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.

Table of Contents

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 Journal

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 Paper Award in the 2022 CSAMSE Conference
- Best Oral Paper Award in the Asia-Pacific Signal and Information Processing Association Annual Summit and Conference 2010
- Best Paper Award in the 14th International Conference of the Chinese Scholars Association for Management Science and Engineering (CSAMSE) 2022
- Best Paper of the 15th International Conference on Database Systems for Advanced Applications (DASFAA'10) 2010
- Best Paper of the 21st Australasian Database Conference (ADC'10) 2010
- 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
- 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 in 2021 MSOM Best OM Paper in OR
- 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
- Inaugural Distinguished Lecturer of APSIPA (Asia-Pacific Signal and Information Processing Association) 2012-2014
- INFORMS Optimization Society Young Researcher Prize 2010
- Invited Speaker of Okawa Prize 2012 Commemorative Symposium
- Keynote Speaker of National Conference on Man-Machine Speech Communication 2011
- Microsoft Research Outstanding Collaborator Award 2016
- Most Successful Woman Award 2022
- Outstanding Fellow of the Faculty of Engineering 2015 for five years
- Outstanding ICT Women Professional Award of the Hong Kong Computer Society 2015
- Overview Speaker of IEEE Workshop on Multimedia Signal Processing 2011
- Plenary Speaker of CogInfoComm 2013
- Plenary Speaker of INTERSPEECH 2018
- Plenary Speaker of IEEE ICASSP 2021
- Keynote Speaker of ACL 2021
- Keynote Speaker of CLIC 2021
- Keynote Speaker of AFEKA 2021
- IEEE Signal Processing Society Leo L Beranek Meritorious Service Award 2019
- Hong Kong ICT Award Smart Inclusion Silver Award 2018
- Shenzhen Municipal Government "Peng Cheng" Visiting Professorship 2010 - Present

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
- 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 of Advisory Board, Cyber Security Lab, Applied Science & Technology Research Institute (ASTRI)
- Member of the Advisory Panel for the FinTech Proof-of-Concept Subsidy Scheme appointed by Financial Services and the Treasury Bureau
- 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 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
- President, Hong Kong Information Technology Joint Council
- 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 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 Multi-party 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
- 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 12th CILTHK Student Day
- Championship of the case study competition in the 13th CILTHK Stduent Day
- 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
- 第四屆中國運籌學會數學規劃分會研究生論壇 優秀成果獎 2018

WORLD-CLASS
Faculty Members

LAM, Wai
林偉

Chairman and 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

EMAIL: wlam@se.cuhk.edu.hk

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

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.

CHENG, Hong
程鴻

Vice-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

EMAIL: hcheng@se.cuhk.edu.hk

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

Zijin Feng, Miao Qiao, Hong Cheng. "Modularity-based Hypergraph Clustering: Random Hypergraph Model, Hyperedge-cluster Relation, and Computation", Proceedings of the 2024 ACM SIGMOD International 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).

Yu Rong, Hong Cheng and Zhiyu Mo. "Why It Happened: Identifying and Modeling the Reasons of the Happening of Social Events", Proceedings of the 21st ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 15), Sydney, Australia, August 2015.

Xin Huang, Hong Cheng, Rong-Hua Li, Lu Qin and Jeffrey Xu Yu. "Top-K Structural Diversity Search in Large Networks", The VLDB Journal (VLDBJ), Vol. 24, Issue 3, pages 319-343, 2015.

AHN, Dohyun
安濤賢

Assistant Professor
BS, MS, PhD (Korea Advanced Institute of Science and Technology)

Research Interests

> Quantitative risk management using optimization and stochastic models
> Monte Carlo simulation methodologies
> Networks in finance and operations
> Decision making under uncertainty

EMAIL: dohyun@se.cuhk.edu.hk

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 .

He received the ISE Best Thesis Award from KAIST, placed second at the 2021 WSC Best Theoretical Paper Competition, placed second at the 2015 INFORMS Section on Finance Best Student Paper Competition, and won the 2015 KORMS Best Paper Award. The paper "Analysis and Design of Microfinance Services: A Case of ROSCA" was highlighted in the December 2017 issue of ISE magazine published by the IISE. The paper "Shock Amplification in Financial Networks with Applications to the CCP feasibility" was selected as a Feature Article of Quantitative Finance.

Selected Publications

D. Ahn and L. Zheng (2023) Conditional Importance Sampling for Convex Rare-Event Sets, Proceedings of the 2023 Winter Simulation Conference, forthcoming

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

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

D. Ahn, N. Chen, and K. Kim (2023) Robust Risk Quantification via Shock Propagation in Financial Networks, Operations Research, forthcoming

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
B.Sc.(Eng) (University of Hong Kong)
MBA (Chinese University of Hong Kong)
DBA (City University of Hong Kong)

Research Interests
> Financial Technology
> Banking Infrastructure
> Smart Banking
> Information Systems Management
> Corporate Entrepreneurship and Innovation

EMAIL: ckchan@cuhk.edu.hk

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 Publication

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

CHEN, Nan
陳南

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.

GAO, Xuefeng
高雪峰

Associate Professor
BSc (Peking University)
PhD (Georgia Institute of Technology)

Research Interests

> Online Learning and Bandits
> Applied Probability
> Algorithmic Trading and Financial Engineering
> Queueing Theory

EMAIL: xfgao@se.cuhk.edu.hk

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: Non-asymptotic 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 infinite-server 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.

HE, Xuedong
何雪冬

Professor
BSc (Peking University)
PhD (University of Oxford)

Research Interests
> Behavioral Finance
> Financial Technology
> Risk Management

EMAIL: xdhe@se.cuhk.edu.hk

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 Associate Editors for Operations Research, 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 Continuous-Time (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. Obłój 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

Assistant Professor
BSc (Tsinghua University)
PhD (National University of Singapore)

Research Interests
> Decision Analysis in Financial Engineering
> Reinforcement Learning
> nformation Aggregation and Wisdom of the Crowd

EMAIL: ywjia@se.cuhk.edu.hk

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

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

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.

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.

LI, Lingfei
李凌飛

Associate 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

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 Stochastics 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.

LIU, Xunying
劉循英

Associate Professor
BSc (Shanghai Jiao Tong University)
MPhil, PhD (University of Cambridge)

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

EMAIL: xyliu@se.cuhk.edu.hk

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 170 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. Dr. Xunying Liu is a member of IEEE and ISCA.

Selected Publications

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, 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.

Jianwei Yu, Shi-Xiong Zhang, Bo, Wu, Shansong Liu, Shoukang Hu, Mengzhe Geng, Xunying Liu, Helen Meng, Dong Yu. Audio-visual Multi-Channel Integration and Recognition of Overlapped Speech, IEEE/ACM Transactions on Audio, Speech and Language Processing, Volume 29, Pages 2067-2082, 2021.

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.

Cai Wingfiled, Li Su, Xunying Liu, Chao Zhang, Philip C. Woodland, Andrew Thwaites, Elisabeth Fonteneau and William D. Marslen-Wilson. Relating Dynamic Brain States to Dynamic Machine States: Human and Machine Solutions to the Speech Recognition Problem, September 2017, PLoS Computational Biology 13(9):e1005617.

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.

Boyang Xue, Jianwei Yu, Junhao Xu, Shansong Liu, Shoukang Hu, Zi Ye, Mengzhe Geng, Xunying Liu, Helