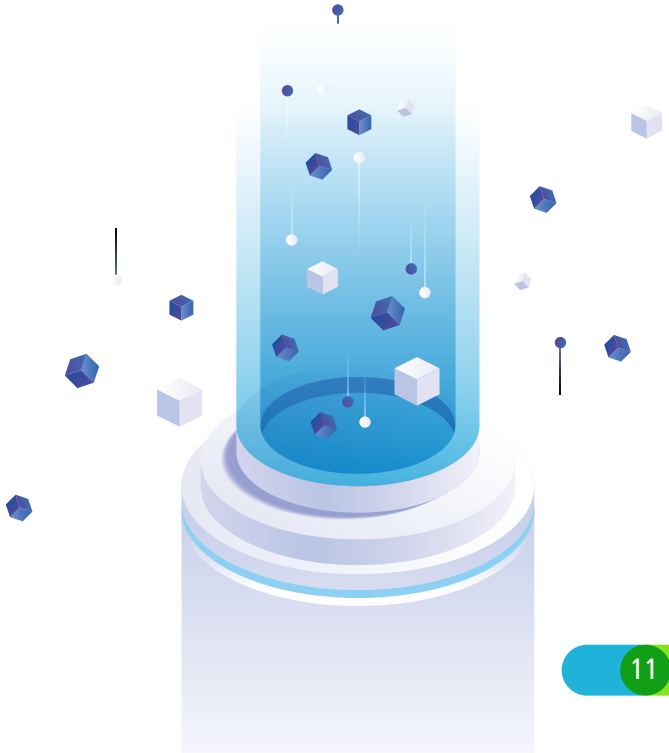
L. Li and G. Zhang, "Option pricing in some non-Levy jump models", SIAM Journal on Scientific Computing, 38(4), B539-B569, 2016.

J. Li, L. Li and R. Mendoza-Arriaga, "Additive subordination and its applications in finance", Finance and Stochastics 20(3), 589-634, 2016.

L. Li and V. Linetsky, "Discretely monitored first passage problems and barrier options: an eigenfunction expansion approach", Finance and Stochatics 19(4), 941-977, 2015.

L. Li and V. Linetsky, "Time-changed Ornstein-Uhlenbeck processes and their applications in commodity derivative models", Mathematical Finance 24(2), 289-330, 2014.

L. Li and V. Linetsky, "Optimal stopping and early exercise: an eigenfunction expansion approach", Operations Research 61(3), 625-643, 2013.



AHN, Dohyun
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BS, MS, PhD (Korea Advanced Institute of Science and Technology)

Research Interests
- Quantitative risk management
- Monte Carlo simulation
- Networks in finance and operations
- Decision making under uncertainty

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Dohyun Ahn received a B.S. degree with a double major in Industrial & Systems Engineering and Management Science in 2011 and his M.S. and Ph.D. degrees in Industrial & Systems Engineering in 2013 and 2018, all from KAIST. His methodological background lies in applied probability, optimization, and stochastic simulation, whereas his application area includes, but is not limited to, financial engineering, risk management, and network analysis .

Dohyun's research has been recognized at various prestigious events, including the WSC I-SIM Best Student Paper Award, the INFORMS Section on Finance Best Student Paper Award, and the WSC Best Theoretical Paper Competition. Actively engaged in community service, he received the 2024 Operations Research Meritorious Service Award.

Selected Publications

D. Ahn and L. Zheng (2025) Efficient Simulation of Polyhedral Expectations with Applications to Finance, Mathematics of Operations Research, Articles in Advance
- 1st Place, Best Student Paper Competition, INFORMS Section on Finance, 2022

D. Ahn, S. Juneja, T. Pagare, and S. Samudra (2025) Data-Driven Estimation of Tail Probabilities under Varying Distributional Assumptions, Proceedings of the 2025 Winter Simulation Conference, forthcoming

D. Ahn, D. Shin, and A. Zeevi (2024) Feature Misspecification in Sequential Learning Problems, Management Science, 71(5):4066-4086

D. Ahn, D. Shin, and L. Zheng (2024) Best-Arm Identification with High-Dimensional Features, Proceedings of the 2024 Winter Simulation Conference

D. Ahn (2024) Data-Driven Resource Allocation for Multi-Target Attainment, European Journal of Operational Research, 318(3):954–965

D. Ahn, N. Chen, and K. Kim (2024) Robust Risk Quantification via Shock Propagation in Financial Networks, Operations Research, 72(1):1-18

D. Ahn and L. Zheng (2023) Conditional Importance Sampling for Convex Rare-Event Sets, Proceedings of the 2023 Winter Simulation Conference
- INFORMS-Sim Best Student Paper Award, Winter Simulation Conference Ph.D. Colloquium, 2023

D. Ahn and T. Kim (2023) Risk-Sensitive Ordinal Optimization, Proceedings of the 2023 Winter Simulation Conference

D. Ahn, K. Kim, and E. Kwon (2023) Multivariate Stress Scenario Selection in Interbank Networks, Journal of Economic Dynamics and Control, 154:104712
- 2nd Place, KIIE Best MS Student Paper Competition, 2019

D. Ahn and L. Zheng (2021) Efficient Simulation for Linear Programming under Uncertainty, Proceedings of the 2021 Winter Simulation Conference
- Runner-up, Best Theoretical Paper Competition, Winter Simulation Conference, 2021

D. Ahn and D. Shin (2020) Ordinal Optimization with Generalized Linear Model, Proceedings of the 2020 Winter Simulation Conference

D. Ahn (2020) Shock Amplification in Financial Networks with Applications to the CCP Feasibility, Quantitative Finance, 20(7):1045-1056
- Selected as a Feature Article by the Editor-in-Chief

D. Ahn, K. Kim, and Y. Kim (2020) Small-Time Smile for the Multifactor Volatility Heston Model, Journal of Applied Probability, 57(4):1070-1087

D. Ahn and K. Kim (2019) Optimal Intervention under Stress Scenarios: A Case of the Korean Financial System, Operations Research Letters, 47(4):257-263

D. Ahn and K. Kim (2018) Efficient Simulation for Expectations over the Union of Half-Spaces, ACM Transactions on Modeling and Computer Simulation, 28(3), Article 23
- KORMS Best Paper Award, 2015
- 2nd Place, Best Student Paper Competition, INFORMS Section on Finance, 2015

D. Ahn, W. Kang, K. Kim, and H. Shin (2017) Analysis and Design of Microfinance Services: A Case of ROSCA, The Engineering Economist, 62(3):197-230
- Highlighted in the December 2017 issue of ISE magazine published by IISE

CHAN, Chun Kwong
陳俊光

Professor of Practice in Financial Technology
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MBA (Chinese University of Hong Kong)
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Research Interests
- Financial Technology
- Banking Infrastructure
- Smart Banking
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- Corporate Entrepreneurship and Innovation

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Prior to joining CUHK as Professor of Practice in FinTech starting September 2018, Prof. Chun Kwong CHAN has been the Chief Information Officer, Retail Banking & Wealth Management, Asia Pacific at HSBC since 2015. From 2012-2015, Professor Chan was the Global Head of Digital Mobile & Channels Engineering at HSBC, having led the direction and engineering of banking applications in implementing the Digital Strategy for HSBC globally. He joined HSBC in Vancouver, Canada in 1990 to help start up the Group Development Centre for HSBC, and moved back to Hong Kong in 2007 to take up key IT management positions at HSBC Asia Pacific.

Besides working in financial technology in the last 28 years, Professor Chan started his career in Hong Kong as an engineer with Fairchild Semiconductor Ltd, and as an IT professional with Hong Kong Telephone, Hong Kong Telecom, and Computasia. During 1988-1990, Professor Chan took up a sabbatical to lecture on Management Information System at the then City Polytechnics of Hong Kong (now City University of Hong Kong).

Professor Chan has won numerous innovation awards by IDC, Asian Bankers, etc. and currently serves on the Innovation and Technology Fund Research Projects Assessment Panel, Hong Kong SAR Government and the Board of Applied Science and Technology Research Institute (ASTRI).

Professor Chan obtained his Bachelor of Science Engineering degree from University of Hong Kong, Master of Business Administration from Chinese University of Hong Kong, and Doctor of Business Administration from City University of Hong Kong.

Selected Publications

C. K. Chan, Y. L. Fang, H. F. Li (2019), "Relative Advantage of Interactive Electronic Banking Adoption by Premium Customers: The Moderating Role of Social Capital", Internet Research, Accepted August, 2019.

Professional Contributions

Chairman of Advisory Panel for the Fintech Proof-of Concept Subsidy Scheme, Cyberport Chairman of Programme

Advisory Committee, BBA(Hons)-Financial Analysis and FinTech (BBA-FAFT), Hang Seng University

Assessor, Hong Kong ICT Award 2022 & 2023: FinTech Award, The Hong Kong Institute of Bankers

Member, Advisory Panel for Advanced Federated Learning for Insurance Applications (AFLIA), Insurance Authority

Member, Board of Directors, Applied Science & Technology Research Institute (ASTRI)

Member of Advisory Board, Cyber Security Lab, ASTRI
Member of Technology Review Board, ASTRI

Member, Distance Business Programme Vetting Committee

Member, Innovation and Technology Fund Enterprise Support Scheme (ESS) Assessment Board, Hong Kong SAR Government

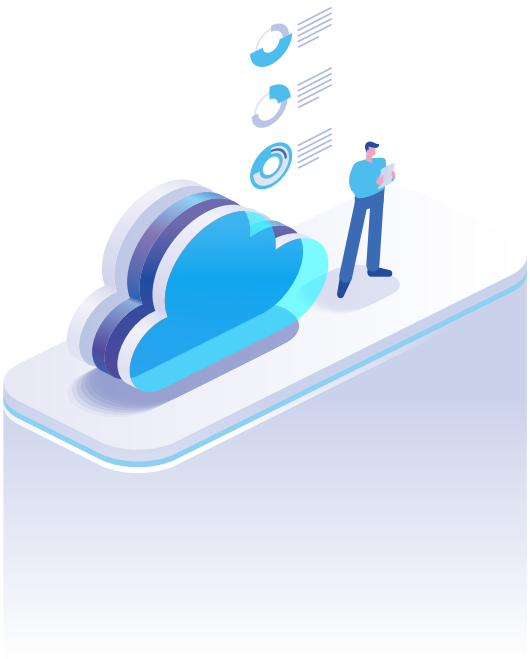
Member, Innovation and Technology Fund Research Projects Assessment Panel (Information Technology Subgroup), Hong Kong SAR Government

Judging panel member - nominations to the State Scientific and Technological Progress Awards (SSTPA) and State Technological Invention Awards (STIA), Hong Kong SAR Government

Honorable Advisor, IBM Collaborative Innovation Program

Panel Member of the Accreditation of Certified Fintech Professional and Associate Fintech Professional, Hong Kong Council for Accreditation of Academic & Vocational Qualifications

Member of Enterprise Support Scheme Assessment Panel, Innovation and Technology Commission, Hong Kong SAR Government (Jul 2021 - Jun 2027)



GAO, Xuefeng
高雪峰

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Research Interests
- Online Learning and Bandits
- Applied Probability
- Algorithmic Trading and Financial Engineering
- Queueing Theory

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Xuefeng Gao received his B.S. in Mathematics from Peking University, China in 2008, and his Ph.D. in Operations Research from Georgia Institute of Technology, USA in 2013. His research interests include Algorithmic Trading and Financial Engineering, Queueing Theory, and Stochastic Processes. His work has been selected as Finalist in the 2011 INFORMS Junior Faculty Interest Group (JFIG) paper competition. During summer 2011 and 2012, he worked as a research intern in the Business Analytics and Mathematical Sciences Department of the IBM T.J. Watson Research Center in New York.

Selected Publications

W. Xu, X. He and X. Gao, "Regret bounds for Markov decision processes with recursive optimized certainty equivalents", ICML, accepted, 2023.

X. Gao and J. Huang, "Asymptotically optimal control of make-to-stock systems", Mathematics of Operations Research, accepted, 2023.

X. Gao, J. Huang and J. Zhang, "Asymptotically optimal control of omnichannel service systems with pick-up guarantees", Operations Research, accepted, 2023.

Y. Xiong, N. Chen, X. Gao and X. Zhou, "Sublinear regret for learning POMDPs". Production and Operations Management, accepted, 2022.

X. Gao, Z.Q. Xu and X.Y. Zhou, "Temperature control for Langevin diffusions". SIAM Journal on Control and Optimization, 60 (3) 1250-1268, 2022

X. Zhou, N. Chen, X. Gao and Y. Xiong, "Regime switching bandits". Advances in Neural Information Processing Systems (NeurIPS), 2021.

M. Gurbuzbalaban, X. Gao, Y. Hu and L. Zhu, "Decentralized stochastic gradient Langevin dynamics and Hamiltonian Monte Carlo". Journal of Machine Learning Research, 22, 1-69, 2021.

X. Gao, M. Gurbuzbalaban and L. Zhu, "Global Convergence of Stochastic Gradient Hamiltonian Monte Carlo for non-convex stochastic optimization: Nonasymptotic performance bounds and momentum-based acceleration". Operations Research, Forthcoming, 2021.

X. Gao, M. Gurbuzbalaban and L. Zhu, "Breaking reversibility accelerates Langevin Dynamics for global non-convex optimization". Advances in Neural Information Processing Systems (NeurIPS) 2020.

Y. Chen, X. Gao and D. Li, "Optimal order execution using hidden orders". Journal of Economic Dynamics and Control. Accepted, 2018.

X. Gao, X. Zhou and L. Zhu. "Transform analysis for Hawkes processes with applications in dark pool trading". Quantitative Finance, Vol. 18, No. 2, p. 265-282, 2018.

X. Gao and L. Zhu, "Functional central limit theorems for stationary Hawkes processes and application to infiniteserver queues". Queueing Systems 2018): 1-46.

X. Gao and L. Zhu, "Limit theorems for Markovian Hawkes processes with a large initial intensity". Stochastic Processes and Their Applications. 2018.

X. Gao and L. Zhu, Large deviations and applications for Markovian Hawkes processes with a large initial intensity. Bernoulli, 24(4A), 2875-2905. 2018. A. B. Dieker and X. Gao, "Sensitivity analysis for diffusion processes constrained to an orthant". The Annals of Applied Probability, 24, p. 1918- 1945, 2014.

J. G. Dai, A. B. Dieker, and X. Gao. "Validity of heavy-traffic steadystate approximations in many-server queues with abandonment". Accepted to Queueing Systems, 2014.

A.B. Dieker and X. Gao, "Piecewise Ornstein-Uhlenbeck processes and common quadratic Lyapunov functions". The Annals of Applied Probability, 23, p. 1291-1317, 2013.

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何雪冬

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BSc (Peking University)
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Research Interests
- Behavioral Finance
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- Risk Management

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Xuedong He received the B.Sc. degree in Mathematics and Applied Mathematics from Peking University in 2005 and the Ph.D. degree in Mathematical Finance from the University of Oxford in 2009. He was an assistant professor at Columbia University in 2009 - 2015 and joined the Chinese University of Hong Kong as an associate professor in 2016.

Xuedong He's research interests include behavioral finance and economics, risk management, stochastic control, and financial technology. He has published papers in leading journals such as Management Science, Operations Research, Mathematical Finance, and Mathematics of Operations Research. He is serving as Area Editor for Operations Research and Associate Editors for Mathematics and Financial Economics, Operations Research Letters, and Digital Finance. He also organized clusters and sessions in international conferences such as the INFORMS Annual Meetings and SIAM Financial Mathematics and Engineering Conferences.

Selected Publications

Risk Measures: Robustness, Elicitability, and Backtesting (with S.G. Kou and X. Peng), Annual Review of Statistics and Its Application, Volume 9, Pages 141-166, 2022.

Mean-Variance Portfolio Selection with Dynamic Targets for Expected Terminal Wealth (with Z. Jiang): Mathematics of Operations Research, Volume 47, Issue 1, Pages 587-615, 2022.

Optimal Payoff under the Generalized Dual Theory of Choice (with Z. Jiang): Operations Research Letters, Volume 49, Issue 3, Pages 372-376, 2021.Forward Rank- Dependent Performance Criteria: Time-Consistent Investment Under Probability Distortion (with M. Strub and T. Zariphopoulou): Mathematical Finance, Volume 31, Issue 2, Pages 683-721, 2021.

A New Preference Model That Allows for Narrow Framing (with J. Guo): Journal of Mathematical Economics, Volume 95, Number 102470, 2021 (An early version with additional results). On the Equilibrium Strategies for Time- Inconsistent Problems in ContinuousTime (supplementary materials) (with Z. Jiang): SIAM Journal on Control and Optimization, Volume 59, Issue 5, Pages 3860-3886, 2021.

Optimal Exit Time from Casino Gambling: Strategies of Pre-Committed and Naive Gamblers (with S. Hu, J. Obłój and X. Y. Zhou): SIAM Journal on Control and Optimization, Volume 57, Issue 3, Pages 1845-1868, 2019.

Two Explicit Skorokhod Embeddings for Simple Symmetric Random Walk (with S. Hu, J. Obłój and X. Y. Zhou): Stochastic Processes and Their Applications, Volume 129, Pages 3431-3445, 2019.

Surplus-Invariant, Law-Invariant, and Positively Homogeneous Acceptance Sets Must be the sets Induced by Value-at-Risk (with X. Peng): Operations Research, Volume 66, Number 5, Pages 1268-1275, 2018.

Realization Utility with Adaptive Reference Points (with L. Yang): Mathematical Finance, Volume 29, Issue 2, Pages 409-447, 2019.

Profit Sharing in Hedge Funds (with S. G. Kou): Mathematical Finance, Volume 28, Issue 1, Pages 50-81, 2018.

Rank Dependent Utility and Risk Taking in Complete Markets (with R. Kouwenberg and X. Y. Zhou): SIAM Journal on Financial Mathematics, Volume 8, Issue 1, Pages 214-239, 2017.

Equilibrium Asset Pricing with Epstein-Zin and Loss- Averse Investors (with J. Guo): Journal of Economic Dynamics and Control, Volume 76, Pages 86-108, 2017.

Processing Consistency in Non-Bayesian Inference (with D. Xiao): Journal of Mathematical Economics, Volume 70, Pages 90-104, 2017.

Path-Dependent and Randomized Strategies in Barberis' Casino Gambling Model (with S. Hu, J. Oblój and X. Y. Zhou): Operations Research, Volume 65, Issue 1, Pages 97-103, 2017.

Dynamic Portfolio Choice when Risk is Measured by Weighted VaR (with H. Q. Jin and X. Y. Zhou): Mathematics of Operations Research, Volume 40, Issue 3, Pages 773- 796, 2015.

Myopic Loss Aversion, Reference Point, and Money Illusion (with X. Y. Zhou): Quantitative Finance, Volume 14, Issue 9, Pages 1541-1554, 2014.

Hope, Fear and Aspirations (with X. Y. Zhou): Mathematical Finance, Volume 26, Issue 1, Pages 3-50, 2016.

Loss-based Risk Measures (with R. Cont and R. Deguest): Statistics and Risk Modeling, Volume 30, Issue 2, Pages 133-167, 2013.

Optimal Insurance Design under Rank Dependent Expected Utility (with C. Bernard, J. A. Yan and X. Y. Zhou): Mathematical Finance, Volume 25, Issue 1, Pages 154-186, 2015.

Portfolio Choice via Quantiles (with X. Y. Zhou): Mathematical Finance, Volume 21, Issue 2, Pages 203-231, April 2011.

Portfolio Choice under Cumulative Prospect Theory: An Analytical Treatment (with X. Y. Zhou): Management Science, Volume 57, Issue 2, Pages 315-331, February 2011.

JIA, Yanwei
賈顏瑋

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BSc (Tsinghua University)
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Research Interests
- Decision Analysis in Financial Engineering
- Reinforcement Learning
- Information Aggregation and Wisdom of the Crowd

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Dr. Yanwei Jia obtained his Ph.D. degree from the National University of Singapore in 2020, and B.Sc. from Tsinghua University in 2016. Prior joining the Department of Systems Engineering and Engineering Management at the Chinese University of Hong Kong in 2023, he was an associate research scientist and adjunct assistant professor in the Department of Industrial Engineering and Operations Research at Columbia University. His research interest falls broadly into financial engineering and decision making problems, focusing on FinTech and data analytics. His recent research aims to develop fundamental theory on continuous-time reinforcement learning, and to solve problems in financial engineering, such as asset allocation and algorithmic trading. He also uses the structural estimation approach to study the information aggregation mechanism and the wisdom of the crowd.

Selected Publications

Yanwei Jia, Jussi Keppo, and Ville Satopaa (2023). "Herding in Probabilistic Forecasts". Management Science.

Min Dai, Yuchao Dong, and Yanwei Jia (2023). "Learning Equilibrium Mean-Variance Strategy". Mathematical Finance.

Yanwei Jia and Xun Yu Zhou (2023)."q-learning in Continuous Time". Journal of Machine Learning Research.

Yanwei Jia and Xun Yu Zhou (2022a). "Policy Evaluation and Temporal-Difference Learning in Continuous Time and Space: A Martingale Approach". Journal of Machine Learning Research.

Yanwei Jia and Xun Yu Zhou (2022b). "Policy Gradient and Actor-Critic Learning in Continuous Time and Space: Theory and Algorithms". Journal of Machine Learning Research.

Min Dai, Yanwei Jia, and Steven Kou (2021). "The Wisdom of the Crowd and Prediction Markets". Journal of Econometrics.

LAM, Wai
林偉

Professor
BSc, MPhil (The Chinese University of Hong Kong)
PhD (University of Waterloo)

Research Interests
- Text Mining and Machine Learning
- Natural Language Processing and Mining
- Intelligent Information Retrieval
- Web Mining

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Lam Wai received a Ph.D. in Computer Science from the University of Waterloo. He obtained his B.Sc. and M.Phil. degrees from The Chinese University of Hong Kong. After completing his Ph.D. degree, he conducted research at Indiana University Purdue University Indianapolis (IUPUI) and the University of Iowa. He joined The Chinese University of Hong Kong, where he is currently a professor.

His research interests include intelligent information retrieval, text mining, digital library, machine learning, and knowledge-based systems. He has published articles in IEEE Transactions on Pattern Analysis and Machine Intelligence, IEEE Transactions on Knowledge and Data Engineering, ACM Transactions on Information Systems, etc.

His research projects have been funded by the Hong Kong SAR Government General Research Fund (GRF) and DARPA (USA). He also managed industrial projects funded by Innovation and Technology Fund (industrial grant) and IT companies.

Selected Publications

Deng, Y., Li, Y., Ding, B, Lam, W., "Leveraging Long Short-Term User Preference in Conversational Recommendation via Multi-agent Reinforcement Learning", IEEE Transactions on Knowledge and Data Engineering, 35(11), 11541-11555, 2023.

Deng, Y., Zhang, W., Xu, W., Lei, W., Chua, T.S., Lam, W., "A Unified Multi-task Learning Framework for Multigoal Conversational Recommender Systems", ACM Transactions on Information Systems 41(3), 77:1-77:25, 2023.

Deng, Y., Zhang, W., Yuan, Y., Lam, W., "Knowledgeenhanced Mixed-initiative Dialogue System for Emotional Support Conversations", ACL (1), 4079-4095, 2023.

Yang, S., Li, X., Bing, L., Lam, W., "Once Upon a Time in Graph: Relative-Time Pretraining for Complex Temporal Reasoning", EMNLP 2023, 11879-11895.

Cai, D. and Lam, W., "AMR Parsing via Graph <-> Sequence Iterative Inference", Annual Meeting of the Association for Computational Linguistics (ACL), 2020.

Li, X., Bing, L., Lam, W. and Shi, B., "Transformation Networks for Target-Oriented Sentiment Classification", Annual Meeting of the Association for Computational Linguistics (ACL), 2018.

Yu, Q. and Lam, W., "Review-Aware Answer Prediction for Product-Related Questions Incorporating Aspects", Proceedings of the ACM International Conference on Web Search and Data Mining (WSDM), 2018.

Li, P., Wang, Z., Ren, Z., Bing L. and Lam, W., "Neural Rating Regression with Abstractive Tips Generation for Recommendation", International ACM SIGIR Conference on Research and Development in Information Retrieval, 2017.

Shi, B., Lam, W., Bing, L., Xu, Y., "Detecting Common Discussion Topics Across Culture From News Reader Comments", Annual Meeting of the Association for Computational Linguistics (ACL), pp. 676-685, 2016.

Bing, L., Lam, W., Wong, T.L. and Jameel, s., "Web Query Reformulation via Joint Modeling of Latent Topic Dependency and Term Context", ACM Transactions on Information Systems, 33(2): 6:1-6:38, 2015.

Jameel, S. and Lam, W. "An Unsupervised Topic Segmentation Model Incorporating Word Order", Proceedings of the International ACM SIGIR Conference on Research and Development in Information Retrieval, pp. 203-212, 2013.

Wong, T.L. and Lam, W., "Learning to Adapt Web Information Extraction Knowledge and Discovering New Attributes via a Bayesian Approach", IEEE Transactions on Knowledge and Data Engineering, 22(4):523-536, 2010.

Jiang, S., Bing, L., Sun, B., Zhang, Y. and Lam, W., "Ontology Enhancement and Concept Granularity Learning: Keeping Yourself Current and Adaptive", Proceedings of the International ACM SIGKDD Conference on Knowledge Discovery and Data Mining, pp. 1244-1252, 2011.

Chen, B., Lam W., Tsang, I. and Wong, T.L., "Extracting Discriminative Concepts for Domain Adaptation in Text Mining", Proceedings of the International ACM SIGKDD Conference on Knowledge Discovery and Data Mining, pp.179-187, 2009.

Lam, W., "Bayesian Network Refinement Via Machine Learning Approach", IEEE Transactions on Pattern Analysis and Machine Intelligence, 20(3):240-251, 1998.

LIU, Weiliang
劉 偉 亮

Assistant Professor
BE (Shanghai Jiao Tong University)
PhD (National University of Singapore)

Research Interests :
- Modern service operations
- Socially responsible operations
- Stochastic models and operations research
- Data-driven decision-making

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Weiliang (Leon) Liu received his B.E. from Shanghai Jiao Tong University in 2020 and his Ph.D. in Industrial Systems and Engineering Management from the National University of Singapore in 2024. He spent a year as a principal researcher at the University of Chicago Booth School of Business before joining the Chinese University of Hong Kong in 2025.

Weiliang Liu's research leverages stochastic modeling and control, queueing theory, optimization, and data analytics to tackle complex operational challenges, with a focus on modern service operations, socially responsible operations, and data-driven queueing control.

His research works have been published in top outlets, including Operations Research, Manufacturing & Service Operations Management, and Production & Operations Management, and have received notable recognitions, including the INFORMS SOLA Best Student Paper Award, and a finalist of the POMS-HK Best Student Paper Award.

Selected Publications

Liu, W., Sun, Q., Tang, L. C., & Ye, Z. (2025). Robust data-driven design of a smart cardiac arrest response system. Accepted by Production and Operations Management. (link)

Sun, X., & Liu, W. (2025). Expanding service capabilities through an on-demand workforce. Operations Research, 73(1), 363-384. (link)

Liu, W., & Sun, X. (2022). Energy-aware and delay-sensitive management of a drone delivery system. Manufacturing & Service Operations Management, 24(3), 1294-1310. (link)

Liu, R., Liu, W., Liu, Y., Pan, E., & Xie, X. (2021). Modeling and optimization for emergency medical services network. IEEE Transactions on Automation Science and Engineering, 19(4), 3520-3535.

LIU, Xunying
劉循英

Associate Professor
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MPhil, PhD (University of Cambridge)
Research Interests

Research Interests
- Machine Learning, Speech Recognition
- Language Modelling, Speech Synthesis
- Speech and Language Processing

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Xunying Liu received his PhD degree in speech recognition and MPhil degree in computer speech and language processing both from University of Cambridge, after his undergraduate study at Shanghai Jiao Tong University. He was a Senior Research Associate at the Machine Intelligence Laboratory of the Cambridge University Engineering Department, prior to joining the Department of Systems Engineering and Engineering Management, Chinese University of Hong Kong, as an Associate Professor in 2016. Dr. Xunying has published more than 190 referred journal and conference articles in top venues of speech technology and artificial intelligence including IEEE/ACM Transactions on Audio, Speech and Language Processing, Computer Speech and Language, Journal of the Acoustical Society of America, IEEE ICASSP, ISCA Interspeech, IEEE ASRU and IEEE CVPR. He and his students were the recipients of a number of best paper awards and nominations, including a Best Paper Award at ISCA Interspeech2010 for the paper titled "Language model cross adaptation for LVCSR system combination", and a Best Student Paper Award at IEEE ICASSP2019 for the paper titled "BLHUC: Bayesian learning of hidden unit contributions for deep neural network adaptation". He is a co-author of the widely used HTK speech recognition toolkit. His research outputs led to several large scale speech recognition systems that were top ranked in international research evaluations supported by DARPA and EPSRC UK. These include the Cambridge Mandarin broadcast and conversational telephone speech recognition systems from 2006 to 2014, and the Cambridge 2015 multi-genre BBC broadcast speech transcription system. His recent research has been supported by Hong Kong Research Grants Council General Research Fund and Theme-based Research Scheme, Hong Kong Innovation and Technology Commission, Shun Hing Institute of Advanced Engineering and Microsoft Research Asia. He is a regular reviewer for top speech technology journals including IEEE/ACM Transactions on Audio, Speech and Language Processing, Computer Speech and Language and Speech Communication. He has served as a member of the scientific or organization committees for conferences including recently ISCA Interspeech2020 and IEEE SLT2021. He is an Associate Editor of IEEE/ACM Transactions on Audio, Speech and Language Processing. He is an Associate Editor of IEEE/ACM Transactions on Audio, Speech and Language Processing. Dr. Xunying Liu is a member of IEEE and ISCA.

Selected Publications

Shujie Hu, Xurong Xie, Mengzhe Geng, Zengrui Jin, Jiajun Deng, Guinan Li, Yi Wang, Mingyu Cui, Tianzi Wang, Helen Meng, Xunying Liu. Self-supervised ASR Models and Features For Dysarthric and Elderly Speech Recognition, IEEE/ACM Transactions on Audio, Speech and Language Processing, Volume 32, Pages 3561-3575, 2024.

Zengrui Jin, Mengzhe Geng, Jiajun Deng, Tianzi Wang, Shujie Hu, Guinan Li, Xunying Liu. Personalized Adversarial Data Augmentation for Dysarthric and Elderly Speech Recognition, IEEE/ACM Transactions on Audio, Speech and Language Processing, Volume 32, Pages 413-429, 2024.

Guinan Li, Jiajun Deng, Mengzhe Geng, Zengrui Jin, Tianzi Wang, Shujie Hu, Mingyu Cui, Helen Meng, Xunying Liu. Audio-visual End-to-end Multi-channel Speech Separation, Dereverberation and Recognition, forthcoming in IEEE/ACM Transactions on Audio, Speech and Language Processing, Volume 31, Pages 2707-2723, 2023.

Jiajun Deng, Xurong Xie, Tianzi Wang, Mingyu Cui, Boyang Xue, Zengrui Jin, Guinan Li, Shujie Hu, Xunying Liu. Confidence Score Based Speaker Adaptation of Conformer Speech Recognition Systems, IEEE/ACM Transactions on Audio, Speech and Language Processing, Volume 31, Pages 1175-1190, 2023.

Mengzhe Geng, Xurong Xie, Zi Ye, Tianzi Wang, Guinan Li, Shujie Wu, Xunying Liu and Helen Meng. Speaker Adaptation Using Spectro-Temporal Deep Features for Dysarthric and Elderly Speech Recognition, IEEE/ACM Transactions on Audio, Speech and Language Processing, Volume 30, 2597-2611, 2022.

Boyang Xue, Shoukang Hu, Junhao Xu, Mengzhe Geng, Xunying Liu, Helen Meng. Bayesian Neural Network Language Modeling for Speech Recognition, IEEE/ACM Transactions on Audio, Speech and Language Processing, Volume 30, 2900-2917, 2022.

Shoukang Hu, Xurong Xie, Mingyu Cui, Jiajun Deng, Shansong Liu, Jianwei Yu, Mengzhe Geng, Xunying Liu and Helen Meng. Neural Architecture Search for LF-MMI Trained Time Delay Neural Networks, IEEE/ACM Transactions on Audio, Speech and Language Processing, Volume 30, 1093-1107, 2022.

Shoukang Hu, Xurong Xie, Shansong Liu, Jianwei Yu, Zi Ye, Mengzhe Geng, Xunying Liu and Helen Meng. Bayesian Learning of LF-MMI Trained Time Delay Neural Networks for Speech Recognition, IEEE/ACM Transactions on Audio, Speech and Language Processing, Volume 29, 1514-1529, 2021.

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Xurong Xie, Xunying Liu, Tan Lee, Lang Wang. Bayesian Learning for Deep Neural Network Adaptation, IEEE/ACM Transactions on Audio, Speech and Language Processing, Volume 29, Pages 2096-2110, 2021.

Shansong Liu, Mengzhe Geng, Shoukang Hu, Xurong Xie, Mingyu Cui, Jianwei Yu, Xunying Liu, Helen Meng. Recent Progress in the CUHK Dysarthric Speech Recognition System, IEEE/ACM Transactions on Audio, Speech and Language Processing, Volume 29, Pages 2267-2281, 2021.

Junhao Xu, Jianwei Yu, Shoukang Hu, Xunying Liu, Helen Meng. Mixed Precision Low-Bit Quantization of Neural Network Language Models for Speech Recognition, IEEE/ ACM Transactions on Audio, Speech and Language Processing, Volume 29, Pages 3679-3693, 2021.

Xixin Wu, Yuewen Cao, Hui Lu, Songxiang Liu, Shiyin Kang, Disong Wang, Xunying Liu and Helen Meng. Speech Emotion Recognition Using Sequential Capsule Networks, IEEE/ACM Transactions on Audio, Speech and Language Processing, Volume 29, 3280-3291, 2021.

Rongfeng Su, Xunying Liu, Lan Wang and Jingzhou Yang. Cross-Domain Deep Visual Feature Generation for Mandarin Audio-Visual Speech Recognition, IEEE/ ACM Transactions on Audio, Speech and Language Processing, Volume 28, Issue 1, December 2020, Pages 185-197.

Xie Chen, Xunying Liu, Yu Wang, Anton Ragni, Jeremy Wong and Mark. J. F. Gales. Exploiting Future Word Contexts in Neural Network Language Models for Speech Recognition, IEEE/ACM Transactions on Audio, Speech and Language Processing, Volume 27, Issue 9, September 2019, Pages 1444-1454.

Xie Chen, Xunying Liu, Yongqiang Wang, Mark J. F. Gales and Philip C. Woodland. Efficient Training and Evaluation of Recurrent Neural Network Language Models for Automatic Speech Recognition, IEEE/ACM Transactions on Audio, Speech and Language Processing, Volume 24, Issue 11, November 2016, Pages 2146-2157.

Xunying Liu, Xie Chen, Yongqiang Wang, Mark J. F. Gales and Philip C. Woodland. Two Efficient Lattice Rescoring Methods Using Recurrent Neural Network Language Models, IEEE/ACM Transactions on Audio, Speech and Language Processing, Volume 24, Issue 8, August 2016, Pages 1438-1449.

Zi Ye, Shoukang Hu, Jinchao Li, Xurong Xie, Mengzhe Geng, Jianwei Yu, Junhao Xu, Boyang Xue, Shansong Liu, Xunying Liu, Helen Meng. DEVELOPMENT OF THE CUHK ELDERLY SPEECH RECOGNITION SYSTEM FOR NEUROCOGNITIVE DISORDER DETECTION USING THE DEMENTIABANK CORPUS, IEEE ICASSP2021, Toronto, Canada.

Jianwei Yu, Bo Wu, Rongzhi Gu, Shixiong Zhang, Lianwu Chen, Yong Xu, Meng Yu, Dan Su, Dong Yu, Xunying Liu, Helen Meng. Audio-visual Multi-channel Recognition of Overlapped Speech, ISCA Interspeech2020, Shanghai, China.

Mengzhe Geng, Xurong Xie, Shansong Liu, Jianwei Yu, Shoukang Hu, Xunying Liu, Helen Meng. Investigation of Data Augmentation Techniques for Disordered Speech Recognition, ISCA Interspeech2020, Shanghai, China.

Shansong Liu, Xurong Xie, Jianwei Yu, Shoukang Hu, Mengzhe Geng, Rongfeng Su, Shixiong Zhang, Xunying Liu, Helen Meng. Exploiting Cross Domain Visual Feature Generation for Disordered Speech Recognition, ISCA Interspeech2020, Shanghai, China.

Xurong Xie, Xunying Liu, Tan Lee, Shoukang Hu, Lan Wang. BLHUC: BAYESIAN LEARNING OF HIDDEN UNIT CONTRIBUTIONS FOR DEEP NEURAL NETWORK SPEAKER ADAPTATION, Best Student Paper Award, IEEE ICASSP2019, Brighton, UK.

Shansong Liu, Shoukang Hu, Yi Wang, Jianwei Yu, Rongfeng Su, Xunying Liu and Helen Meng. Exploiting Visual Features using Bayesian Gated Neural Networks for Disordered Speech Recognition, ISCA Student Paper Award Nomination, ISCA Interspeech2019, Graz, Austria.

Jianwei Yu, Xurong Xie, Shoukang Hu, Shansong Liu, Max W. Y. Lam, Xixin Wu, Ka Ho Wong, Xunying Liu and Helen Meng Development of the CUHK Dysarthric Speech Recognition System for the UA Speech Corpus, ISCA Interspeech2018, Hyderabad, India.

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Research Interests
- Supply Chain Risk Management
- Project Management
- Inventory Control
- Target-based Risk Management
- Robust Optimization

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Daniel Z. Long received his bachelor degree from Tsinghua University in 2005, the master degree from Chinese Academy of Science in 2008, and the Ph.D. degree from the Department of Decision Sciences, National University of Singapore in 2013. His current research revolves around distributionally robust optimization, risk management, and various applications on operations management such as logistics and supply chain management. He has been serving as an associate editor for MSOM since 1/2024.

Awards
- Gold Medals with Congratulations of the Jury, 50th International Exhibition of Inventions Geneva (IEIG) 2025
- The Second Prize in the Best Paper Award at the 2024 CSAMSE Conference
- The First Prize in the Best Paper Award at the 2022 CSAMSE Conference
- Dean's Exemplary Teaching Award 2021
- Finalist in the 2021 MSOM Best OM paper in OR

Selected Publications

X. Cai, D.Z. Long, G. Yu, L. Zhang. "Multi-portfolio Optimization: A Fairness-aware Target-oriented Model", Manufacturing and Service Operations Management, forthcoming, 2024.

D. Z. Long, J. Qi, A. Zhang. "Supermodularity in Two- Stage Distributionally Robust Optimization", Management Science, 70(3): 1394-1409, 2024.

Z. Cui, J. Ding, D. Z. Long, L. Zhang. "Target-based Resource Pooling Problem", Production and Operations Management, 32(4): 1187-1204, 2023.

Z. Cui, D. Z. Long, J. Qi, L. Zhang. "The Inventory Routing Problem under Uncertainty", Operations Research, 71(1): 378-395, 2023.

D. Z. Long, M. Sim, M. Zhou. "Robust Satisficing", Operations Research, 71(1): 61-82, 2023.

V. T. F. Chow, Z. Cui, D. Z. Long. "Target Oriented Distributionally Robust Optimization and Its Applications to Surgery Allocation", INFORMS Journal on Computing, 34(4): 2058-2072, 2022.

A. J. Conejo, N. G. Hall, D. Z. Long, R. Zhang. "Robust Capacity Planning for Project Management", INFORMS Journal on Computing, 33(4): 1533-1550, 2021.

J. Zhang, D. Z. Long, R. Wang, C. Xie. "Impact of Penalty Cost on Customers' Booking Decisions", Production and Operations Management, 30(6): 1603-1614, 2021.

X. Chen, D. Z. Long, J. Qi. "Preservation of Supermodularity in Parametric Optimization: Necessary and Sufficient Conditions on Constraint Structures", Operations Research, 69(1): 1-12, 2021.

L. G. Chen, D. Z. Long, M. Sim, "On Dynamic Decision Making to Meeting Consumption Targets", Operations Research, 63(5): 1117-1130, 2015.

N. G. Hall, D. Z. Long, J. Qi, M. Sim, "Managing Underperformance Risk in Project Portfolio Selection", Operations Research, 63(3): 660-675, 2015.

L. G. Chen, D. Z. Long, G. Perakis, "The Impact of a Target on Newsvendor Decisions", Manufacturing and Service Operations Management, 17(1): 78-86, 2015.

D. Z. Long, J. Qi, "Distributionally Robust Discrete Optimization with Entropic Value at Risk", Operations Research Letter, 42(8): 532-538, 2014.

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Patrick Huen Wing Ming Professor of Systems Engineering & Engineering Management

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Research Interests

- Multilingual Speech and Language Processing
- Human-AI Interaction
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Helen Meng is Patrick Huen Wing Ming Professor of Systems Engineering & Engineering Management at The Chinese University of Hong Kong. She received all her degrees from MIT and joined CUHK in 1998. She is the Founding Directorof the Microsoft-CUHK Joint Laboratory for Human-Centric Computing and Interface Technologies in 2005, which has been recognized as a Ministry of Education of China (MoE) Key Laboratory since 2008. In 2006, she founded the Tsinghua-CUHK Joint Research Centre for Media Sciences, Technologies and Systems and has served as its Director. In 2013, she helped establish the CUHK Stanley Ho Big Data Decision Analytics Research Center and serves as its Founding Director. In 2020, she helped establish the Centre for Perceptual and Interactive Intelligence, which is a CUHK-affiliated R&D centre located in the Hong Kong Science and Technology Park. She served as former Associate Dean (Research) of Engineering (2006- 2010), and former Chairman of the Department (2012-2018).

Helen's professional services include former Editor-in-Chief of the IEEE Transactions on Audio, Speech and Language Processing, and a member of the IEEE Board of Governors. She has served or is serving as a member of the HKSARG's Digital Economy Development Committee, Advisory Panel of the Hong Kong Science and Technology Park Corporation, the review panels of the Swedish Research Council European Research Infrastructure Initiative, and the National Centres of Competence in Research of the Swiss National Science Foundation. She is a member of the HKSAR Government's Steering Committee on eHealth Record Sharing, Convenor of the Engineering Panel HKSAR Government's Competitive Research Funding Schemes for the Self-financing Degree Sector, member of the Hong Kong/Guangdong ICT Expert Committee and Coordinator of the Working Group on Big Data Research and Applications, Council membership of the Open University of Hong Kong, member of the Research Grants Council, former Council Member of the Hong Kong Productivity Council, former member of the HKSAR Government's Digital 21 Strategy Advisory Committee, and Chairlady of the Working Party of the Manpower Survey of the Information Technology Sector.

Helen is a recognized scholar in her field. She leads the interdisciplinary research team that received the first Themebased Research Scheme Project in Artificial Intelligence in 2019. Her recent awards include the Golden, Silver and Bronze medals of 49th and 50th International Exhibition of Inventions Geneva 2024 and 2025, 2023 and 2024 INTERSPEECH Best Student Paper Award@ACL 2024, 2022 Most Success Women Awards, Top Ranking Team in DialDoc 2022 Challenge@ACL, SciTech Challenge 2021 Open Category Championship, HKICT Awards 2021 Smart People (Smart Education & Learning) Gold Award, 2019 IEEE Signal Processing Society Leo L Beranek Meritorious Service Award, 2018 CogInfoComm Best Paper Award, 2017 Outstanding Women Professional Award, 2016 Microsoft Research Outstanding Collaborator Award (one of 32 academics worldwide), 2016 IBM Faculty Award, 2016 IEEE ICME Best Paper Award, 2015 ISCA Distinguished Lecturer, Prior to that, she has also received such awards as the CUHK Faculty of Engineering Exemplary Teaching Award, Young Researcher Award and Service Award; APSIPA Best Oral Paper Award, and 2009 Ministry of Education Higher Education Outstanding Scientific Research Output Award in Technological Advancements. She has delivered numerous invited and keynote talks, such as Internet Economy Summit 2017, GMIC 2017, INTERSPEECH 2018 Plenary, SIGDIAL 2019 Keynote, IEEE 2021 Plenary, ACL 2021 Plenary, IEEE PROGRESS Keynote 2022, etc. She is Distinguished Fellow of the Hong Kong Computer Society Professor and Fellow of IEEE, ISCA, HKIE.

Selected Publications

Minglin Wu, Jing Xu, Xueyuan Chen, Helen Meng, "Integrating Potential Pronunciations for Enhanced Mispronunciation Detection and Diagnosis Ability in LLMs", IEEE ICASSP 2025, Hyderabad, India.

Haohan Guo, Fenglong Xie, Dongchao Yang, Xixin Wu and Helen Meng, "Speaking from Coarse to Fine: Improving Neural Codec Language Model via Multi-Scale Speech Coding and Generation", IEEE ICASSP 2025, Hyderabad, India.

Dongchao Yang, Dingdong Wang, Haohan Guo, Xueyuan Chen, Xixin Wu, Helen Meng, "SimpleSpeech: Towards Simple and Efficient Text-to-Speech with Scalar Latent Transformer Diffusion Models", INTERSPEECH 2024, Greece.

Minglin Wu, JingXu, Xixin Wu, Helen Meng, "Prompting Large Language Models with Mispronunciation Detection and Diagnosis Abilities", INTERSPEECH 2024, Greece.

Dongchao Yang, Haohan Guo, Yuanyuan Wang, Rongjie Huang, Xiang Li, Xu Tan, Xixin Wu, Helen Meng, "UniAudio 1.5: Large Language Model-Driven Audio Codec is A Few-Shot Audio Learner", 38th Annual Conference on Neural Information Professing Systems 2024.

Jingyan Zhou, Minda Hu, Junan Li, Xiaoying Zhang, Xixin Wu, Irwin King, Helen Meng, "Rethinking Machine Ethics - Can LLMs Perform Moral Reasoning through the Lens of Moral Theories?", NAACL 2024, Mexico City, Mexico.

Xiaoying Zhang, Baolin Peng, Ye Tian, Jingyan Zhou, Lifeng Jin, Linfeng Song, Haitao Mi, Helen Meng, "Self-Alignment for Factuality: Mitigating Hallucinations in LLMs via Self-Evaluation", ACL 2024 Main, Bangkok, Thailand.

Helen Meng, Brian Mak, Man-Wai Mak, Helene Fung, Xianmin Gong, Timothy Kwok, Xunying Liu, Vincent Mok, Patrick Wong, Jean Woo, Xixin Wu, Ka Ho Wong, Sean Shensheng Xu, Naijun Zheng, Ranzo Huang, Jiawen Kang, Xiaoquan Ke, Junan Li, Jinchao Li, Yi Wang. "Integrated and Enhanced Pipeline System to Support Spoken Language Analytics for Screening Neurocognitive Disorders", INTERSPEECH 2023, Dublin, Ireland.

Lingwei Meng, Jiawen Kang, Mingyu Cui, Yuejiao Wang, Xixin Wu, Helen Meng, "A Sidecar Separator Can Convert a Single-Talker Speech Recognition System to a Multi-Talker One", IEEE ICASSP 2023, Rhodes Island, Greece.

Disong Wang, Songxiang Liu, Xixin Wu, Hui Lu, Lifa Sun, Xunying Liu, Helen Meng, "Speaker Identity Preservation in Dysarthric Speech Reconstruction by Adversarial Speaker Adaptation", IEEE ICASSP 2022, Singapore.

Zijian Ding, Jiawen Kang, Tinky Oi Ting Ho, Ka Ho Wong, Helene H. Fung, Helen Meng, Xiaojuan Ma, "TalkTive: A Conversational Agent Using Backchannels to Engage Older Adults in Neurocognitive Disorders Screening", CHI Conference on Human Factors in Computing Systems, 2022.

Kun Li, Tianhua Zhang, Liping Tang, Junan Li, Hongyuan Lu, Xixin Wu, and Helen Meng, "Grounded Dialogue Generation with Cross-encoding Re-ranker, Grounding Span Prediction, and Passage Dropout", The 2nd DialDoc Workshop on Document-grounded Dialogue and Conversational Question Answering, Association for Computational Linguistics 2022, Dublin, Ireland. (Ranked Top in the Challenge)

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Research Interests
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Viet Anh Nguyen received his Ph.D. degree in Management of Technology from Ecole Polytechnique Federale de Lausanne (EPFL) in 2019. Before that, he received a Bachelor of Engineering and a Master of Engineering in Industrial and Systems Engineering from the National University of Singapore in 2011 and 2013, respectively. He graduated from the Swiss Program for Beginning Doctoral Students in Economics at the Study Center Gerzensee in 2014. He also holds the Diplome d'Ingenieur (Gustave Eiffel batch) from Ecole Centrale des Arts et Manufactures (Ecole Centrale de Paris).

Viet Anh Nguyen won First Place at the 2018 INFORMS George E. Nicholson Best Student Paper Award, and the Best Teaching Assistant Award from EPFL in 2018.

He is interested in ethical decision making under uncertainty, statistical optimization and machine learning with applications in energy systems, operations management, and data/policy analytics.

Selected Publications

V. A. Nguyen, F. Zhang, S. Wang, J. Blanchet, E. Delage, and Y. Ye, "Robustifying conditional portfolio decisions via optimal transport," Operations Research, 2024.

Y. Wang, V. A. Nguyen, and G. A. Hanasusanto, "Wasserstein robust classification with fairness constraints," Manufacturing & Service Operations Management, 2024.

B. Nguyen, B. Nguyen, H. Nguyen and V. A. Nguyen, "Generative conditional distributions by neural (entropic) optimal transport," in Proceedings of the 41st International Conference on Machine Learning (ICML), 2024.

N. Bui, H. Nguyen, V. A. Nguyen and Z. Ying, "Explaining graph neural networks via structure-aware interaction index," in Proceedings of the 41st International Conference on Machine Learning (ICML), 2024.

H. Nguyen, D. Nguyen, K. Doan and V. A. Nguyen, "Cold-start recommendation by personalized embedding region elicitation," in Conference on Uncertainty in Artificial Intelligence (UAI), 2024.

B. Nguyen, B. Nguyen, and V. A. Nguyen, "Bellman optimal step-size straightening of flow-matching models," in International Conference on Learning Representations (ICLR), 2024.

D. Nguyen, N. Bui, and V. A. Nguyen, "Distributionally robust recourse action," in International Conference on Learning Representations (ICLR), 2023. Honorable Mention, Undergraduate Operations Research Prize, INFORMS 2022.

X. Hua, T. Nguyen, T. Le, J. Blanchet, and V. A. Nguyen, "Dynamic flows on curved space generated by labeled data," in International Joint Conference on Artificial Intelligence (IJCAI), 2023.

D. Nguyen, N. Bui, and V. A. Nguyen, "Feasible recourse plan via diverse interpolation," in International Conference on Artificial Intelligence and Statistics (AISTATS), 2023.

B. Nguyen, and V. A. Nguyen, "Efficient Failure Pattern Identification of Predictive Algorithms," in Conference on Uncertainty in Artificial Intelligence (UAI), 2023.

J. Blanchet, Y. Kang, J. L. Montiel Olea, V. A. Nguyen, and X. Zhang, "Machine learning's dropout training is distributionally robust optimal," Journal of Machine Learning Research, 2023.

N. Bui, D. Nguyen and V. A. Nguyen, "Counterfactual plans under distributional ambiguity," in International Conference on Learning Representations (ICLR), 2022.

H. Vu, T. Tran, M.-C. Yue and V. A. Nguyen, "Distributionally robust fair principal components via geodesic descents," in International Conference on Learning Representations (ICLR), 2022.

D. Nguyen, N. Bui, D. Nguyen, M.-C. Yue and V. A. Nguyen, "Robust Bayesian recourse," in Conference on Uncertainty in Artificial Intelligence (UAI), 2022.

T. Le, T. Nguyen, D. Phung and V. A. Nguyen, "Sobolev transport: A scalable metric for probability measures with graph metrics," in International Conference on Artificial Intelligence and Statistics (AISTATS), 2022.

V. A. Nguyen, S. Shafieezadeh-Abadeh, P. Mohajerin Esfahani and D. Kuhn, "Bridging Bayesian and minimax mean square error estimation via Wasserstein distributionally robust optimization," forthcoming, Mathematics of Operations Research.

V. A. Nguyen, D. Kuhn, and P. Mohajerin Esfahani, "Distributionally robust inverse covariance estimation: The Wasserstein shrinkage estimator," Operations Research, vol. 70, no. 1, pp. 490 – 515, 2021.

C. Ordoudis, V. A. Nguyen, D. Kuhn and P. Pinson, "Energy and reserve dispatch with distributionally robust joint chance constraints," Operations Research Letters, vol. 49, no. 3, pp. 291 – 299, 2021.

T. Le, T. Nguyen, M. Yamada, J. Blanchet and V. A. Nguyen, "Adversarial regression with doubly non-negative weighting matrices," in Advances in Neural Information Processing Systems (NeurIPS), 2021.

B. Taskesen, M.-C. Yue, J. Blanchet, D. Kuhn, and V. A. Nguyen, "Sequential domain adaptation by synthesizing distributionally robust experts," in Proceedings of the 38th International Conference on Machine Learning (ICML), 2021. Oral presentation, top 3% of submissions.

N. Si, K. Murthy, J. Blanchet and V. A. Nguyen, "Testing group fairness via optimal transport projections," in Proceedings of the 38th International Conference on Machine Learning (ICML), 2021.

R. Vreugdenhil, V. A. Nguyen, A. Eftekhari, P. Mohajerin Esfahani, "Principal component hierarchy for sparse quadratic programs," in Proceedings of the 38th International Conference on Machine Learning (ICML), 2021.

B. Taskesen, J. Blanchet, D. Kuhn, and V. A. Nguyen, "A statistical test for probabilistic fairness," at ACM Conference on Fairness, Accountability, and Transparency (FAccT), 2021.

J. Blanchet, K. Murthy and V. A. Nguyen, "Statistical analysis of Wasserstein distributional robust estimators," INFORMS TutORials in Operations Research, pp. 227 – 254, 2021.

V. A. Nguyen, F. Zhang, J. Blanchet, E. Delage, and Y. Ye, "Distributionally robust local nonparametric conditional estimation," in Advances in Neural Information Processing Systems (NeurIPS), 2020.

V. A. Nguyen, X. Zhang, J. Blanchet, and A. Georghiou, "Distributionally robust parametric maximum likelihood estimation," in Advances in Neural Information Processing Systems (NeurIPS), 2020.

V. A. Nguyen, N. Si, and J. Blanchet, "Robust Bayesian classification using an optimistic score ratio," in Proceedings of the 37th International Conference on Machine Learning (ICML), 2020.

D. Kuhn, P. Mohajerin Esfahani, V. A. Nguyen, and S. Shafieezadeh-Abadeh, "Wasserstein distributionally robust optimization: Theory and applications in machine learning," INFORMS TutORials in Operations Research, pp. 130–166, 2019.

V. A. Nguyen, S. Shafieezadeh-Abadeh, M.-C. Yue, D. Kuhn, and W. Wiesemann, "Optimistic distributionally robust optimization for nonparametric likelihood approximation," in Advances in Neural Information Processing Systems (NeurIPS), 2019.

V. A. Nguyen, S. Shafieezadeh-Abadeh, M.-C. Yue, D. Kuhn, and W. Wiesemann, "Calculating optimistic likelihoods using (geodesically) convex optimization," in Advances in Neural Information Processing Systems (NeurIPS), 2019.

S. Shafieezadeh-Abadeh, V. A. Nguyen, D. Kuhn, and P. Mohajerin Esfahani, "Wasserstein distributionally robust Kalman filtering," in Advances in Neural Information Processing Systems (NeurIPS), 2018. Spotlight presentation, top 5% of submissions.

SO, Man Cho Anthony
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Research Interests
- Algorithm Design
- Data Analytics
- Optimization

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Anthony Man-Cho So received his BSE degree in Computer Science from Princeton University with minors in Applied and Computational Mathematics, Engineering and Management Systems, and German Language and Culture. He then received his MSc degree in Computer Science and his PhD degree in Computer Science with a PhD minor in Mathematics from Stanford University. Dr. So joined The Chinese University of Hong Kong (CUHK) in 2007. He is currently Dean of the Graduate School, Deputy Master of Morningside College, and Professor in the Department of Systems Engineering and Engineering Management. His research focuses on optimization theory and its applications in various areas of science and engineering, including computational geometry, machine learning, signal processing, and statistics.

Dr. So is a Fellow of IEEE and a Fellow of HKIE. He held an Outstanding Fellowship of the Faculty of Engineering at CUHK. He currently serves on the editorial boards of Journal of Global Optimization, Mathematical Programming, Mathematics of Operations Research, Open Journal of Mathematical Optimization, and Optimization Methods and Software. He has also served as the Lead Guest Editor of IEEE Signal Processing Magazine Special Issue on Non-Convex Optimization for Signal Processing and Machine Learning. Dr. So has received a number of research and teaching awards, including the 2024 INFORMS Computing Society Prize, the SIAM Review SIGEST Award in 2024, the 2018 IEEE Signal Processing Society Best Paper Award, the 2016-17 CUHK Research Excellence Award, the 2015 IEEE Signal Processing Society Signal Processing Magazine Best Paper Award, the 2014 IEEE Communications Society Asia-Pacific Outstanding Paper Award, the 2010 INFORMS Optimization Society Optimization Prize for Young Researchers, and the 2010 CUHK Young Researcher Award, as well as the 2022 University Grants Committee (UGC) Teaching Award (General Faculty Members Category), the 2022 University Education Award, the 2013 CUHK Vice-Chancellor's Exemplary Teaching Award, the 2011, 2013, 2015 CUHK Faculty of Engineering Dean's Exemplary Teaching Award, and the 2008 CUHK Faculty of Engineering Exemplary Teaching Award.

Selected Publications

L. Tian, A. M.-C. So, "No Dimension-Free Deterministic Algorithm Computes Approximate Stationarities of Lipschitzians", Mathematical Programming, Series A, 208(1-2): 51-74, 2024.

H. Liu, M.-C. Yue, A. M.-C. So, "A Unified Approach to Synchronization Problems over Subgroups of the Orthogonal Group", Applied and Computational Harmonic Analysis 66: 320-372, 2023.

L. Tian, K. Zhou, A. M.-C. So, "On the Finite-Time Complexity and Practical Computation of Approximate Stationarity Concepts of Lipschitz Functions", Proceedings of the 39th International Conference on Machine Learning, pp. 21360-21379, 2022.

X. Li, S. Chen, Z. Deng, Q. Qu, Z. Zhu, A. M.-C. So, "Weakly Convex Optimization over Stiefel Manifold Using Riemannian Subgradient-Type Methods", SIAM Journal on Optimization 31(3): 1605-1634, 2021.

X. Li, Z. Zhu, A. M.-C. So, R. Vidal, "Nonconvex Robust Low-Rank Matrix Recovery", SIAM Journal on Optimization 30(1): 660-686, 2020.

S. Chen, S. Ma, A. M.-C. So, T. Zhang, "Proximal Gradient Method for Nonsmooth Optimization over the Stiefel Manifold", SIAM Journal on Optimization 30(1): 210-239, 2020.

M.-C. Yue, Z. Zhou, A. M.-C. So, "On the Quadratic Convergence of the Cubic Regularization Method under a Local Error Bound Condition", SIAM Journal on Optimization 29(1): 904-932, 2019.

H. Liu, A. M.-C. So, W. Wu, "Quadratic Optimization with Orthogonality Constraint: Explicit Łojasiewicz Exponent and Linear Convergence of Retraction-Based Line-Search and Stochastic Variance-Reduced Gradient Methods", Mathematical Programming, Series A, 178(1-2): 215-262, 2019.

Z. Zhou, A. M.-C. So, "A Unified Approach to Error Bounds for Structured Convex Optimization Problems", Mathematical Programming, Series A, 165(2): 689-728, 2017.

K.-Y. Wang, A. M.-C. So, T.-H. Chang, W.-K. Ma, C.-Y. Chi, "Outage Constrained Robust Transmit Optimization for Multiuser MISO Downlinks: Tractable Approximations by Conic Optimization", IEEE Transactions on Signal Processing 62(21): 5690-5705, 2014.

A. M.-C. So, "Moment Inequalities for Sums of Random Matrices and Their Applications in Optimization", Mathematical Programming, Series A, 130(1): 125-151, 2011.

Y. J. Zhang, A. M.-C. So, "Optimal Spectrum Sharing in MIMO Cognitive Radio Networks via Semidefinite Programming", IEEE Journal on Selected Areas in Communications 29(2): 362-373, 2011.

Z.-Q. Luo, W.-K. Ma, A. M.-C. So, Y. Ye, S. Zhang, "Semidefinite Relaxation of Quadratic Optimization Problems", IEEE Signal Processing Magazine 27(3): 20-34, 2010.

A. M.-C. So, Y. Ye, "Theory of Semidefinite Programming for Sensor Network Localization", Mathematical Programming, Series B, 109: 367-384, 2007.

WAI, Hoi-To
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BEng, MPhil (CUHK)
PhD (Arizona State University)

Research Interests
- Optimization Algorithms
- Signal and Information Processing on Graph
- Data Analytics

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Hoi-To Wai received his PhD degree from Arizona State University (ASU) in Electrical Engineering in Fall 2017, B. Eng. (with First Class Honor) and M. Phil. degrees in Electronic Engineering from The Chinese University of Hong Kong (CUHK) in 2010 and 2012, respectively. He is currently an Associate Professor in the Department of Systems Engineering and Engineering Management at CUHK. Previously he has held research positions at ASU (USA), UC Davis (USA), Telecom ParisTech (France), Ecole Polytechnique (France), and LIDS, MIT (USA).

He currently serves on the editorial board of the IEEE Transactions on Signal Processing, IEEE Transactions on Signal and Information Processing over Networks and Elsevier's Signal Processing, as well as an Elected Member of the IEEE SPS's Signal Processing Theory and Method's Technical Committee. His research interests are in the broad area of optimization algorithms, graph signal processing, and machine learning. He has received Best Student Paper Awards from IEEE ICASSP 2025 (as a coauthor), IEEE SAM Workshop 2024 (as a coauthor), IEEE ICASSP 2018, and the 2017's Dean's Dissertation Award from the Ira A. Fulton Schools of Engineering of ASU for his thesis on network science and distributed optimization.

Selected Publications

C. Zhang, Y. He, H.-T. Wai, "Detecting low pass graph signals via spectral pattern: Sampling complexity and applications", IEEE Transactions on Signal Processing, 2024.

A. Dieuleveut, G. Fort, E. Moulines, H.-T. Wai, "Stochastic Approximation Beyond Gradient for Signal Processing and Machine Learning", IEEE Transactions on Signal Processing, 2023.

M. Hong, H.-T. Wai, Z. Wang, Z. Yang, "A two-timescale stochastic algorithm framework for bilevel optimization: Complexity analysis and application to actor-critic", SIAM Journal on Optimization, 2023.

Q. Li, C.-Y. Yau, H.-T. Wai, "Multi-agent Performative Prediction with Greedy Deployment and Consensus Seeking Agents," in Proceedings of NeurIPS, 2022.

Q. Li, H.-T. Wai, "State Dependent Performative Prediction with Stochastic Approximation", in Proceedings of AISTATS, 2022.

Y. He, H.-T. Wai, "Detecting central nodes from low-rank excited graph signals via structured factor analysis", IEEE Transactions on Signal Processing, 2022.

M. Kaledin, E. Moulines, A. Naumov, V. Tadic, H.-T. Wai, "Finite time analysis of linear two-timescale stochastic approximation with Markovian noise", in Proceedings of COLT, 2020.

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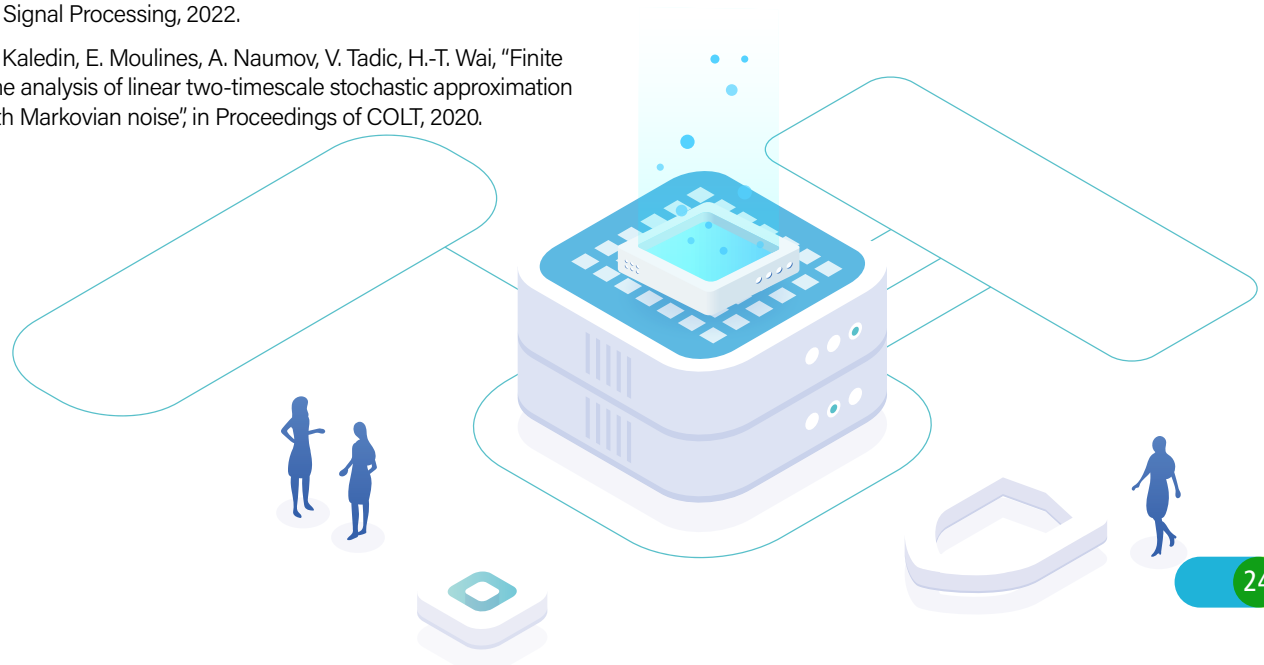
B. Karimi, B. Miasojedow, E. Moulines, H.-T. Wai, "Nonasymptotic Analysis of Biased Stochastic Approximation Scheme", in Proceedings of COLT, 2019



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Research Interests
- Graph Data Management
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Sibo Wang is an Associate Professor in the Department of Systems Engineering and Engineering Management, Faculty of Engineering (since Dec 2018). He received his B.E. in Software Engineering in 2011 from Fudan University and his Ph.D. in Computer Science in 2016 from Nanyang Technological University. His main research area is database and data mining. He is currently interested in graph data management, big data analysis, especially social network analysis, and efficient algorithm design via indexing or approximation.

Award

- 2022 Tencent Rhino-Bird Elite Talent Program Outstanding Mentor Award

Selected Publications

Fangyuan Zhang, Dechuang Chen, Sibo Wang, Yin Yang, Junhao Gan. Scalable Approximate Butterfly and Bi-triangle Counting for Large Bipartite Networks. Proceedings of the ACM on Management of Data (SIGMOD), to appear, 2024.

Xingguang Chen, Fangyuan Zhang, Jinchao Huang, Sibo Wang. Efficient Approximation Framework for Attribute Recommendation. Proceedings of the ACM on Management of Data (SIGMOD), to appear, 2024.

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Qintian Guo, Sibo Wang, Zhewei Wei, Wenqing Lin, Jing Tang. Influence Maximization Revisited: Efficient Sampling with Bound Tightened. ACM Transactions on Database Systems (TODS), 47(3):12:1-12:45, 2022.

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Runhui Wang, Sibo Wang, Xiaofang Zhou. Parallelizing Approximate SingleSource Personalized PageRank Queries on Shared-Memory. International Journal on Very Large Data Bases (VLDBJ), 28(6):923-940, 2019.

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Research Interests

Research Interests
- Chinese Information Processing
- Databases
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KF. Wong is Fellow of Association of Computation Linguistics (ACL). He obtained his Ph.D. from Edinburgh University, Scotland, in 1987. He was a post doctoral researcher in Heriot-Watt University (Scotland), UniSys (Scotland) and ECRC (Germany). At present, he is Professor in the Department of Systems Engineering and Engineering Management, The Chinese University of Hong Kong (CUHK). In parallel, he serves as the Associate Dean (External Affairs) of Engineering, the Director of the Centre for Innovation and Technology (CINTEC), and Associate Director of the Centre for Entrepreneurship (CfE), CUHK. He serves as the President of Asian Federation of Natural Language Processing (AFNLP, 2015-2016), President of the Governing Board of Chinese Language Computer Society CLCS (2015-2017). Also, he was the President of Hong Kong Information Technology Joint Council (2007-2014) and the Vice President of VLDB School China (2005-2013).

His research interest focuses on Chinese computing, database and information retrieval. He has published over 250 technical papers in these areas in different international journals and conferences and books. He is a member of the ACM, Senior Member of IEEE as well as Fellow of BCS (UK), IET (UK) and HKIE. He is the founding Editor-In-Chief of ACM Transactions on Asian Language Processing (TALIP), and serves as associate editor of International Journal on Computational Linguistics and Chinese Language Processing. He was the Conference Co-Chair of NDBC2016 (Shenzhen), BigComp2016 (Hong Kong), NLPCC2015 (Nancheng) and IJCNLP2011 (Thailand); the Finance Chair SIGMOD2007 (Beijing); the PC Cochair of IJCNLP2006 (Jeju, Korea); and the Local Organization Chair of EMNLP-IJCNLP'2019 (Hong Kong). Also, he is the General Chair of the AACL-IJCNLP'2020 (Suzhou). Also he is a Programme Committee member of many international conferences. He was awarded by the HKSAR Government Medal of Honour (MH) for his contribution to information technology development in Hong Kong in 2011, by the Shenzhen Innovation technology Council "Virtual University Campus Outstanding Project Investigator Honor Certificate" and by the Hong Kong Scout Association, the Medal of Long Services in 2013.

Selected Publications

Lingzhi Wang, Xingshan Zeng, Jinsong Guo, Kam-Fai Wong, Georg Gottlob: Selective Forgetting: Advancing Machine Unlearning Techniques and Evaluation in Language Models. AAAI 2025: 843-851

Bojia Zi, Shihao Zhao, Xianbiao Qi, Jianan Wang, Yukai Shi, Qianyu Chen, Bin Liang, Rong Xiao, Kam-Fai Wong, Lei Zhang: CoCoCo: Improving Text-Guided Video Inpainting for Better Consistency, Controllability and Compatibility. AAAI 2025: 11067-11076

Liang Chen, Li Shen, Yang Deng, Xiaoyan Zhao, Bin Liang, Kam-Fai Wong: PEARL: Towards Permutation-Resilient LLMs. ICLR 2025

Bin Liang, Shiwei Chen, Lin Gui, Hui Wang, Yue Yu, Ruifeng Xu, Kam-Fai Wong: Centrality-guided Pre-training for Graph. ICLR 2025

Zezhong Wang, Xingshan Zeng, Weiwen Liu, Liangyou Li, Yasheng Wang, Lifeng Shang, Xin Jiang, Qun Liu, Kam-Fai Wong: ToolFlow: Boosting LLM Tool-Calling Through Natural and Coherent Dialogue Synthesis. NAACL (Long Papers) 2025: 4246-4263

Liang Chen, Yatao Bian, Yang Deng, Deng Cai, Shuaiyi Li, Peilin Zhao, Kam-Fai Wong: WatME: Towards Lossless Watermarking Through Lexical Redundancy. ACL (1) 2024: 9166-9180

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Hongru Wang, Rui Wang, Boyang Xue, Heming Xia, Jingtao Cao, Zeming Liu, Jeff Z. Pan, Kam-Fai Wong: AppBench: Planning of Multiple APIs from Various APPs for Complex User Instruction. EMNLP 2024: 15322-15336

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Wai-Chung Kwan, Huimin Wang, Hongru Wang, Zezhong Wang, Bin Liang, Xian Wu, Yefeng Zheng, Kam-Fai Wong: JoTR: A Joint Transformer and Reinforcement Learning Framework for Dialogue Policy Learning. LREC/COLING 2024: 9578-9588

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BS (Beihang University)
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- Affective Computing
- Human-machine Interaction

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Xixin Wu received his BS, MS and PhD degrees from Beihang University, Tsinghua University and The Chinese University of Hong Kong, respectively. He is currently an Assistant Professor in the Department of Systems Engineering and Engineering Management, CUHK. Before this, he worked as a Research Associate with the Machine Intelligence Laboratory, Engineering Department of Cambridge University, and a Research Assistant Professor at the Stanley Ho Big Data Decision Analytics Research Centre, CUHK. His research interests include generative artificial intelligence, speech and language technologies, affective computing, and human-machine interaction.

Awards
- First place in two tasks of ACII 2022 Affective Vocal Bursts (AV-B) Recognition Competition
- First place in ACL 2022 Doc2Dial Shared Task
- Best paper award, IEEE Robio 2022
- Champion, HKSTP SciTech Challenge 2021

Selected Publications

UniSep: Universal Target Audio Separation with Language Models at Scale, Yuanyuan Wang, Hangting Chen, Dongchao Yang, Weiqin Li, Dan Luo, Guangzhi Li, Shan Yang, Zhiyong Wu, Helen Meng, Xixin Wu, in Proc. ICME, 2025.

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A Hierarchical Regression Chain Framework for Affective Vocal Burst Recognition, Jinchao Li, Xixin Wu*, Kaitao Song, Dongsheng Li, Xunying Liu, Helen Meng, in Proc. ICASSP, 2023 (ACII 2022 Affective Vocal Burst (AV-B) Recognition competition 1st place).

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Research Interests
- Robust optimization
- Risk analytics
- Stochastic programming
- Data-driven optimization
- Optimization in energy and finance

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Huifu Xu is a Professor of the Department of Systems Engineering and Engineering Management, The Chinese University of Hong Kong. Prior to joining CUHK, he was a professor of Operational Research in the School of Mathematical Sciences, University of Southampton and the Director of the Centre of Operational Research, Management Science and Information Technology (2016-2018), one of the largest research centres in the areas of OR, MS and IT. Huifu Xu obtained BSc in computational mathematics and MSc in numerical optimization from Nanjing University in 1980s and PhD from University of Ballarat (Federation University Australia) in 1999. He was a lecturer of Ningbo University from 1989 to 1996 and a postdoctoral research fellow in the Australian Graduate of Management from 1999 to 2002. From 2002, he moved to work in the UK as a lecturer, senior lecturer and professor of operational research in the University of Southampton and City University London (2013-2015).

Huifu Xu's current research is on optimal decision making under uncertainty such as preference robust optimization and distributionally robust optimization which are associated with ambiguity in decision maker's utility preference or risk attitude and distribution of exogenous uncertainty data. His focus is on developing robust models and computational methods for these problems and applying them in finance, engineering and management sciences. He has published more than 80 papers in the international journals of operational research and optimization including Mathematical Programming, SIAM Journal on Optimization, Mathematics of Operations Research and Operations Research. Huifu Xu is an associate editor of Computational Management Science and Mathematical Programming, and a member of Mathematical Optimization Society.

Selected Publications

J. Liu, Z. Chen, H. Xu, Preference ambiguity and robustness in multistage decision making. Mathematical Programming, 2025, 1-93.

S. Guo, H. Xu, S. Zhang, Utility preference robust optimization with moment-type information structure. Operations Research, 2024, 72.5: 2241-2261.

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V. DeMiguel and H. Xu, A stochastic multiple leader Stackelberg model: analysis, computation, and application, Operations Research, 57: 1220–1235, 2009.

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E. Anderson and H. Xu, Epsilon-optimal bidding in electricity markets with discontinuous market distribution function, SIAM Journal on Control and Optimization, 44: 1391-1418, 2005.

H. Xu, Level function method for quasi-convex programming, Journal of Optimization Theory and Applications, 108: 407-437, 2001.

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Research Interests
- Market Frictions
- Mathematical Finance
- Financial Technology

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Chen Yang received a B.Sc. degree in Mathematics and Applied Mathematics from Zhejiang University in 2008, and his Ph.D. degree in Financial Mathematics from National University of Singapore in 2017. Prior to joining the Chinese University of Hong Kong, he was a postdoctoral researcher at ETH Zurich from 2017 to 2019.

Chen Yang's research interests include portfolio selection and asset pricing with market frictions, financial technology, and mathematical finance. His papers have been published in or accepted by leading journals such as The Review of Financial Studies, Management Science, Mathematics of Operations Research, and Mathematical Finance.

Selected Publications

Min Dai, Yaoting Lei, Hong Liu and Chen Yang, "Optimal Tax-Timing with Transaction Costs", Management Science, Accepted for Publication.

Yizhou Cao, Min Dai, Steven Kou, Lewei Li and Chen Yang, "Designing Stablecoins", Mathematical Finance, 35(1):263-294, 2025.

Johannes Muhle-Karbe, Xiaofei Shi and Chen Yang, "An Equilibrium Model for the Cross-Section of Liquidity Premia", Mathematics of Operations Research, 48(3):1423-1453, 2023.

Min Dai, Steven Kou, Mete Soner and Chen Yang, "Leveraged Exchange-Traded Funds with Market Closure and Frictions", Management Science, 69(4):2517-2535, 2023.

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Min Dai, Hong Liu, Chen Yang and Yifei Zhong, "Optimal Tax-timing with Asymmetric Long-term/short-term Capital Gains Tax", The Review of Financial Studies, 28:2687-2721, 2015.

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Research Interests
- Graph Database and Query Processing
- Graph Mining
- Social Networks
- Big Data and Cloud Computing
- Machine Learning in Database

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Dr. Jeffrey Xu Yu is a Professor of the Department of Systems Engineering and Engineering Management, The Chinese University of Hong Kong. His current main research interests include graph algorithms, graph processing systems, graph neural networks, and query processing in database systems. Dr. Yu served/serves in over 300 organization committees and program committees in international conferences/ workshops including the PC Co-chair of APWeb'04, WAIM'06, APWeb/WAIM'07, WISE'09, PAKDD'10, DASFAA'11, ICDM'12, NDBC'13, ADMA'14, CIKM'15 and Bigcomp'17, DSAA'19, CIKM'19, and DASFAA'20, and the conference general co-chair of APWeb'13, ICDM'18 and ADC'22 . Dr. Yu served as an Information Director and a member in ACM SIGMOD executive committee (2007-2011), an associate editor of IEEE Transactions on Knowledge and Data Engineering (2004-2008), and an associate editor in VLDB Journal (2007-2013), and the chair of the steering committee in Asia Pacific Web Conference (2013-2016). Currently, he serves as associate editor in ACM Transactions on Database Systems (TODS) and WWW Journal.

Jeffrey Xu Yu is a member of ACM, a senior member of IEEE, and a member of IEEE Computer Society.

Selected Publications

Jiadong Xie, Jeffrey Xu Yu, and Yingfan Liu: Fast Approximate Similarity Join in Vector Databases, ACM SIGMOD International Conference on Management of Data (SIGMOD'25) 2025.

Rui Li, Zongyan He, and Jeffrey Xu Yu: Join optimization revisited: a novel DP algorithm for join&sort order selection, VLDB Journal, Vol 34, No 3, 2025.

Zongyan He and Jeffrey Xu Yu: A Branch-&-Bound Algorithm for Fractional Hypertree Decomposition, in Proceedings of the VLDB Endowment (PVLDB), Vol 17, No 13, 2024.

Zhixun Li, Yushun Dong, Qiang Liu, and Jeffrey Xu Yu: Rethinking Fair Graph Neural Networks from Re-balancing, in Proceedings of the 30th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (SIGKDD'24), 2024.

Jia Li, Xiangguo Sun, Yuhan Li, Zhixun Li, Hong Cheng, and Jeffrey Xu Yu: Graph Intelligence with Large Language Models with Prompt Learning, in Proceedings of the 30th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (SIGKDD'24), 2024.

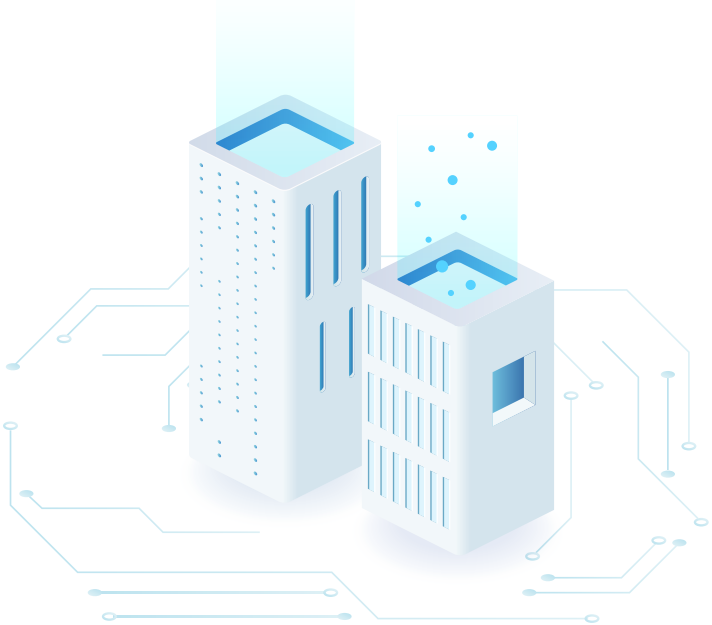
Hao Zhang, Jeffrey Xu Yu, Yikai Zhang, and Kangfei Zhao: Parallel Query Processing: To Separate Communication from Computation. ACM SIGMOD International Conference on Management of Data (SIGMOD'22) 2022.

Kangfei Zhao, Jiao Su, Jeffrey Xu Yu, Hao Zhang: "SQL-G: Efficient Graph Analytics by SQL", IEEE Transactions on Knowledge and Data Engineering, Vol. 33, No. 5, 2021.

Hao Zhang, Jeffrey Xu Yu, Yikai Zhang, and Kangfei Zhao: "Distributed Subgraph Counting: A General Approach", in Proceedings of the VLDB Endowment (PVLDB), Vol. 13, No. 11, 2020.

Yikai Zhang, and Jeffrey Xu Yu: "Unboundedness and Efficiency of Truss Maintenance in Evolving Graphs", in Proceedings of the 2019 ACM SIGMOD International Conference on Management of Data (SIGMOD'19), 2019.

Kangfei Zhao and Jeffrey Xu Yu: "All-in-One: Graph Processing in RDBMSs Revisited", in Proceedings of the 2017 ACM SIGMOD International Conference on Management of Data (SIGMOD'17), 2017.



HO, Sin Cheung
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Research Interests
- Bike sharing
- Vehicle routing
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- Logistics
- Metaheuristics

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Sin C. Ho received her PhD degree from the Department of Informatics, University of Bergen in Norway. Her research is within the development of mathematical models and solution algorithms for decision problems in the areas of transportation and logistics. She is a Chartered Member of the Chartered Institute of Logistics and Transport (CILTHK) and a member of the editorial advisory board of Transportation Research Part E. Before joining CUHK, she has held a faculty position at Aarhus University in Denmark for several years.

Selected Publications

Hu, R., Szeto, W. Y. and Ho, S. C., "Repositioning in bike sharing systems with broken bikes considering on-site repairs ", Transportation Research Part E, 201: 104155, 2025.

Liu, Y., Szeto, W. Y. and Ho, S. C., "A static free-floating bike repositioning problem with multiple heterogeneous vehicles, multiple depots, and multiple visits", Transportation Research Part C, 92: 208-242, 2018.

Ho, S. C., Szeto, W. Y., Kuo, Y. H., Leung, J. M. Y., Petering, M. and Tou, T. W. H., "A survey of dial-a-ride problems: Literature review and recent developments", Transportation Research Part B, 111: 395-421, 2018.

Ho, S. C. and Szeto, W. Y., "A hybrid large neighborhood search for the static multi-vehicle bike-repositioning problem", Transportation Research Part B, 95: 340-363, 2017.

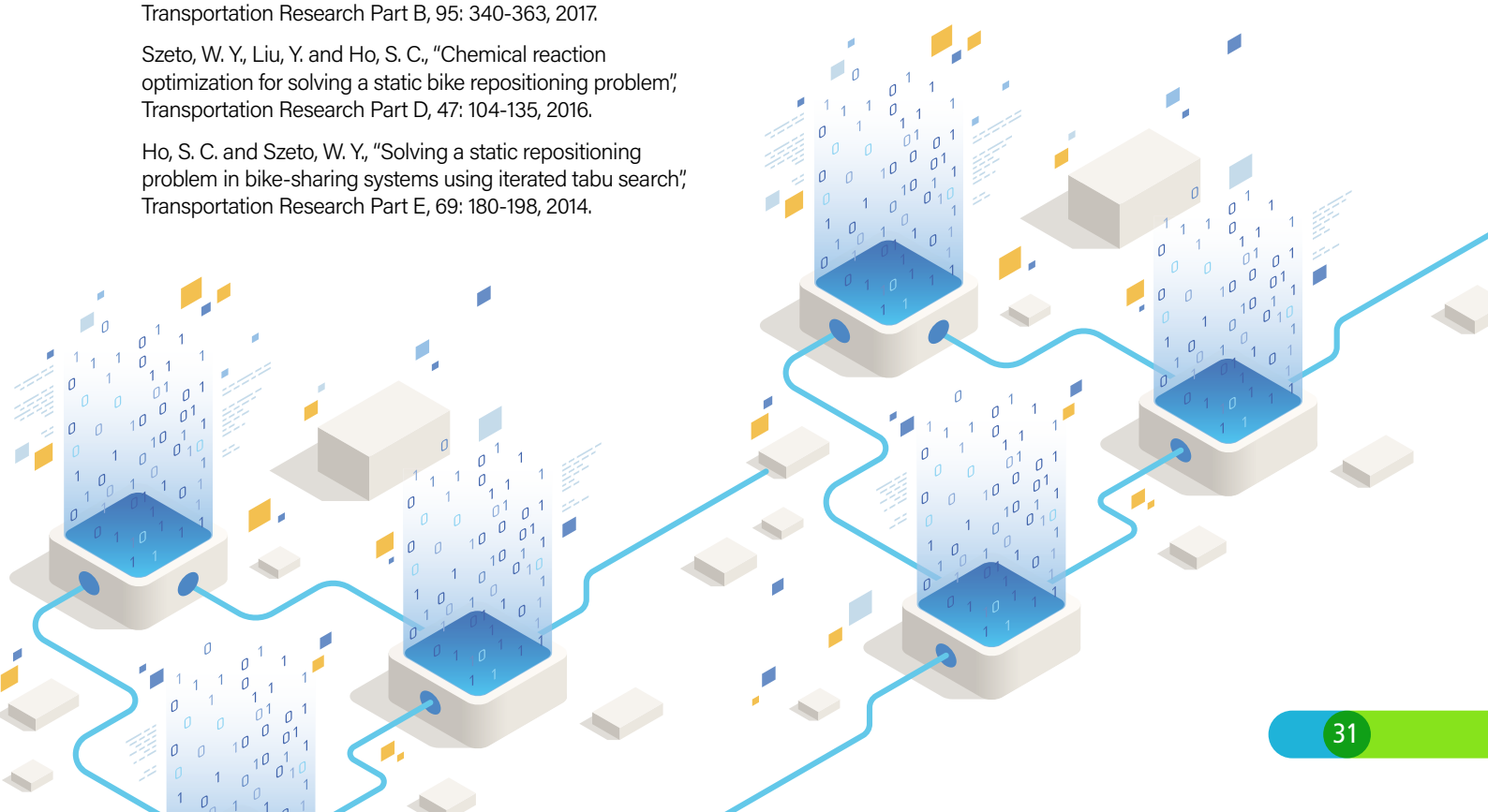
Szeto, W. Y., Liu, Y. and Ho, S. C., "Chemical reaction optimization for solving a static bike repositioning problem", Transportation Research Part D, 47: 104-135, 2016.

Ho, S. C. and Szeto, W. Y., "Solving a static repositioning problem in bike-sharing systems using iterated tabu search", Transportation Research Part E, 69: 180-198, 2014.

Szeto, W. Y., Wu, Y. and Ho, S. C., "An artificial bee colony algorithm for the capacitated vehicle routing problem", European Journal of Operational Research, 215(1): 126-135, 2011.

Ho, S. C. and Leung, J. M. Y., "Solving a manpower scheduling problem for airline catering using metaheuristics", European Journal of Operational Research, 202(3): 903-921, 2010.

Haugland, D., Ho, S. C. and Laporte, G., "Designing delivery districts for the vehicle routing problem with stochastic demands", European Journal of Operational Research, 180(3): 997-1010, 2007



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Research Interests
- Global Optimization
- Nonlinear Integer Programming
- Discrete-Time Optimal Control
- Inventory Control and Supply Chain Management

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NG, Chi-Kong (Kevin) obtained his B.Sc., M.Sc., and M.Phil. degrees from the Hong Kong Baptist University. He received his Ph.D. degree in Systems Engineering and Engineering Management in 2003 from The Chinese University of Hong Kong (CUHK), and is currently a senior lecturer there. His Ph.D. Dissertation, entitled "High Performance Continuous/Discrete Global Optimization Methods," has been awarded the CUHK Young Scholars Dissertation Awards 2003 by CUHK and the Outstanding Ph.D. Thesis Award 2003 by the Faculty of Engineering, CUHK.

Kevin's research interests include theoretical, computational, and practical aspects of global optimization, nonlinear integer programming, discrete time optimal control, inventory control and supply chain management. He has published articles in SIAM Journal on Optimization, Computers & Operations Research, Journal of Global Optimization, Computational Optimization and Applications, etc. He is a member of IEEE, INFORMS, POP, and SIAM.

Selected Publications

Chi-Kong Ng and Duan Li, "One-Parameter Discrete Global Descent Method for Discrete Global Optimization and Nonlinear Integer Programming," submitted for publication.

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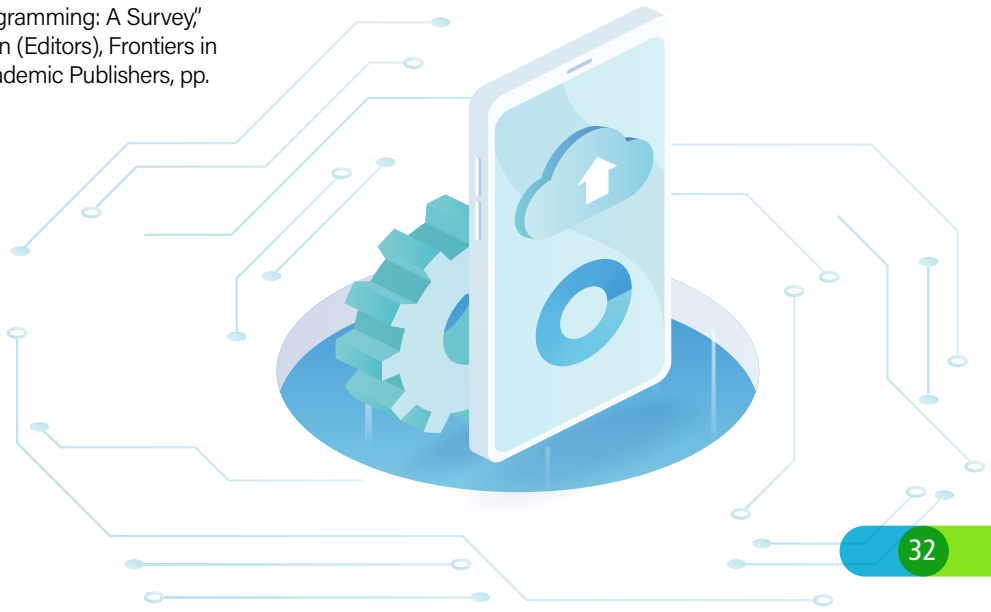

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BS (National Taiwan University)
MS, PhD (Carnegie Mellon University)

Research Interests
- Speech Recognition and Synthesis
- Spoken Language Processing
- Natural Language Processing
- Information Retrieval and Web Search
- Data Mining

Dr. Hsiao-Wuen Hon is a Corporate Vice President at Microsoft, having been with the company since 1995. In 2004, he joined Microsoft Research Asia as Deputy Managing Director, assuming the Managing Director role from 2004 to 2021. Under Dr. Hon's leadership, Microsoft Research Asia has become a world-class research lab, recognized by MIT Technology Review as "the hottest computer lab in the world." From 2014 to 2022, Dr. Hon served as Chairman for Microsoft's Asia Pacific R&D Group, driving the company's research and development strategy in the region and fostering successful collaborations with academia.

Dr. Hon's leadership was further evident when he founded and managed the Microsoft Search Technology Center from 2005 to 2007, leading the development of Microsoft's search product, Bing, in the Asia-Pacific market. His commitment to innovation and development is demonstrated by his significant contributions to Microsoft and the technology sector.

Prior to joining Microsoft Research Asia, Dr. Hon was the founding member and architect of the Natural Interactive Services Division at Microsoft Corporation, overseeing architectural and technical aspects of the award-winning Microsoft Speech Server product, Natural User Interface Platform and Microsoft Assistance Platform. He previously worked at Apple, where he led research and development for Apple's Chinese Dictation Kit.

An IEEE Fellow and a distinguished scientist at Microsoft, Dr. Hon is an internationally recognized expert in speech technology. He has published more than 120 technical papers in international journals and at conferences. He co-authored the book, Spoken Language Processing, a widely used reference and textbook in the field of speech technology. Dr. Hon also holds over three dozen patents in several technical areas.

Dr. Hon received his PhD in Computer Science from Carnegie Mellon University and his B.S. in Electrical Engineering from National Taiwan University.

Selected Publications

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Y. Cao, J. Xu, T.Y. Liu, H. Li, Y. Huang, H.W. Hon, "Adapting ranking SVM to document retrieval", 29th annual international ACM SIGIR-2006 conference, Seattle, WA.

LUO, Zhi Quan Tom
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BS (Peking University)
PhD (Massachusetts Institute of Technology)

Research Interests
- Optimization Methods for Big Datab Analytics
- Complexity and Computational Issues Arising from Signal Processing
- Digital Communication

Zhi-Quan (Tom) Luo is Vice President (Academic) at The Chinese University of Hong Kong, Shenzhen, and the founding Director of the Shenzhen Research Institute of Big Data. He earned his B.S. in Applied Mathematics from Peking University and a Ph.D. in Operations Research from MIT. Before his current roles, he held tenured faculty positions in both Canada and the United States.

Professor Luo is internationally recognized for his expertise in optimization, big data, signal processing, and wireless communications. His outstanding contributions have been recognized by numerous awards, including the 2010 Farkas Prize, the 2012 Paul Y. Tseng Memorial Lectureship, the 2022 Wang Xuan Applied Mathematics Prize, and the 2023 Shenzhen Science and Technology Progress Award (First Place). He is a Fellow of the IEEE, SIAM, the Royal Society of Canada, and a foreign member of the Chinese Academy of Engineering.

In 2020, Professor Luo introduced a pioneering data-driven approach to network optimization, integrating statistical network models with artificial intelligence. This innovative methodology has been deployed in over 30 countries, optimizing 1.8 million base stations worldwide. His work has improved wireless network performance for a quarter of the global population, significantly reduced operational costs and carbon emissions for telecom operators, and generated substantial economic and social benefits on a global scale.

Selected Publications

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Y. Jiao, Y. Gu, T. -H. Chang and Z. -Q. Luo, "Decentralized Rank-Adaptive Matrix Factorization—Part II: Convergence Analysis," in IEEE Transactions on Signal Processing, 2024

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Qingqing Wu, Beixiong Zheng, Changsheng You, Lipeng Zhu, Kaiming Shen, Xiaodan Shao, Weidong Mei, Boya Di, Hongliang Zhang, Ertugrul Basar, Lingyang Song, Marco Di Renzo, Zhi-Quan Luo, Rui Zhang, "Intelligent Surfaces Empowered Wireless Network: Recent Advances and the Road to 6G," in Proceedings of the IEEE, 2024

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Y. -B. Zhao and Z. -Q. Luo, "Dynamic Orthogonal Matching Pursuit for Sparse Data Reconstruction," in IEEE Open Journal of Signal Processing, vol. 4, pp. 242-256, 2023

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Adjunct Professor
PhD - Operations Management (University of Toronto)
MSc - Electronic Engineering (Tsinghua University)
BSc - Electronic Engineering (Tsinghua University)

Research Interests
- Risk Modeling and Analysis
- Machine Learning and Algorithms
- Stochastic Models
- Supply Chain Management

Professor Houmin Yan is Chair Professor of Management Sciences, and director of MSc in Accounting and Finance with AI and Fintech Applications, City University of Hong Kong and Beijing National Accounting Institute. He is also the Director, Hong Kong Laboratory of AI-Powered Financial Technologies, Ltd. He was Dean of the College of Business at the City University of Hong Kong from Jan. 2013 to June 2020 (Acting Dean June 2019-June 2020) . 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, machine learning and algorithms, risk modeling and analysis, 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 a commissioned citation study by Journal of Operations Management on the knowledge evolution in Operations Management over last thirty years, his research work in supply chain coordination has been recognized as part of general knowledge structure for Operations Management of 2000s. 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 Wickham-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 Scheduling and Logistics from the Institute of Industrial Engineers(IIE).

He received his BSc. and MSc. from Tsinghua University, both in electrical engineering, and his Ph.D. from the University of Toronto in business. He is a member of Business Studies, Research Grant Council (RGC), a member of Hongkong Academy of Finance, a member of EQUIS Committee, EFMD, and a member of CIR Committee, AACSB.

Selected Publications

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Lu, Meng; Sethi, Suresh; Xie, Yangyang; Yan, Houmin / Profit Allocation, Decision Sequence and Compliance Aspects of Coordinating Contracts: A Retrospect. May 2019; In: Production and Operations Management. Vol. 28, No. 5, pp. 1222-1237

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Yan, Houmin; Zhou, Xun Yu; Yin, G. / Approximating an optimal production policy in a continuous flow line: Recurrence and asymptotic properties. July 1999; In: Operations Research. Vol. 47, No. 4, pp. 535-549

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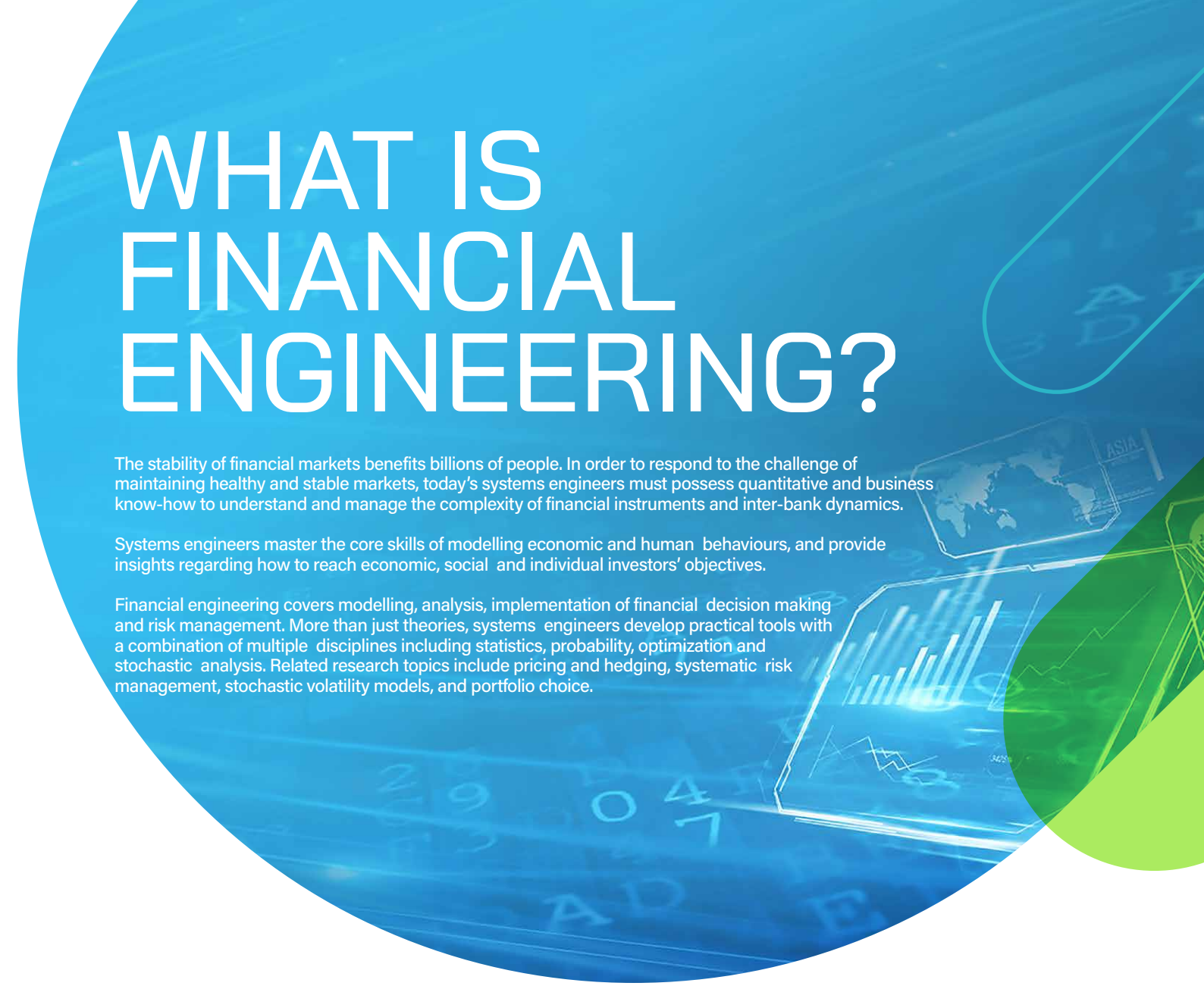
RESEARCH ACTIVITIES

WHAT IS FINANCIAL ENGINEERING?

The stability of financial markets benefits billions of people. In order to respond to the challenge of maintaining healthy and stable markets, today's systems engineers must possess quantitative and business know-how to understand and manage the complexity of financial instruments and inter-bank dynamics.

Systems engineers master the core skills of modelling economic and human behaviours, and provide insights regarding how to reach economic, social and individual investors' objectives.

Financial engineering covers modelling, analysis, implementation of financial decision making and risk management. More than just theories, systems engineers develop practical tools with a combination of multiple disciplines including statistics, probability, optimization and stochastic analysis. Related research topics include pricing and hedging, systematic risk management, stochastic volatility models, and portfolio choice.



Continuous-time Risk-sensitive Reinforcement Learning via Quadratic Variation Penalty

Y. Jia

The risk-sensitive objective arises either as the agent's risk attitude or as a distributionally robust approach against the model uncertainty. In this paper, the risk-sensitive RL problem is shown to be equivalent to ensuring the martingale property of a process involving both the value function and the q-function, augmented by an additional penalty term: the quadratic variation of the value process, capturing the variability of the value-to-go along the trajectory. This characterization allows for the straightforward adaptation of existing RL algorithms developed for non-risk-sensitive scenarios to incorporate risk sensitivity by adding the realized variance of the value process.

First-Loss Capital

X. He

In most U.S. hedge funds, the managers take a performance fee, such as 20%, for any profit they generate for the investors but do not pay in case of a loss. In China private equities and also in some new hedge funds in the United States, the managers, however, need to provide a first-loss capital to absorb the investors' loss and charge a performance fee at a higher rate, e.g., 40%. We study how the first-loss capital can reduce fund risk, improve the well-being of the managers and investors, and separate skilled managers from unskilled ones.

Hedging Periodic Cashflow

C. Yang

Financial products such as Leveraged ETFs involve the hedging of an infinite-horizon cashflow stream, where the hedging occurs in continuous time while the hedging performance is monitored periodically at discrete time points. Traditional theoretical frictionless hedging strategy can cause a considerable amount of market frictional costs and lead to large hedging error. We study how the incorporation of market frictions affects the characteristics of the optimal hedging strategy, and how to strike a balance between minimising the frictions and minimising the hedging error.

High Frequency Trading

N. Chen

High frequency trading (HFT) is to use computers to process market information and make elaborate decisions to "initiate buy/sell orders. As of July 2009, HFT firms account for 73% of all US equity trading volumes." We study how to develop realistic and analytically tractable models for the dynamics of order-driven trading systems The implications on optimal execution and investment strategies will be investigated.

Limit Order Books

X.F. Gao

As a trading mechanism, limit order books have gained growing popularity in equity and derivative markets in the past two decades. The objective of this project is to understand deeper on different time scales, how the price is driven by supply and demand, which is expressed in the geometric property of the time-varying order book shape.

Model-based reinforcement learning in diffusion environments

L. Li

Description: Reinforcement learning (RL) attempts to learn the optimal decision policy by interacting with the unknown environment through trial and error. Many RL algorithms are model free in the sense that they do not learn the environment while learning the optimal policy. However, in many financial applications learning the environment is needed, such as investment and algorithmic trading. In this project, we develop algorithms and theory for model-based RL in diffusion environments and apply them to financial applications.

Multivariate Stress Scenario Selection

D. Ahn

In modern financial systems, stress testing has been considered an important tool to figure out the effect of multiple economic factors on the stability of financial institutions. In usual stress testing, by applying extremeyet- plausible stress scenarios, we compute risk measures that might not be easily captured by analyzing historical market data or by using stochastic models for market prediction. However, due to the complicated nature of the financial systems, it is hard to identify stress scenarios that cause large losses and threaten the stability of the financial system. Such identification of extreme-yetplausible scenarios, called reverse stress testing, can help us understand the potential triggers of risky events and remove the arbitrariness in the scenario selection for stress testing. The aim of this project is thus to provide an optimization approach to reverse stress testing, i.e., choosing the most likely scenarios among scenarios that cause a risk measure exceeding a given threshold.

Realization Utility

X. He

Individual investors derive realization utility: every time they buy a stock, an investment account is created in their mind and will be closed when the stock is sold. They feel good with a realized gain and bad with a realized loss. In this project, we study how the derivation of realization utility affects the investors' trading behavior and accounts for various empirical findings such as disposition effect.

Reinforcement learning for mean-variance efficient portfolio selection

Y. Jia

In markets where stock prices are diffusion processes driven by observable factors that are also diffusion processes yet the coefficients of these processes are unknown, we are interested in how to learn a mean-variance efficient, and hence, Sharpe ratio maximizing portfolio choice. This approach bypasses the specification and estimation of a statistical model for stock price and learns the portfolio choice directly. The empirical results demonstrate that the continuous-time RL strategies are consistently among the best especially in a volatile bear market, and decisively outperform the model-based continuous-time counterparts by significant margins.

Reinforcement learning for optimal execution

L. Li

Description: In this project, we develop reinforcement learning algorithms for the optimal execution problem, where the trader decides how to split a large order into smaller ones to execute over a time horizon to minimize market impact. In practice, the market impact parameters may be difficult to estimate, making RL an attractive approach for this problem.

WHAT IS INFORMATION SYSTEMS?

Information Systems is about data-intensive computing for information processing and intelligence extraction to enable better decision-making and execution for complex systems in our changing society.

In order to leverage today's rapidly-advancing technology, new generations of algorithms and technologies are applied. Systems engineers are well-trained with solid computer-related and programming knowledge for analysing and mining data, building large-scale analytic models, both stochastic and deterministic, creating algorithms for solving problems, executing large-scale simulation models, and allowing users to easily visualize and manipulate the data.

AI for Digital Health

H. Meng

We are developing AI-based speech and language processing technologies for early detection of neurocognitive disorder (NCD, also known as dementia). The use of speech and language in NCD detection offers an accessible and affordable alternative to existing detection approaches, e.g. blood tests, brain scans, etc. We believe that the use of AI, as well as speech and language technologies, in digital health applications will be increasingly important for public health in our society.

Complex Question Answering Via Reasoning Across Multiple Text Passages

W. Lam

Automatic answering natural language queries or questions issued by users can facilitate the development of a wide range of intelligent applications. We intend to investigate a practical setting in which there exists a large collection of text documents. The aim is to infer and find the answer from the document collection given a question issued by the user. We investigate a new framework for answering complex natural language queries and questions capable of conducting reasoning and integrating evidence derived across multiple text snippets or passages from different documents.

Computer-Aided Second Language Learning through Speech-based Human-Computer Interactions

H. Meng

This initiative aims to develop speech and language technologies to support second language learning, especially for Chinese learners of English. We are developing an automatic speech recognizer that can detect and diagnose the learners' pronunciation errors, in order to automatically generate corrective feedback that is helpful for the user. Text-to-speech synthesis technologies are also developed to provide spoken feedback. This project brings together the fields of engineering, linguistics and education. It opens up new opportunities in the area of e-learning and collaborative learning using nextgeneration web technologies.

Please see www.se.cuhk.edu.hk/hccl/languagelearning

Efficient Deep Learning Algorithms for Human Language Big Data

X. Liu

Human languages are natural forms of big data. Statistical language models form key components of many human language technology applications including speech recognition, machine translation, natural language processing, human computer interaction, language learning and handwriting recognition. A central part of language modelling research is to appropriately model long-distance context dependencies. In recent years deep learning based language modelling techniques are becoming increasingly popular due to their strong generalization performance and inherent power in modelling sequence data. The application of deep learning techniques to speech and language processing also opened up a number of key research challenges. The computational cost incurred in training and evaluation significantly limits their scalability and the number of possible application areas. In order to address these issues, This project aims to significantly improve the efficiency and performance of recurrent neural network based deep language modelling approaches on large data sets.

Efficient Random Walk Based Query Processing on Massive Graphs

S. Wang

Random walk based queries on graphs find extensive applications in search engines, social recommendations, community detection, spam detections, and so on. In the era of big data, one big challenge is how to handle the random walk based queries efficiently and effectively since such queries are typically processed in large batches and a regular manner by many IT companies, like Twitter, Pinterest, and Tencent. This project aims to devise more efficient solutions for the random walk based queries by considering many aspects including developing new algorithms with improved time complexity, devising novel index structures with bounded space consumption, exploring new hardware or distributed computing, and considering new models of random walks for improved accuracy.

Generative AI and Conversational AI

H. Meng

This project aims to develop foundation models to support speech and language technologies for human-computer dialog interactions, multi-lingual open-domain question answering, multilingual textto- speech synthesis to support a talking avatar, computer-aided pronunciation training, and a diversity of possible use cases. We are also interested in the use of cross modal generation involving images, text and audio.

Graph data modeling and inference

H.-T. Wai

Inferring graph structure from (behavioral) data is an important topic in data science as the relationship between nodes are often unknown. In this research, we develop novel graph signal processing model and inference methods with improved, explicit bounds on the sampling complexity. These data models stem from opinion dynamics, finance networks, and complex systems, providing the mathematical framework for information flow on a network. We test our methods on real datasets to obtain new insights about the underlying networks. In the case of opinion data, this research also focuses on applications to understand and combat the spread of fake news or adoption of new products.

Graph Algorithms and Systems

J. Yu

Graph has been widely used as a data structure to abstract complex relationships among entities. There exist many large graphs, for example, online bibliographic networks (DBLP, PubMed), online social networks (Facebook, Twitter, Flickr, LinkedIn), Wikipedia, or even the entire WWW. To support graph analytics over large graphs, algorithms are designed and systems are developed to maintain information, understand the complex relationships, and discovery knowledge. There are several challenges. Firstly, many graph analytical tasks are hard problems. To compute the exact solution for such hard problems induces high time complexities, making it impractical to be applied to realworld huge graphs. It needs to design new graph algorithms. Secondly, there are many graph processing systems developed. Such graph processing systems have their own features to deal with certain type of graph tasks efficiently, but not all. It needs to build an unified graph processing system that can efficiently process graph tasks in general. In this project, we concentrate on new algorithms design and graph processing system development.

Highly Natural Chinese Speech Synthesis with a Talking Avatar

H. Meng

We are developing text-to-audiovisual-speech synthesizer that can automatically generate a synthetic speech, together with a talking avatar based on textual input. This avatar can speak in Cantonese or Putonghua. We are working on improving the naturalness of the avatar, both in terms of its spoken expressions, as well as facial expressions and articulatory gestures. This exciting project has many applications, e.g. electronic books, reading aids for the visually impaired, language learning, singing synthesis, etc.

Please see www.se.cuhk.edu.hk/crystal

Information Mining and Discovery from Text Data

W. Lam

Massive amount of information is stored in the form of texts. They can be in the form of unrestricted natural language and in different domains. Some texts are in semistructured form such as Web pages. This project aims at developing new models for discovering new, previously unknown information that is useful for human or for further construction of intelligent systems. Techniques drawn from machine learning, natural language processing, and information retrieval are investigated.

Integration of Classification and Pattern Mining: A Discriminative and Frequent Pattern-based Approach

H. Cheng

Many existing classification methods assume the input data is in a feature vector representation. However, in many tasks, the predefined feature space is not discriminative enough to distinguish different classes. More seriously, in many other applications, the input data has no predefined feature vector, such as transactions, sequences, graphs, and semi-structured data. For both scenarios, a primary challenge is how to construct a discriminative and compact feature set. Besides popularly investigated machine learning and statistical approaches, frequent pattern mining can be considered as another approach. The direction is interesting because frequent patterns are usually statistically significant and semantically meaningful. The objective of this project is to use discriminative frequent patterns to characterize complex structural data and thus enhance the classification power. I developed a framework of discriminative frequent patternbased classification which could lead to a highly accurate, efficient and interpretable classifier on complex data.

Large Scale Graph Embedding

S. Wang

Graph embedding is the task to learn a low-dimensional representation for each node in the graph that preserves the graph topology. Due to its wide applications in graph mining tasks, e.g., link prediction, node classification, and graph clustering, it has attracted a plethora of research works to devise efficient and effective graph embeddings. Recent progress on graph embedding shows that proximity matrix factorization methods gain superb performance on many graph mining tasks. However, all these methods still work on a single machine which limits the scalability of such solutions. On one hand, many companies are deploying their graphs in a distributed setting for more scalable graph data analysis by exploring the computational powers of multiple machines. On the other hand, there usually exist huge graphs in many companies that do not fit into the main memory. For instance, consider the Facebook graph where each user is a node and each friendship is an edge. It includes 1.3 billion users with more than 400 billion edges as of 12/2014. This requires around 3TB to only maintain the graph and the embedding result in the main memory. In fact, it requires even more space due to the intermediate result, e.g., the proximity matrix, which usually requires more memory than the input graph and embedding.

In addition, real-world graphs are dynamically changing. It is desirable to update the graph embedding periodically, say every few weeks. A naive solution is to compute the graph embedding from scratch. However, such a solution is computationally redundant, since the graph updates may be rather small compared to the original graph. Therefore, it is more desirable to incrementally update the embedding according to the past graph embedding results. This tends to be more efficient and saves a huge amount of computational resources.

Motivated by this, the proposed project aims to devise algorithms for scalable graph embedding. We will focus on the proximity matrix factorization-based methods, of which the state-of-the-art solution could not only provide high-quality graph embedding vectors but also have the potential of high scalability. The following aspects will be investigated, including efficient distributed computation of proximity matrix, efficient distributed proximity matrix factorization, and embedding maintenance on dynamic graphs. As an outcome, the project is expected to develop new frameworks that can be used to facilitate graph embedding on graphs up to a trillion-edge scale.

Multimodal Emotion Recognition and Synthesis

X. X. Wu

Emotion artificial intelligence is indispensable for harmonic human-machine interaction. Recent successful achievements in generative AI appeal to further investigation of emotion AI for enhanced generated content fit for various application scenarios. This project aims to develop intelligent interfaces for human-machine interaction via computationally modelling human emotion and generating responses with appropriate emotions according to conversational context. We intend to develop effective multimodal frameworks for emotion recognition and synthesis, by analyzing and generating tone of voice, facial expressions, gestures, etc.

Multi-modal and Multi-lingual Spoken Dialog Systems

H. Meng

We are developing distributed spoken dialog systems that support the languages of Hong Kong (Cantonese, Mandarin and English) as well as human-computer interactions using portable PDAs and smart phones connected over a wireless network. Our systems accept multimodal input via speech, handwriting and pointing; and they deliver multimedia output involving text, audio and video. Users can use these systems for information access in the travel and financial domains. Our systems integrate a plethora of technologies involving speech recognition, natural language understanding, multi-modal dialog modelling and speech synthesis.

Social Media and e-Community Analysis

K.F. Wong

Facebook, Twitter, LinkedIn, etc. are popular social media. Today, they are widely used for sharing opinions on different targets, e.g. services, products, politics etc. Social media is becoming an indispensable way of communication in our daily life. Different from traditional communication, social media provides a platform where people are connected together to form e-communities. Hence, social media brings significant advances to our understanding of social behaviors, and the study of social media is of great importance in sociology, biology, and computer science. The core element in social media is the notion of e-community, which serves the roles of an information generator and propagator, as well as a relationship manager. There is, therefore, a growing research interest in understanding e-communities, which is the target of our research team.

Temporal Information Extraction and Processing

K.F. Wong

Temporal information carries information about changes and time of the changes. It is regarded as an equally, if not more, important piece of information in applications like extracting and tracking information over time or planning and evaluating activities. The conventional information systems may maintain and manipulate the occurrence time of events, but they may not be able to handle users' queries concerning how an event relates to another in time. In this project, we investigate techniques in natural language processing for extracting temporal information from a document and, based on the extracted information, develop techniques in temporal logic inference.

To Support Machine Learning by Database System

J. Yu

In the big data era, machine learning techniques have been extensively studied to learn new things from a huge amount of data, instead of find new things by programming. Given the goal of machine learning is to learn from data, it becomes a natural question how machine learning and database system can be integrated tightly in the same platforms, instead of simply extracting massive data from a database system to conduct machine learning tasks every time when there is such a need, which is with high cost. We concentrate ourselves on supporting machine learning in the kernel of a database system. We focus on query processing techniques, and aim at enhancing query processing to efficiently support machine learning algorithms in a standalone/distributed database system.

WHAT IS LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Hong Kong is one of the world's logistics and supply chain management hubs, which expands to include nonindustrial operations involving supply, distribution, transportation, communication and information handling, medical care and safety. According to The Association for Operations Management (APICS), nowadays supply chain management covers the design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand and measuring performance globally.

To increase the agility and flexibility of today's complex business environment, systems engineers can process huge amounts of business data for decision-making, optimization, and effective execution along the supply chain networks. They possess professional knowledge in the design and control of these operational and information-rich systems, which require the use of many different kinds of scientific management methodologies.

Data-Driven Matching for Impatient and Heterogeneous Demand and Supply

W.L. Liu

This paper develops a framework that integrates finite-sample statistical learning with queueing asymptotic analysis to design matching policies. The stochastic matching model we consider assumes heterogeneous demand (customers) and heterogeneous supply (workers) arrive randomly over time, each with a randomly sampled patience time, and are lost (renege) if forced to wait longer than that time to be matched. Since the inter-arrival and patience time distributions are unknown, matching decisions must be made based on historical (offline) data. We leverage asymptotic analysis to formulate a deterministic, data-driven (fluid) matching problem (DDMP) that approximates the original stochastic matching problem. We establish finite-sample statistical guarantees on the performance gap between the DDMP solution and the ground-truth matching problem solution, which requires a novel uniform error bound involving the patience time quantile function. We show that a discrete-review, estimate-then-match-type matching policy is asymptotically optimal with high probability when arrival rates grow large. Finally, we show that the DDMP can be approximately solved via a mixed-integer linear program, and we quantify the approximation gap and its impact on policy performance.

Energy-Aware and Delay-Sensitive Management of a Drone Delivery System

W.L. Liu

Problem definition: This paper considers a drone delivery system that delivers packages to multiple locations using a model that captures three distinctive features of interest: first, a battery-operated drone that can fly a limited number of distance units on a full battery; second, a set of demand locations with different flight distances and service-level requirements; and third, an adjustable flight speed to trade off energy efficiency for faster deliveries. By leveraging drone speed, job sequencing, and admission control, the system operator strives to achieve two managerial objectives: (i) to minimize energy- and congestion-related costs and (ii) to maximize the use of the battery energy between consecutive battery replacements. Academic/practical relevance: E-commerce and shipping companies worldwide are testing and launching commercial drone delivery services to residences. According to a recent study, such services are expected to grow to $100 billion market by the end of the next decade. Our work focuses on improving drone delivery operations, which can reduce costs and improve user satisfaction. Methodology: Focusing on the first objective, we approximate system dynamics using diffusion processes and derive an optimal control policy for the approximating system. Results: Interpreting that policy in the context of the physical system while taking into account the second objective, we devise an implementable set of speed control, job sequencing, and admission strategies. The sequencing strategy, which selects a portfolio of jobs (termed as an activity) to be accomplished within a full battery cycle, results in a win-win scenario—it allows both objectives to be approximately optimized at the same time. Managerial implications: Using the activity-based prioritization scheme provides opportunities to improve the overall performance of the system. Additionally, to achieve the intended job prioritization, the system operator can rely on a small set of activities that are of equal size to the number of job classes.

Expanding Service Capabilities Through an On-Demand Workforce

W.L. Liu

An on-demand workforce can greatly benefit a traditional call center by allowing it to adjust its service capacity on demand quickly. Despite its conceptual elegance, the operationalization of this process is challenging due to the various sources of randomness involved. The purpose of this paper is to help call centers enhance service levels while keeping operating expenses low by taking advantage of an on-call pool of temporary agents in day-to-day operations. For that purpose, we develop a two-stage decision model in which the first stage seeks the optimal mix of permanent and on-call staff, and the second stage seeks a joint on-demand staffing and call scheduling policy to minimize the associated cost given the base staffing level and the size of the on-call pool. Because the exact analysis of the two-stage decision model seems analytically intractable, we resort to an approximation in a suitable asymptotic regime. In that regime, we characterize the system dynamics of the service operation and derive an optimal joint on-demand staffing and call scheduling policy for the second-stage problem, which in turn is used to find an approximate solution to the first-stage problem. In particular, the derived policy for the second-stage problem involves tapping into the on-call pool to procure a team of on-demand agents when the number of calls to be processed exceeds a certain threshold and dismissing them when it falls below another threshold; additionally, the call scheduling rule shows an unusual pattern due to the interplay between staffing and scheduling decisions. Extensive numerical studies under realistic parameter settings show that the solution approach we propose can achieve significant cost savings.

Impact of Penalty Cost on Customers' Booking Decisions

Z. Y. Long

We study a novel newsvendor-type problem where the information on demand quantity is not exogenously given. The customer needs to make the booking decision based on her estimation on demand, which is affected by the value of shortage penalty cost. The problem is motivated by low-cost airline service practices where passengers need to book baggage allowance for their travel. The baggage overweight price affects the accuracy of passengers' baggage weight estimation and thus their booking quantities. Through stochastic decision models, we analytically characterize the impact of shortage penalty cost on passengers' booking decisions as well as airline's profit. We consider various modeling settings, including a system with multiple passengers and a system where passengers have stochastic inconvenience costs on notcarrying overweight baggage. The results and insights from our study provide guidelines for firms to set their optimal penalty prices.

Preservation of Supermodularity in Parametric Optimization: Necessary and Sufficient Conditions on Constraint Structures

Z. Y. Long

This paper presents a systematic study of the preservation of supermodularity under parametric optimization, allowing us to derive complementarity among parameters and monotonic structural properties for optimal policies in many operational models. We introduce the new concepts of mostly sublattice and additive mostly sublattice, which generalize the commonly imposed sublattice condition significantly, and use them to establish the necessary and sufficient conditions for the feasible set so that supermodularity can be preserved under various assumptions about the objective functions. Furthermore, we identify some classes of polyhedral sets that satisfy these concepts. Finally, we illustrate the use of our results in assemble-to-order systems.

Robust Capacity Planning for Project Management

Z. Y. Long

We consider a significant problem that arises in the planning of many projects. Project companies often use outsourced providers that require capacity reservations that must be contracted before task durations are realized. We model these decisions for a company that, given partially characterized distributional information, assumes the worst-case distribution for task durations. Once task durations are realized, the project company makes decisions about fast tracking and outsourced crashing, to minimize the total capacity reservation, fast tracking, crashing, and makespan penalty costs. We model the company's objective using the target-based measure of minimizing an underperformance riskiness index. We allow for correlation in task performance, and for piecewise linear costs of crashing and makespan penalties. An optimal solution of the discrete, nonlinear model is possible for small to medium size projects. We compare the performance of our model against the best available benchmarks from the robust optimization literature, and show that it provides lower risk and greater robustness to distributional information. Our work thus enables more effective risk minimization in projects, and provides insights about how to make more robust capacity reservation decisions.

Supermodularity in Two- Stage Distributionally Robust Optimization

Z. Y. Long

In this paper, we solve a class of two-stage distributionally robust optimization problems that have the property of supermodularity. We exploit the explicit worst case expectation of supermodular functions and derive the worst case distribution for the robust counterpart. This enables us to develop an efficient method to obtain an exact optimal solution to these two-stage problems. Further, we provide a necessary and sufficient condition for checking whether any given two-stage optimization problem has the supermodularity property. We also investigate the optimality of the segregated affine decision rules when problems have the property of supermodularity. We apply this framework to several classic problems, including the multi-item newsvendor problem, the facility location problem, the lot-sizing problem on a network, the appointment-scheduling problem, and the assemble-to-order problem. Whereas these problems are typically computationally challenging, they can be solved efficiently under our assumptions. Finally, numerical examples are conducted to illustrate the effectiveness of our approach.

Target-based resource pooling problem

Z. Y. Long

We study a two-stage resource pooling problem with multiple resources and customers. The central decision-maker decides the capacity level of the resources within a total budget before the realization of uncertain demand. Then, the fulfillment policy is determined by individual service-level requirements. We use a robust satisficing framework to formulate the problem and allow ambiguity in the distribution of demand. Moreover, we introduce a new utility-based probability distance allowing the model to be solved exactly using a column and constraint generation algorithm. We also provide a more efficient solution method for some special cases. Finally, we conduct experiments for a process flexibility problem, which is an example of the resource pooling problem. We show the advantage of our model over some benchmark approaches, and show the impact of the flexibility structure and correlation between demands.

Target-Oriented Distributionally Robust Optimization and Its Applications to Surgery Allocation

Z. Y. Long

In this paper, we propose a decision criterion that characterizes an enveloping bound on monetary risk measures and is computationally friendly. We start by extending the classical value at risk (VaR) measure. Whereas VaR evaluates the threshold loss value such that the loss from the risk position exceeding that threshold is at a given probability level, it fails to indicate a performance guarantee at other probability levels. We define the probabilistic enveloping measure (PEM) to establish the bound information for the tail probability of the loss at all levels. Using a set of normative properties, we then generalize the PEM to the risk enveloping measure (REM) such that the bound on the general monetary risk measures at all levels of risk aversion are captured. The coherent version of the REM (CREM) is also investigated. We demonstrate its applicability by showing how the coherent REM can be incorporated in distributionally robust optimization. Specifically, we apply the CREM criterion in surgery block allocation problems and provide a formulation that can be efficiently solved. Based on this application, we report favorable computational results from optimizing over the CREM criterion.

The Inventory Routing Problem Under Uncertainty

Z. Y. Long

We study an uncertain inventory routing problem with a finite horizon. The supplier acts as a central planner who determines the replenishment quantities and also, the delivery times and routes to all retailers. We allow ambiguity in the probability distribution of each retailer's uncertain demand. Adopting a service-level viewpoint, we minimize the risk of uncertain inventory levels violating a prespecified acceptable range. We quantify that risk using a novel decision criterion, the service violation index, that accounts for how often and how severely the inventory requirement is violated. The solutions proposed here are adaptive in that they vary with the realization of uncertain demand. We provide algorithms to solve the problem exactly and then, demonstrate the superiority of our solutions by comparing them with several benchmarks.

WHAT IS OPERATIONS RESEARCH?

Operations research combines the applications of optimization, probability and statistics to solve problems in different including business, energy and utilities, health services, financial services and logistics. In order to solve today's complex system environment, operations research often works at the intersection of these disciplines, such as the use of optimization in the estimation of large scale statistical models, optimal collection of information, and stochastic optimization.

Systems engineers know how to develop and use mathematical and statistical models to help solve these decision problems. Like other engineers, they are problem formulators and solvers. Their work requires the formation of a mathematical model of a system and the analysis and prediction of the consequences of alternate modes of operating the system.

A General Framework for Importance Sampling with Latent Markov Processes

Y. Jia

Although stochastic models driven by latent Markov processes are widely used, the classical importance sampling method based on the exponential tilting for these models suffers from the difficulty of computing the eigenvalues and associated eigenfunctions and the plausibility of the indirect asymptotic large deviation regime for the variance of the estimator. We propose a general importance sampling framework that twists the observable and latent processes separately based on a link function that directly minimizes the estimator's variance. As applications, we estimate an overflow probability under a pandemic model and the CoVaR, a measurement of the co-dependent financial systemic risk. Both applications are beyond the scope of traditional importance sampling methods due to their nonlinear structures.

Adaptive Polyhedral Method for Elicitation of Nonlinear Utility and Distortion Functions and Applications

H. Xu

The expected utility theory of Von Neumann-Morgenstern and the dual utility theory of Quig-gin and Yaari are two normative approaches for quantification of a decision maker's (DM's) preference in decision making under uncertainty. The former modifies the numeric values of gains/losses of the DM by a utility function whereas the latter modifies the probability of gains/losses with a distortion function. Identifying the true utility/distortion function which captures the DM's risk preferences is often difficult. Toubia, Hauser, and Simester (2004) pro-pose a powerful polyhedral method to elicit a decision maker's linear utility function in multi-attribute decision making process in marketing. However, it remains as an open question as to whether their method can be extended to nonlinear utility/distortion functions. On the other hand, utility/ distortion functions in many practical decision-making problems are often nonlinear. This project aims to fill out the gap by proposing an adaptive polyhedral method for elicitation of nonlinear utility and distortion Functions. We will embed the new elicitation approach into preference robust optimization models for decision making problems such as medical resource planning where information on the decision maker's utility function and/or distortion function is incomplete and the optimal decision is based on the worst-case utility/ distortion function. The outcomes of this project will make the existing preference robust optimization models more applicable by users.

Best System Identification Using Ordinal Optimization

D. Ahn

Given a number of stochastic systems and a finite sampling budget, we consider an ordinal optimization problem to find an optimal allocation that maximizes the likelihood of selecting the system with the best performance. Generalized linear models are used to describe the relationship between system performance and feature vectors, and unknown parameters are estimated using maximum likelihood estimation. We first formulate the problem in a tractable form by characterizing the structural properties of the optimal allocation with the large deviations theory and then obtain a Euclidean approximation for the optimal allocation. This enables us to design a sampling strategy that is near-optimal particularly when the first- and second-best systems are comparable. The proposed sampling strategy turns out to be not only computationally tractable when the model is correctly specified but also applicable to the case of model misspecification.

Community Responder Crowdsourcing for Time-Sensitive Medical Emergencies

W.L. Liu

In parallel with traditional ambulance dispatch, community first responder (CFR) systems utilize mobile applications to locate and alert nearby registered volunteers (i.e., community responders) for rapid intervention in time-sensitive medical emergencies. A crucial decision is the strategic determination of alert recipients and timings. Insufficient alerts risk delayed intervention, while excessive alerts can reduce future responder engagement. This problem is challenging due to the heterogeneity and uncertainty in responders' behavior, which cannot be precisely predicted. Current CFR systems rely on ad-hoc rules for alert decisions. In this paper, we develop a dynamic programming (DP) approach to model the alert decision problem and a model predictive control (MPC) algorithm that can generate high-quality solutions very quickly. We show that our MPC alert policy maintains the optimal DP policy's structure while challenging existing alert rules. Unlike existing rules that expand the alert radius over time, both our MPC policy and the optimal DP policy strategically narrow the responder pool for alert consideration as time progresses. Our numerical studies reveal further limitations of existing rules: 1) Many CFR systems issue all alerts at the start, ignoring different travel times, response probabilities, and real-time behavior of responders. However, the optimal number of initial alerts is typically small and varies according to responder characteristics; 2) The common practice of alerting the nearest responders first is not always optimal. An optimal strategy might alert a more distant responder if the higher probability of alert acceptance outweighs the longer travel time. Our simulations using real-world CFR system data validate the superiority of our MPC policy in practical situations.

Fast Algorithms for Big Data Analytics

A. M.-C. So

The ubiquity of big datasets and the desire to extract information and knowledge from them have motivated the development of a wide array of data analytics tools in recent years. Many of these tools aim at identifying the most informative features in a dataset according to some criteria. As such, they often require the algorithmic solution of certain (intractable)optimization problems. In this project, we will develop efficient algorithmic implementations of various optimization-based data analytics tools and rigorously establish their performance guarantees (such as convergence rate, approximation quality and statistical properties). This will contribute to both the theory and practice of big data optimization. We will also test our results on various applications, such as recommender systems and systems biology.

Fast Algorithms for Distributionally Robust Optimization

A. M.-C. So

Distributionally robust optimization (DRO) has received much attention lately due to its ability to incorporate data uncertainty in and provide robustness interpretation of optimization models. Many of the DRO problems that arise in practice admit exact convex reformulations and can be solved by off-the-shelf solvers. Nevertheless, the use of such solvers severely limits the applicability of DRO in large-scale problems, as they often rely on general purpose interior-point algorithms. Our goal in this project is to develop practically efficient algorithmic frameworks for tackling various DRO problems.

Financial Systemic Risk

N Chen

Financial institutions knit a complex network. They interconnect with each other directly through active borrowing-and-lending activities and holding significant amount of marketable securities against each other. In normal times, this network helps the institutions diversify their idiosyncratic risks to achieve an efficient allocation of economic resources. However, under crisis conditions, this network can be easily turned into a conduit that propagates failures at one or several institutions to the entire system. Further complicating the matter is a second layer of interconnectedness of the institutions, indirectly via the market. The asset fire sale by a distressed firm will create a significant negative externality for the rest of the system. As the recent financial crisis reveals, these two, direct and indirect but mutually enhancing, channels play an important role in the development of systemic risk. The objectives of my research aims to develop mathematical tools to modeling and analyzing systemic risk, in particular studying how defaults spread through the entire financial system.

Langevin Dynamics for Sampling and Global Optimization

X.F. Gao

Langevin Dynamics (LD) have received considerable attention recently in the field of machine learning and computational statistics. LD has been proven to be powerful techniques for two closelyrelated tasks: 1) globally optimizing a non-convex objective function, and 2) sampling from a high-dimensional probability distribution. Langevin dynamics is based on the overdamped Langevin stochastic differential equation which is reversible in time. In this project, we aim to understand how breaking the reversibility could accelerate the Langevin dynamics for both optimization and sampling.

Multiportfolio Optimization: A Fairness-Aware Target-Oriented Model

Z. Y. Long

We consider a multiportfolio optimization problem in which nonlinear market impact costs result in a strong dependency of one account's performance on the trading activities of the other accounts. Methodology/results: We develop a novel target-oriented model that jointly optimizes the rebalancing trades and the split of market impact costs. The key advantages of our proposed model include the consideration of clients' targets on investment returns and the incorporation of distributional uncertainty. The former helps fund managers to circumvent the difficulty in identifying clients' utility functions or risk parameters, whereas the latter addresses a practical challenge that the probability distribution of risky asset returns cannot be fully observed. Specifically, to evaluate the quality of multiple portfolios' investment payoffs in achieving targets, we propose a new class of performance measures, called fairness-aware multiparticipant satisficing (FMS) criteria. These criteria can be extended to encompass distributional uncertainty and have the salient feature of addressing the fairness issue with the collective satisficing level as determined by the least satisfied participant. We find that, structurally, the FMS criteria have a dual connection with a set of risk measures. For multiportfolio optimization, we consider the FMS criterion with conditional value-at-risk being the underlying risk measure to further account for the magnitude of shortfalls against targets. The resulting problem, although nonconvex, can be solved efficiently by solving an equivalent converging sequence of tractable subproblems. Managerial implications: For the multiportfolio optimization problem, the numerical study shows that our approach outperforms utility-based models in achieving targets and in out-of-sample performance. More generally, the proposed FMS criteria provide a new decision framework for operational problems in which the decision makers are target-oriented rather than being utility maximizers and issues of fairness and ambiguity should be considered.

Multi-Attribute Utility Preference Robust Optimization and Robust Spectral Risk Optimization

H. Xu

Decision maker's preference in utility or risk determines which utility function or risk measure to use in an optimal decision making problem.

Ambiguity arises when there is incomplete information about decision maker's preference and such ambiguity is ubiquitous in multi-attribute decision making problems such as healthcare management, network management, airport operations management, finance and supply chain management.

In this project, we will propose various preference robust optimization models which can be effectively used to mitigate the risks arising from the endogenous preference uncertainty, and develop efficient computational methods for solving the resulting robust optimization problems. We will also develop the underlying theory which can be effectively used to examine stability of the proposed models and numerical schemes in a data-driven environment.

Nonconvex Optimization and Global Optimization

D. Li and C. K. Ng

The research goal is to develop equivalent transformations for generating a saddle point for nonconvex optimization problems. A saddle point condition is a sufficient condition for optimality. A saddle point can be generated in an equivalent representation space for nonconvex optimization problems that do not have a saddle point in their original settings. Certain equivalent transformations may convexify the perturbation function and a zero duality gap can be thus achieved. This investigation would lead to some efficient dual search algorithms that ensure the global optimality for a class of nonconvex optimization problems.

Nonconvex Optimization for Big Data Analysis: Theory and Practice

A. M.-C. So

Optimization is now widely reckoned as an indispensable tool in big data analysis. Although convex optimization remains a powerful, and is by far the most extensively used, paradigm for tackling big data applications, we have witnessed a shift in interest to non-convex optimization techniques over the last few years. Given the potential of non-convex optimization techniques for dealing with big data applications, our goal is to elucidate common structures that are present in the non-convex formulations of various applications from machine learning, signal processing, and statistics, and to demonstrate how such structures can be exploited in the design and analysis of numerical methods that are suitable for large-scale problems.

Nonlinear Integer Programming

D. Li and C. K. Ng

The research goal is to establish convergent duality theory and to develop efficient solution algorithms for largescale nonlinear integer programming problems. The fundamental target underlying our theoretical development is to eliminate duality gap in the classical Lagrangian dual formulation. We have developed nonlinear Lagrangian theory that has yielded several new dual formulations with asymptotic zero duality gap. The key concept is the construction of a nonlinear support for a nonconvex piecewise-constant perturbation function. Our numerical implementation of a duality-gap reduction process relies on some novel cutting procedures. Performing objectivelevel cut, objective contour cut or domain cut reshapes the perturbation function, thus exposing eventually an optimal solution to the convex hull of a revised perturbation function and guaranteeing a zero duality gap for a convergent Lagrangian method. Applications include nonlinear knapsack problems, constrained redundancy optimization in reliability networks, and optimal control problems with integer constraints.

Robust Data-Driven Design of a Smart Cardiac Arrest Response System

W.L. Liu

This paper studies the data-driven design of a smart emergency response system for out-of-hospital cardiac arrest (OHCA) that involves drones for automatic external defibrillator delivery and community responders alerted via a mobile application, in addition to ambulances. Our study is motivated by the widespread exploration of drones for delivery service, and the emergence of mobile applications that crowdsource community for emergency response. Based on a historical OHCA dataset with community responders' response records from Singapore, we develop a robust joint deployment model of drone and ambulance to maximize the survivability of the response system while accounting for data uncertainty in OHCA occurrence and responders' behavior. We discretize the planning area into finite demand regions, and allow different regions to have different OHCA demand rates, alert response probabilities and alert response time distributions from responders. Each of these attributes is only known to reside in an uncertainty/ambiguity set constructed from historical data. Our objective is to maximize the worst-case demand-weighted survival rate in the presence of uncertainty. We reformulate the resulting robust deployment model as a mixed-integer linear program, which can be efficiently solved by a proposed row-and-column generation algorithm with convergence guarantee. We illustrate our model and solution approach using real data from Singapore. We find that (i) hedging against uncertainty leads to a higher survival rate of the response system, compared to a sample average approximation deployment approach; (ii) while adding more drones/ambulances to the system exhibits diminishing return, a few drones are sufficient to increase the survival rate dramatically; and (iii) the impact of the behavior of responders on survival outcomes is more significant than that of simply adding drones/ambulances.

Robust Mechanism for Risk Management in Absence of Complete Information on Risk Preference

H. Xu

Quantitative measure of risk is a key element in risk management for many financial institutions and regulatory authorities.

Over the past few decades, many risk measures have been introduced. In all of these research, it is assumed that the information on decision maker's risk preference is complete.

In this project, we propose to study robust mechanisms for quantitative risk measurement and management where decision maker's risk preference is ambiguous.

We focus on the distortion risk measure which allows us to use a distortion functional to characterize a decision maker's risk preference and construct the ambiguity set in the absence of complete information of the true preference.

We propose to develop effective elicitation procedures to construct the ambiguity set and numerical schemes for computing the robust risk measure.

As an application, we apply the proposed robust models to capital allocation problems. This research fills out an important gap in the area of risk measurement and risk management and will have some direct and/or indirect impact on behavioural economics.

Robust Satisficing

Z. Y. Long

We present a general framework for robust satisficing that favors solutions for which a risk-aware objective function would best attain an acceptable target even when the actual probability distribution deviates from the empirical distribution. The satisficing decision maker specifies an acceptable target, or loss of optimality compared with the empirical optimization model, as a trade-off for the model's ability to withstand greater uncertainty. We axiomatize the decision criterion associated with robust satisficing, termed as the fragility measure, and present its representation theorem. Focusing on Wasserstein distance measure, we present tractable robust satisficing models for risk-based linear optimization, combinatorial optimization, and linear optimization problems with recourse. Serendipitously, the insights to the approximation of the linear optimization problems with recourse also provide a recipe for approximating solutions for hard stochastic optimization problems without relatively complete recourse. We perform numerical studies on a portfolio optimization problem and a network lot-sizing problem. We show that the solutions to the robust satisficing models are more effective in improving the out-of-sample performance evaluated on a variety of metrics, hence alleviating the optimizer's curse.

Statistical Robustness of Stochastic Generalized Equations

H. Xu

Stochastic generalized equations (SGE) provide a unified framework for characterizing the first order optimality and equilibrium conditions of many decision making problems with random data.

The current research of SGE focuses on asymptotic convergence of the solutions obtained from solving the sample average approximated SGE (SAA solution in short) to the true solution of the SGE and uses the former to construct a confidence region of the latter.

A key assumption of the research is that sample data are generated by the true probability distribution which means that they do not contain noise.

In data-driven problems, data from real-world experiments are often corrupted with outliers and/or exhibiting heavy tails.

In this project, we aim to address the issue by developing a new theory and method which builds upon robust statistics for analyzing SAA solutions in a data-driven environment where all data are potentially corrupted with applications in stochastic equilibrium problems and machine learning.

Stochastic and Dynamical Optimization Techniques for Machine Learning

H.-T. Wai

The recent success of machine learning is inseparable from the advancements of stochastic optimization techniques. We look at two different directions in this research. The first one deals with big-data' spread across a network of machines. We develop new optimization algorithms that are adaptable to a distributed setting and are provably efficient, applying the problems such as matrix completion, logistic regressions, etc., as well as resource allocation problems in cyber-physical systems. The second one deals with reinforcement learning (RL) which has been applied to complicated tasks such as Go game, Starcraft as well as self driving cars. However, the theoretical analysis of the algorithms used in RL is rare and many applications rely on mere heuristics. We analyze reinforcement learning algorithms as optimization methods that process dynamical data obtained from interacting with the environment. Particularly, we draw connections to the rich theories of control systems and stochastic optimization.

PROGRAMMES

UNDERGRADUATE PROGRAMMES

The Department offers two Undergraduate Programmes, namely, Bachelor of Engineering in Financial Technology and Bachelor of Engineering in Systems Engineering and Engineering Management. Programme details are provided in the following paragraphs.

Scholarships

To help eligible students with financial need, the HKSAR Government has made provisions for grants and loans through the Joint Committee on Student Finance. The University and the Faculty offer Admission Scholarships to newly admitted students covering JUPAS, Non-JUPAS, International and Mainland students with excellent entrance grades in public examinations. The University and its constituent colleges also administer their own scholarships, bursaries, loans, and campus work schemes. There is also a number of scholarships specifically for students in the Department of Systems Engineering and Engineering Management, such as the Department of SEEM Scholarship. Students may also obtain financial assistance from the schemes of Student Travel Loans, the Summer Subsistence Loans, University Bursaries and Loans, Emergency Bursaries and Loans, Student Campus Work Schemes, etc. Further details are available at the Office of Admissions and Financial Aid and the General Office of the Department.

B.Eng. in FINANCIAL TECHNOLOGY (FTEC)

Admissions

According to University regulations, applicants seeking admission to a course of study leading to a Bachelor's degree of the University should satisfy the minimum entrance requirements of the University and the programme concerned.

The FTEC programme accepts Year 1 JUPAS (JUPAS Code JS4428) and Non-JUPAS (Local, International and Mainland) students. Please refer to https://fintech.se.cuhk.edu.hk for details. For details of the admission score, please scan the QR code.

Curriculum

Recommended Study Plan

Students are required to complete a minimum of 75 units of courses as follows:

(i) Faculty Package	9 units
(ii) FinTech Foundation Courses	13 units
(iii) Required Courses	39 units
(iv) Elective Course	14 units
Total:	75 units

Term 1

	Course Title	Unit
FINA2310	Fundamentals of Business Finance	3
ENGG1125/ESTR1007	Single Variable Calculus for Engineers	3
		6

Term 2

	Course Title	Unit
ENGG1110/ESTR1002	Problem Solving By Programming	
ENGG1120/ESTR1005	Linear Algebra for Engineers	6
ENGG1111	AI Literacy Workshop (0 unit)	
ECON2011	Basic Microeconomics	6
ENGG1130/ESTR1006	Multivariable Calculus for Engineers	
		12

Term 3

	Course Title	Unit
AIST1110	Introduction to Computing Using Python/	
CSCI1120/ESTR1100/ CSCI1130/ESTR1102	Introduction to Computer Using C++/ Introduction to Computing Using Java	
ENGG2440/ESTR2004	Discrete Mathematics for Engineers	11
ENGG2760/ESTR2018	Probability for Engineers	
SEEM2520	Fundamentals in Financial Engineering and Financial Technology	
		11

Term 4

	Course Title	Unit
CSCI2100/ESTR2102	Data Structures	
ENGG2780/ESTR2020	Statistics for Engineers	
FTEC2001	FinTech Regulation and Legal Policy	11
FTEC2101/ESTR2520	Optimization Methods	
FTEC2602	Financial Technology Practicum	
		11

Term 5

	Course Title	Unit
FTEC3001/	Financial Innovation and Structured Products	9
FTEC3002	Introduction to Financial Infrastructures	
FTEC4003	Data Mining for FinTech	
SEEM3590/ESTR3509	Investment Science	
		9

Term 6

	Course Title	Unit
FTEC3001/	Financial Innovation and Structured Products	6
FTEC3002	Introduction to Financial Infrastructures	
SEEM3550/ESTR3506	Fundamentals in Information Systems	
	Major Elective for respective stream	3
		9

Term 7

	Course Title	Unit
FTEC4998	Final Year Project I	3
	Major Electives for respective stream	6
		9

Term 8

	Course Title	Unit
FTEC4999	Final Year Project II	3
	Major Electives for respective stream	5
		8

Recommended Elective Courses

14 units of courses (At least 6 units from FTEC4001, 4002, FTEC4005, 4006, 4007, 4008, and IERG4004; and courses from 3 other subject areas).

ACCT2111	Introductory Financial Accounting
AIST4010/ESTR4140	Foundation of Applied Deep Learning
CSCI2040	Introduction to Python
CSCI2120	Introduction to Software Engineering
CSCI3150/ESTR3102	Introduction to Operating Systems
CSCI3160/ESTR3104	Design and Analysis of Algorithms
CSCI3320	Fundamentals of Machine Learning
CSCI4130/IERG4130/ ESTR4306	Introduction to Cyber Security
CSCI4160/ESTR4104	Distributed and Parallel Computing
CSCI4180/ESTR4106	Introduction to Cloud Computing and Storage
CSCI4430/IERG3310/ ESTR3310/ESTR4120	Data Communication and Computer Networks or Computer Networks
ECON2021	Basic Macroeconomics
ENGG1820	Engineering Internship
FINA3020	International Finance
FINA3030	Management of Financial Institutions
FINA3070	Corporate Finance: Theory and Practice
FINA3210	Risk Management and Insurance
FINA4010	Security Analysis
FTEC4001	Advanced Database Technologies
FTEC4002	Behavioral Analytics
FTEC4005	Financial Informatics
FTEC4006	Internet Finance
FTEC4007	Introduction to Blockchain and Distributed Ledger Technology
FTEC4008	Natural Language Processing for FinTech
IERG4004	E-payment Systems and Cryptocurrency Technologies
IERG4080/ESTR4312	Building Scalable Internet-based Services
IERG4210	Web Programming and Security
MKTG4120	Quantitative Marketing
SEEM3410	System Simulation
SEEM3450/ ESTR3502	Engineering Innovation and Entrepreneurship
SEEM3580	Risk Analysis for Financial Engineering
SEEM4730/ ESTR4508	Data Analytics Models and Methods for Financial Engineering and Fintech
SEEM4760/ESTR4512	Stochastic Models for Decision Analytics

B.Eng. in

SYSTEMS ENGINEERING AND ENGINEERING MANAGEMENT (SEEM)

Admissions

According to University regulations, applicants seeking admission to a course of study leading to a Bachelor's degree of the University should satisfy the minimum entrance requirements of the University and the programme concerned.

The SEEM programme accepts Year 1 JUPAS (JUPAS Code JS4458) and Non-JUPAS (Local, International and Mainland) students. Please refer to https://seem.se.cuhk.edu.hk for details. For details of the admission score, please scan the QR code.

Curriculum

There are two streams of specialization: Business Information Systems, Decision Analytics. Students may choose to specialize in one of the two streams and select courses as prescribed. A student who does not wish to specialize in any of the two streams should follow a study scheme devised with the advice of the academic advisers of the Department.

Recommended Study Plan

Students are required to complete a minimum of 75 units of courses as follows:

(i) Faculty Package	9 units
(ii) Foundation Courses	18 units
(iii) Required Courses	30 units
(iv) Six Elective Courses	18 units
Total:	75 units

Term 1

	Course Title	Unit
ENGG1110/ESTR1002	Problem Solving By Programming	
ENGG1125/ESTR1007	Single Variable Calculus for Engineers	6
ENGG1111	AI Literacy Workshop (0 unit)	
		6

Term 2

	Course Title	Unit
ENGG1120/ESTR1005	Linear Algebra for Engineers	3
ENGG1130/ESTR1006	Multivariable Calculus for Engineers	
ENGG1310/ESTR1003/	Engineering Physics: Electromagnetics, Optics and Modern Physics	
ENGG2720/ESTR2014/	Complex Variables for Engineers	
ENGG2740/ESTR2016/	Differential Equations for Engineers	5
PHYS1003/	General Physics for Engineers	
PHYS1110/	Engineering Physics: Mechanics and Thermodynamics	
SEEM2460/ESTR2540	Introduction to Data Science	
		8

Term 3

	Course Title	Unit
CSCI1120/1130/ ESTR1100/1102	Introduction to Computing Using C++/ Introduction to Computing Using Java	11
ENGG2440/ESTR2004	Discrete Mathematics for Engineers	
ENGG2760/ESTR2018	Probability for Engineers	
SEEM2440/ESTR2500	Engineering Economics	
		11

Term 4

	Course Title	Unit
CSCI2100/ESTR2102	Data Structures	9
ENGG2780/ESTR2020	Statistics for Engineers	
SEEM2420	Operations Research I	
SEEM2602	Systems Engineering Practicum	
		9

Term 5

	Course Title	Unit
CSCI2040	Introduction to Python	8
SEEM3410	System Simulation	
SEEM3440/ESTR3500	Operations Research II	
	Major Elective for respective stream	3
		11

Term 6

	Course Title	Unit
SEEM3550/ESTR3506	Fundamentals in Information Systems	6
SEEM3650/ESTR3516	Fundamentals in Decision and Data Analytics	
	Major Elective for respective stream	3
		9

Term 7

	Course Title	Unit
SEEM4998	Final Year Project I	3
	Major Electives for respective stream	6
		9

Term 8

	Course Title	Unit
SEEM3450/ESTR3502	Engineering Innovation and Entrepreneurship	6
SEEM4999	Final Year Project II	
	Major Electives for respective stream	6
		12

Recommended Elective Courses

Students choosing a stream of specialization should take at least 6 courses (2 stream required and 4 stream elective courses) from the corresponding list for their stream of specialization.

Business Information Systems (BIS)	
SEEM3430	Information Systems Analysis and Design
SEEM4540	Open Systems for E-Commence
AIST3510/SEEM3510	Human and Computer Interaction
CSCI4140	Open Source Software Project Development
ENGG1820	Engineering Internship (1 Unit)
FTEC4001	Advanced Database Technologies
FTEC4005	Financial Informatics
FTEC4007	Introduction to Blockchain and Distributed Ledger Technology
IERG4210	Web Programming and Security
SEEM3460/ ESTR3504	Computer Processing System Concepts
SEEM3490	Information Systems Management
SEEM3680/ ESTR3512	Technology, Consulting and Analytics in Practice
SEEM4570	System Design and Implementation
SEEM4630	E-Commerce Data Mining

Decision Analytics (DA)	
SEEM3620/ESTR3514	Introduction to Logistics and Supply Chain Management
SEEM4760/ESTR4512	Stochastic Models for Decision Analytics
ENGG1820	Engineering Internship (1 Unit)
FTEC4002	Behavioral Analytics
FTEC4005	Financial Informatics
MKTG2010	Marketing Management
SEEM2520	Fundamentals in Financial Engineering and Financial Technology
SEEM3500	Quality Control and Management
SEEM3580	Risk Analysis for Financial Engineering
SEEM3590/ESTR3509	Investment Science
SEEM3630/ESTR3510	Service Management
SEEM4630	E-Commerce Data Mining
SEEM4670	Service Systems
SEEM4720/ESTR4506	Computational Finance
SEEM4730/ESTR4508	Data Analytics Models and Methods for Financial Engineering and Fintech
SEEM4750/ESTR4510	Advances in Logistics and Supply Chain Management

POSTGRADUATE PROGRAMMES

M. Phil. – Ph.D. Programme in
SYSTEMS ENGINEERING AND ENGINEERING MANAGEMENT

Admission Criteria

The Ph.D. programme in SEEM normally requires the candidate to hold a research-based Master degree in engineering, applied mathematics, computer science, or related areas. The M.Phil. programme in SEEM normally requires the candidate to hold a bachelor degree in engineering, applied mathematics, computer science, or related areas. Exceptional candidates with a bachelor degree may apply directly to the Ph.D. Programme.

Applicants must meet the general qualifications required for admission to the Graduate School http://www.gs.cuhk.edu.hk/page/EntryRequirements

All applicants must also fulfil the "English Language Proficiency Requirement" as stipulated by the Graduate School before being considered for admission. Please refer to the "Postgraduate Prospectus" of the Chinese University of Hong Kong for details. Please refer to Admission On-line of CUHK for more information: https://www.gs.cuhk.edu.hk/admissions/

Application Procedures

Applicants can apply for either M.Phil. or Ph.D. programme. The applications may be made in September for admission in August of the following year. Ph.D. applications during other periods will be subject to the available places. Please submit online application form to https://www.gs.cuhk.edu.hk/admissions/ and send the supporting documents (such as TOEFL, and GRE General Test scores) to our Department. An applicant should also have the following credentials sent separately to the Department as early as possible:

- One official transcript of academic record, to be sent by the original university/institution; the institution should be requested to indicate the programme that the candidate applies for;
- Proof of English Language proficiency

Curricula

An M.Phil. student in this Division is required to take at least 4 courses with a total of 12 units. A Ph.D. student is required to take at least 6 courses with a total of 18 units. Among the 6 courses, at least 4 courses with a total of 12 units are required to be completed during the pre-candidacy stage, including at least 1 faculty core course. Moreover, a Ph.D. student must fulfil the candidacy requirements within the maximum period of his/her pre-candidacy stage before the advancement to the post-candidacy stage. In addition, all M.Phil. and Ph.D. students must register for the Research for Thesis course (SEEM8003, SEEM8006 & SEEM8012). Exemption to any of the above requirements must be approved by the Division Head on a case-by-case basis.

Area I: Operations Research	
SEEM5160	Advanced Data Science for Systems Engineering
SEEM5350	Numerical Optimization
SEEM5380	Optimization Methods for High-Dimensional Statistics
SEEM5390	Stochastic Optimization and Risk Management
SEEM5410	Optimal Control
ENGG5501	Foundations of Optimization (SEEM5520 Optimization I)
SEEM5580	Advanced Stochastic Models
SEEM5650	Integer Programming

Area II: Information Systems	
SEEM5010	Advanced Database and Information Systems
SEEM5020	Algorithms for Big Data
SEEM5030	Generative Artificial Intelligence
SEEM5160	Advanced Data Science for Systems Engineering
SEEM5330	Speech and Language Processing
SEEM5640	Conversational AI Systems
SEEM5680	Text Mining Models and Application

Area III: Engineering Management	
SEEM5390	Stochastic Optimization and Risk Management
SEEM5580	Advanced Stochastic Models
ENGG5501	Foundations of Optimization (SEEM5520 Optimization I)

Area IV: Financial Engineering	
SEEM5160	Advanced Data Science for Systems Engineering
SEEM5340	Stochastic Calculus
SEEM5360	Term Structure Modeling of Interest Rates
SEEM5390	Stochastic Optimization and Risk Management
SEEM5410	Optimal Control
SEEM5570	Numerical Methods in Finance
SEEM5670	Advanced Models in Financial Engineering

Other SEEM courses	
SEEM5120	Advanced Topics in Systems Engineering and Engineering Management (I)
SEEM5121	Advanced Topics in Systems Engineering and Engineering Management (II)
SEEM5201	Seminars in Systems Engineering and Engineering Management (I)
SEEM5202	Seminars in Systems Engineering and Engineering Management (II)

Faculty core courses			
ENGG5101	Advanced Computer Architecture	ENGG5301	Information Theory
ENGG5103	Techniques for Data Mining	ENGG5303	Advanced Wireless Communications
ENGG5104	Image Processing and Computer Vision	ENGG5383	Applied Cryptography
ENGG5105	Computer and Network Security	ENGG5392	Lightwave System Technologies
ENGG5106	Information Retrieval and Search Engines	ENGG5402	Advanced Robotics
ENGG5108	Big Data Analytics	ENGG5403	Linear System Theory and Design
ENGG5202	Pattern Recognition	ENGG5404	Micromachining and Microelectromechanical Systems
ENGG5281	Advanced Microwave Engineering	ENGG5501	Foundations of Optimization
ENGG5282	Nanoelectronics	ENGG5601	Principles of Biomechanics and Biomaterials
ENGG5291	Fiber Optics: Principles and Technologies	ENGG5781	Matrix Analysis and Computations

Presentation and Seminar Requirements

Each Ph.D. (post-candidacy) student is required to give a presentation on his/her research progress before his/her Thesis Advisory Committee and submit a research report during his/her normative period of study. In addition, he/she must complete the SEEM seminar courses (SEEM5201 and SEEM5202) in his/her first year of study.

Financial Aid

All full-time M.Phil. and Ph.D. students receive financial support. This could be:

1. Postgraduate Studentships: For 2025-2026, the monthly stipend is around HK$19,100 which is non-taxable. The amount may be adjusted annually to accommodate cost-of-living adjustments. Students with postgraduate studentships are generally required to take up some tutoring duties;

2. Scholarships and Bursaries: There are a number of scholarships and bursaries available to eligible students.

M.Sc. Programme in

E-COMMERCE AND LOGISTICS TECHNOLOGIES

The Programme focuses on information and logistics technologies that support Internet business, and aims at training a new generation of talents in both the management and engineering aspects of E-Commerce and Logistics Technologies.

Admission Criteria

An applicant should have:

1. graduated from a recognized university and obtained a Bachelor's degree in engineering, science, business administration or related fields, normally with Second Class Honours or higher, or an average grade of B or better in his undergraduate courses; or
2. completed a course of study in a tertiary educational institution and obtained professional or similar qualifications equivalent to an honours degree in related fields.

All applicants must also fulfil the "English Language Proficiency Requirement" as stipulated by the Graduate School before being considered for admission. Please refer to the "Postgraduate Prospectus" of The Chinese University of Hong Kong for details. Please refer to Admission Online of CUHK for more information: https://www.gs.cuhk.edu.hk/admissions/

Curriculum

All students are required to take a minimum of 8 postgraduate courses (24 credits in total) within a normal period of two years (Part-time mode) or one-year (Fulltime mode) of which 4 should be required courses and 4 elective courses. An exemption from a required course may be sought provided that the student has sufficient background and knowledge in the required course. The exempted course must be replaced with an approved elective course. Other M.Sc. courses from the Faculty of Engineering may be taken as electives with the approval of the Division Head. The degree of Master of Science will be conferred upon students who have completed the prescribed coursework with a cumulative grade-point average of 2.0 or above.

Required Courses

ECLT5710	Fundamentals of E-Commerce Technologies	
ECLT5720	Electronic Payments Systems	
ECLT5930	Engineering Economics	
Either	ECLT5730	Logistics Management
or	ECLT5940	Supply Chain Management

Elective Courses

A student should choose at least two courses from each area:

Area I: Internet and Information Systems	
ECLT5810	E-Commerce Data Mining Techniques
ECLT5820	Distributed and Mobile Systems
ECLT5830	Network and Web Programming
ECLT5840	Open Systems for E-Commerce
*ECLT5850	Project I in E-Commerce and Logistics Technologies
*ECLT5960	E-Commerce and Logistics Technologies Internship

Area II: Enterprise Solutions	
ECLT5910	Information Technology Management
ECLT5920	Decision Methodologies with Financial Application
ECLT5940	Supply Chain Management
*ECLT5950	Project II in E-Commerce and Logistics Technologies
*ECLT5960	E-Commerce and Logistics Technologies Internship
SEEM5810	Machine Intelligence and Systems Engineering

* Among these courses, only one can be countedtowards the minimum graduation requirements

M.Sc. Programme in

SYSTEMS ENGINEERING AND ENGINEERING MANAGEMENT

This taught programme is offered with the following objectives:

1. to provide advanced training for engineers and professionals who aspire to take up more management responsibilities in their careers, and
2. to offer students a well-rounded education through a selected set of courses on state-of-the-art subjects and cutting-edge technologies.

Admission Criteria

An applicant should have:

1. graduated from a recognized university and obtained a Bachelor's degree in engineering, science, business administration or related fields, normally with Second Class Honours or higher, or an average grade of B or better in his undergraduate courses; or
2. completed a course of study in a tertiary educational institution and obtained professional or similar qualifications equivalent to an honours degree in related fields.

All applicants must also fulfil the "English Language Proficiency Requirement" as stipulated by the Graduate School before being considered for admission. Please refer to the "Postgraduate Prospectus" of The Chinese University of Hong Kong for details. Please refer to Admission Online of CUHK for more information: https:// www.gs.cuhk.edu.hk/admissions/

Curriculum

All students are required to take a minimum of 8 postgraduate courses (24 credits in total), within a normal period of two years (Part-time mode) or one year (Fulltime mode) of which 3 should be required courses and 5 elective courses. An exemption from a required course may be sought provided that the student has sufficient background and knowledge in the required course. The exempted course must be replaced with an approved elective course. Other M.Sc. courses from the Faculty of Engineering may be taken as electives with the approval of the Division Head. The degree of Master of Science will be conferred upon students who have completed the prescribed coursework with a cumulative grade-point average of 2.0 or above.

Required Courses

SEEM5710 Principles of Operations Management
SEEM5730 Information Technology Management
SEEM5820 Introduction to Financial Engineering

Elective Courses

Students must complete 5 elective courses but they must take at least 1 from each of the following three areas. SEEM5910 and SEEM 5920 may be grouped under any of the areas.

*SEEM5910 Project in SEEM

*SEEM5920 SEEM Internship

Area I: Operations Management	
SEEM5740	Engineering Economics
SEEM5790	Project and Technology Management
SEEM5800	Logistics Management
SEEM5810	Machine Intelligence and Systems Engineering
SEEM5880	Supply Chain Management

Area II: Information Systems	
SEEM5750	Expert Systems and Decision Support
SEEM5760	Client/Server Information Systems
SEEM5770	Open Systems and Electronic Commerce
SEEM5810	Machine Intelligence and Systems Engineering

Area III: Financial Engineering	
SEEM5830	Stochastic Investment Models
SEEM5840	Quantitative Risk Management
SEEM5870	Computational Finance

* Among these courses, only one can be countedtowards the minimum graduation requirements

CAREERS OF SYSTEMS ENGINEERS

To lead in today's rapidly-changing world, systems engineers need to have strong quantitative, technology and interdisciplinary training. Our graduates work in a wide range of industries, such as telecommunications, entertainment, finance, fast moving consumer goods, healthcare, logistics, manufacturing, semiconductors, sports, travel, and transportation. They have pursued successful careers in entrepreneurship, consulting, commercial and investment banking, enterprise management, financial analysis, government policy analysis, industrial research, line management, product development, project management, strategic planning, and university teaching and research. Examples of employers of our graduates include:

- AIA Group
- Accenture
- Agricultural Bank of China
- Bank of China
- Bank of Communications
- Cathay Pacific Airways
- China Construction Bank
- China Mobile
- China Securities Index Co.
- DBS Bank
- Deloitte
- FedEx
- Hang Seng Bank
- Hong Kong Air Cargo Terminals
- Hong Kong Interbank Clearing
- Hongkong International Terminals
- HSBC
- Huawei Technologies
- IBM
- Industrial and Commercial Bank of China
- ING
- J.P. Morgan
- Kerry Logistics
- KPMG
- MAERSK
- Merrill Lynch
- Modern Terminals
- Oracle
- Orient Overseas Container Line
- Pacific Alliance Group
- PCCW
- PricewaterhouseCoopers
- Society for Worldwide Interbank Financial Telecommunication (SWIFT)
- Shell
- Standard Chartered Bank
- Swire
- Tectura
- The Hong Kong Jockey Club
- The Hong Kong SAR Government
- Tibbett & Britten
- Wing Lung Bank

Placement and Internship Programme

To have the opportunity to apply the knowledge acquired from our programme, our students can consider joining the Placement and Internship Programme (PIP). Through the PIP, our students can become familiar with the real business world, as they can involve in day-to-day business operations.

By joining the PIP, our students can enhance their technical knowledge, as well as gain leadership and teamwork experiences. In order to become competent systems engineers, our students can learn about project management in the real world, where tight deadlines and quality deliverables are expected.

In some cases, students will be assigned to different departments inside a company to understand the collaborations among departments. These opportunities provide our future systems engineers with solid knowledge and exposure on how to design and manage a complex system in today's ever-changing environments.

Industry-type Final Year Projects

The careers of systems engineers are exciting and rewarding. They can help our society and businesses solve challenging problems and add value to existing operations. To prepare undergraduates to enter the business world, a final year project is required of each student. The topics of the projects target problems in the daily operations of businesses, and students work in groups on a specific topic to gain collaboration experience.

At the same time, business leaders are invited to be project advisors, whose advice will stimulate our students to consider, as systems engineers, different perspectives in real-world situations, enhancing our students' critical thinking ability, knowledge, and skills. The project advisors include leaders from local and international corporations such as banking, finance, and technology-related companies.

STATE-OF-THE-ART LABORATORIES

Our department is equipped with state-of-the-art-laboratories, where our students can engage in the use of leading technology to conduct quantitative analysis, test their hypothesis, discover new insights and formulate innovative methodologies. Our integrated technology platforms can deal with today's challenging requirements include big- data, mobile technologies, cloud computing and enterprise information exchange. Our department has the following laboratories to conduct data-intensive teaching and research.

E-Services Laboratory

This laboratory supports research and teaching in E-Services technology. Through this laboratory, we aim to broaden and strengthen the service industry of Hong Kong and help transform the local service industry from the traditional labour-intensive paradigm to a sophisticated Internet-based electronic service paradigm. The laboratory is equipped with the state-of- the-art equipment to support both research and teaching. The latest PCs and enterprise servers are interconnected by a high- speed network. This provides an ideal environment to support sophisticated commercial systems and software. Our research focuses on decision methodology and information systems to improve service business operations. In one on-going project, we develop RFIDenabled sensing technologies for service operations. The project plans to develop a configurable RFID hardware platform, which cannot be found in any of the commercially available active RFID technologies to house various external sensor and utility modules based on different monitoring needs.

Financial Engineering Laboratory

Hong Kong is a world financial centre. The development of its financial market is, therefore, a key factor to the success of the city. In the Financial Engineering Laboratory (FEL), theoretical as well as practical financial problems, such as portfolio selection, financial and behavioural risk assessment, asset liability management, stochastic control, pricing models and computational methods are investigated. In addition, data-driven analytical models are studied to extract critical information hidden in a huge amount of dynamically changing financial data. The FEL provides great opportunities for faculty and students to investigate various new financial issues.

Human-Computer Communications Laboratory

The Human-Computer Communications Laboratory (HCCL) was established in 1999. Our vision is to leverage the powerful confluence of massive of computing, communication and content to derive intelligence in a form that is amenable to effective access, visualization and utilization for humans. Our mission is to foster interdisciplinary research and education in human-centric information systems. The scope of our study includes how interactive and intelligent human-computer interfaces to information should be designed and realized, in order to enable users to accomplish their desired tasks in smart, effective and efficient ways.

Guided by our mission, HCCL supports research areas including but not limited to: speech recognition, spoken language understanding, speech generation and synthesis, conversational systems development, audio information processing, multimodal and multimedia interface development, multi-biometric authentication, intelligent agents, mobile computing and e-learning.

Information Systems Laboratory

(Key Laboratory of High Confidence Software Technologies)

This laboratory supports research and teaching in all aspects in information processing and management. The scope includes effective information retrieval and management, efficient data organization and storage, automated knowledge discovery and machine learning, intelligent analysis and reasoning, as well as friendly access and timely delivery techniques. A major goal is to facilitate sophisticated decision making for enterprise operations and management. The laboratory also provides the state-of-the-art facilities offering excellent support for conducting cutting edge research and developing industrial-strength projects.

To achieve the goal, the laboratory investigates both basic and applied research issues including but not limited to: intelligent information retrieval, natural language processing (Chinese and English), data mining and text mining, knowledge discovery and automated reasoning, machine learning, multimedia information processing, and text mining for financial applications.

COMPETITIVE RESEARCH FUNDING

Excellence in our department's research is reflected through many publications in top journals and conferences in our fields of expertise. Our work has also been realized in applications and generated impact across different sectors. We also create knowledge for the industries to develop strategic new directions to enhance their competitiveness. Our faculty has been awarded many research grants and industry sponsorships to support our R&D programmes and our postgraduate students, including:

Name of Investigator	Project Title	Sponsor	Currency	Amount
AHN Dohyun	Data-Driven Top-k Selection Methods for Risk Management	The Chinese University of Hong Kong - Research Committee - Direct Grants	HKD	$34,447
AHN Dohyun	Tail Risk Quantification under Model Uncertainty	The Chinese University of Hong Kong - Research Committee - Direct Grants	HKD	$43,170
CHEN Nan	Duality-Based Dynamic Programming: A Model-Free Learning Approach to Stochastic Control Problems	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$978,709
CHEN Nan	Algorithmic Collusion and Competition: A Multi-agent Reinforcement Learning Perspective	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$1,032,078
CHENG Hong	Hypergraph Prompting for Cross-Task and Cross-Domain Adaptation	The Chinese University of Hong Kong - Research Committee - Direct Grants	HKD	$34,447
CHENG Hong	Multi-Task Prompting for Graph Neural Networks	The Chinese University of Hong Kong - Research Committee - Postdoctoral Research Fellowship Scheme	HKD	$166,667
CHENG Hong	Research on WeChat global data-driven recognition based on large language model and unique hypergraph	Tencent Technology (Shenzhen) Co. Ltd.	CNY	$300,000
CHENG Hong	Social Media Content in the Context of Cross-border Human Trafficking: Evolving Roles, Accountability and Regulation	The Chinese University of Hong Kong - Research Committee: Strategic Seed Funding for Collaborative Research Scheme	HKD	$500,000
CHENG Hong	Intelligent Analysis of User Psychological Traits via Online Multi-Modal Social Fingerprints	Shun Hing Institute of Advanced Engineering - Shun Hing Institute of Advanced Engineering (SHIAE) Fund, CUHK	HKD	$700,000
CHENG Hong	Foundation Models for Urban Weather Forecasting	The Chinese University of Hong Kong - Postdoctoral Fellowship Scheme (Research Committee)	HKD	$750,000

Name of Investigator	Project Title	Sponsor	Currency	Amount
CHENG Hong	Application of Fault Prediction and Classification Technology Based on Neural Network in Intelligent Maintenance	Huawei Technologies Co., Ltd	HKD	$1,050,750
CHENG Hong	Robust Learning on Dynamic Graphs	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$1,086,185
GAO Xuefeng	Online learning in games and algorithmic collusion	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$658,524
GAO Xuefeng	Regret Bounds for Risk-Sensitive Linear Quadratic Control	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$703,303
GAO Xuefeng	Temperature Control for Langevin Diffusions	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$706,936
GAO Xuefeng	Logarithmic Regret Bounds for Learning in Continuous-Time Markov Decision Processes	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$745,437
HE Xuedong	Portfolio Diversification with Realization Utility	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$675,611
JIA Yanwei	A General Framework for Importance Sampling with Latent Markov Processes	The Chinese University of Hong Kong - Research Committee - Direct Grants	HKD	$150,000
JIA Yanwei	Data-Driven Mean-Variance Asset Allocation in Continuous Time	Research Grants Council (RGC) - Early Career Scheme (ECS)	HKD	$441,536
LAM Wai	Digesting Novels With Long Context Understanding for Large Language Models	The Chinese University of Hong Kong - Research Committee - Direct Grants	HKD	$34,447
LAM Wai	Continual Learning of Heterogeneous Natural Language Understanding Tasks	The Chinese University of Hong Kong - Research Committee - Direct Grants	HKD	$43,170
LAM Wai	Evaluation and Optimization Methods for Long-Text Comprehension Capabilities of Large Language Models in Novel Reading Comprehension	Tencent Technology (Shenzhen) Co. Ltd.	CNY	$300,000
LAM Wai	Time-aware Knowledge Learning for Language Model Pre-training	Alibaba DAMO Academy (Hangzhou) Technology Co., Ltd	HKD	$543,000
LAM Wai	Knowledge-Guided Text Response Generation for Information-Seeking User Utterances from Heterogeneous Information Sources	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$602,349
LI Lingfei	Continuous-time model-based reinforcement learning in financial engineering	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$655,529
LI Lingfei	Reinforcement Learning for the Optimal Trade Execution Problem in Financial Engineering	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$715,891
LIU Xunying	High-performance Low-footprint Speech Recognition Using Mixed Precision Deep Neural Network Quantization	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$838,393
LIU Xunying	Towards High-performance On-the-fly Speaker Adaptation of Pre-trained ASR Systems for Dysarthric and Elderly Speech Recognition	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$1,038,967
LONG Zhuoyu	Assortment Optimization with Distributionally Uncertainty	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$711,143
LONG Zhuoyu	Supermodularity in Two Stage Distributionally Robust Optimization	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$712,306
LONG Zhuoyu	Empty Carriage Dispatching in Large-Scale Railway Logistics Networks	1+1+1 Joint Collaboration Fund	HKD	$925,000
MENG Mei Ling Helen	Research Data Management for Engineering	Committee on Research Data Management-CUHK Library - Faculty RDM Incentivising Programme Fund	HKD	$100,000
MENG Mei Ling Helen	2024 Proposal for the CUHK MoE-Microsoft Key Laboratory of Human-centric Computing and Interface Technologies	Microsoft Hong Kong Ltd	HKD	$233,000

Name of Investigator	Project Title	Sponsor	Currency	Amount
MENG Mei Ling Helen	Educational Knowledge Graph Construction and Refinement through User Interactions with Large Language Models	Microsoft Hong Kong Ltd	HKD	$233,000
MENG Mei Ling Helen	AI-ENDO: AI-enabled Video Data Analytics to Improve Endoscopic Surgical Safety	Dr. Stanley Ho Medical Development Foundation	HKD	$300,000
MENG Mei Ling Helen	Intelligent Surgical Robotic Assistant	The Chinese University of Hong Kong - Research Committee: Strategic Seed Funding for Collaborative Research Scheme	HKD	$300,000
MENG Mei Ling Helen	Hyperscanning to Explore the Human Mind in Ensemble	The Chinese University of Hong Kong - Research Committee Group Research Scheme	HKD	$500,000
MENG Mei Ling Helen	Effectiveness of Theory-based Outreach Using Mobile Health Technology in Colorectal Cancer Screening Uptake: A Randomized Controlled Trial	Health Bureau (HB) - Health and Medical Research Fund (HMRF)	HKD	$868,720
MENG Mei Ling Helen	Provision of Services for the Development and Delivery of Professional Training Programmes on Artificial Intelligence for the Junior Secondary (S.I-3) Learning and Teaching Materials	Education Bureau, HKSAR Government	HKD	$1,398,561
MENG Mei Ling Helen	CUHK Jockey Club AI for the Future Project	The Chinese University of Hong Kong - Research Committee: Research Assistant Professorship Scheme	HKD	$2,000,000
MENG Mei Ling Helen	AI-ENDO: AI-enabled Video Data Analytics to Improve Endoscopic Surgical Safety	Innovation and Technology Commission - Innovation and Technology Support Programme (ITSP)	HKD	$2,692,840
MENG Mei Ling Helen	Innovative Diagnosis and Treatment for Shrimp Allergy	The Chinese University of Hong Kong - Research Committee - Research Impact Matching Fund	HKD	$3,598,756
MENG Mei Ling Helen	Hyperscanning to Explore the Human Mind in Ensemble (Awarded Amount from RGC: HKD8,330,150, exclusive of on-costs; University Matching: HKD8,330,150 on Equipment)	Research Grants Council (RGC) - Collaborative Research Fund (CRF)	HKD	$8,330,150
MENG Mei Ling Helen	Innovative diagnosis and treatment for shrimp allergy (Amount awarded from RGC: $8,397,098; Matching from CUHK: $3,598,756)	Research Grants Council (RGC) - Research Impact Fund (RIF)	HKD	$8,397,098
MENG Mei Ling Helen & LIU Xunying	Research and Development of Artificial Intelligence in Extraction and Identification of Spoken Language Biomarkers for Screening and Monitoring of Neurocognitive Disorders	Research Grants Council (RGC) - Theme-based Research Scheme (TRS)	HKD	$50,000,000
MENG Mei Ling Helen & WU Xixin	Intelligent Surgical Robotic Assistant with Multimodal-AI Perception and Interaction	The Chinese University of Hong Kong - Research Committee Group Research Scheme	HKD	$500,000
MENG Mei Ling Helen & WU Xixin	Intelligent Surgical Robotic Assistant with Multimodal-AI Perception and Interaction	Research Grants Council (RGC) - Collaborative Research Fund (CRF)	HKD	$7,778,633
MENG Mei Ling Helen & WU Xixin	Utilization of a Theory-driven, Culturally Tailored, Social Media-based, Interactive Telehealth Intervention to Increase Longitudinal Adherence to Repeat Faecal Immunochemical Test Screening. A Randomized Controlled Trial	Health Bureau (HB) - Health and Medical Research Fund (HMRF)	HKD	$911,424
NGUYEN Viet Anh	Personalizing Recourse Recommendations with Cost Elicitation	Research Grants Council (RGC) - Early Career Scheme (ECS)	HKD	$528,764
SO Man Cho	Towards Provably Efficient and Effective Methods for Non-Convex Group Synchronization	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$815,601
SO Man Cho	Towards Understanding the Hardness of Structured Non-Smooth Non-Convex Optimization Problems	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$946,348

Name of Investigator	Project Title	Sponsor	Currency	Amount
SO Man Cho	Towards Understanding the Complexity of Approximate Stationarity Concepts in Structured Non-Convex, Non-Smooth Optimization	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$1,068,950
SO Man Cho	Geometry-Adapted Convergence Analysis of Bregman Distance-Based Methods	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$1,128,902
WAI Hoi To	Communication Efficient Stochastic Optimization Algorithms on Network	The Chinese University of Hong Kong - Research Committee - Direct Grants	HKD	$43,170
WANG Sibo	Efficient Fairness-Aware Sampling on Massive Data: Theory and Practice	The Chinese University of Hong Kong - Research Committee - Direct Grants	HKD	$34,447
WANG Sibo	Risky user detection in Large Heterogeneous Networks	1+1+1 Joint Collaboration Fund	HKD	$925,000
WANG Sibo	Risk Merchant Mining Based on Large-Scale Financial Networks	Tencent Technology (Shenzhen) Co. Ltd.	CNY	$300,000
WANG Sibo	Large Scale Graph Embedding	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$690,300
WONG Kam Fai William	An Explainable AI Framework for Mental Health with Robot for Child Well-being Therapy	The Chinese University of Hong Kong - Research Committee - Direct Grants	HKD	$43,170
WONG Kam Fai William	大模型與交互智能長期框架項目運行管理辦法	Huawei Tech. Investment Co. Ltd	HKD	$210,000
WONG Kam Fai William	Embodied Conversational Agent (ECA) on Mental Health with Humanoid Robot for Child Well-being Therapy	The Chinese University of Hong Kong Knowledge Transfer Project Fund (KPF)	HKD	$400,000
WONG Kam Fai William	A Knowledge Graph Based Dynamic Video Extractive Summarisation System	Innovation and Technology Commission - Partnership Research Programme (PRP)	HKD	$787,000
WONG Kam Fai William	A Knowledge Graph Based Dynamic Video Extractive Summarisation System	Find Solution AI Limited	HKD	$800,000
WONG Kam Fai William	Research and Development of Key Technologies for Multimodal Dialogue System Based on Large Model	RAISOUND (HONGKONG) CO., LIMITED	HKD	$830,000
WONG Kam Fai William	Privacy-Infused Constitutional AI: Contrastive Reinforced [Un]learning and Evolving from AI Feedback	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$906,256
WONG Kam Fai William	China's Data Protection Regime in the context of Fintech	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$1,067,230
WONG Kam Fai William	Incorporating Memory in Large Language Model based Dialogue System	Huawei Technologies Co., Ltd	HKD	$1,980,688
WONG Kam Fai William	ASSETE: ASsessment Scheme for Engineering and Technology Education	Trumptech Digital Education Services Ltd	HKD	$2,002,000
WONG Kam Fai William	ASSETE: ASsessment Scheme for Engineering and Technology Education	Innovation and Technology Commission - General Support Program	HKD	$5,078,469
WU Xixin	Multimodal Disordered Speech Reconstruction	The Chinese University of Hong Kong - Research Committee - Direct Grants	HKD	$150,000
WU Xixin	Research on Key Technology of Speech Synthesis for Older Adults	National Natural Science Fund (NSFC) Young Scientists Fund	RMB	$300,000
WU Xixin	Speech Foundation Models	Huawei Technologies Co., Ltd.) Gift Fund	HKD	$330,000
WU Xixin	Large Speech Synthesis Model	Tencent AI Lab Rhino Bird Fund	HKD	$350,000
WU Xixin & MENG Mei Ling Helen	Older Adult-Facing, Personalized Text-to-Speech Synthesis with Automatic Textual and Prosodic Enhancements for Perceptual Clarity	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$1,228,619
XU Huifu	Statistical Robust Analysis of Stochastic Generalized Equations with Applications in Machine Learning and Stochastic Equilibrium Problems	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$815,601

Name of Investigator	Project Title	Sponsor	Currency	Amount
XU Huifu	Adaptive Polyhedral Method for Elicitation of Nonlinear Utility and Distortion Functions and Applications	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$978,878
YANG Chen	High-Dimensional Continuous-Time Portfolio Selection with Capital Gains Tax	Research Grants Council (RGC) - Early Career Scheme (ECS)	HKD	$523,231
YANG Chen	Continuous-Time Nonconcave Portfolio Selection with General Payoffs and Transaction Costs	Research Grants Council (RGC) - General Research Fund (GRF)	HKD	$670,802
YU Jeffrey Xu	AI Sparse Graph Technology (Speeding Up Monotonic Graph Search)	Huawei Technologies Co., Ltd	HKD	$1,437,000
YU Jeffrey Xu	Acceleration of Sparse Graph Based Multimodal Reasoning	Huawei Technologies Co., Ltd	HKD	$1,480,000
YU Jeffrey Xu	Acceleration of Large-Scale Incremental Graph-Based Search	Huawei Technologies Co., Ltd	HKD	$1,660,000
YU Jeffrey Xu	AI Sparse Graph Technology (Monotonic Graph Storage Optimization)	Huawei Technologies Co., Ltd	HKD	$1,790,000

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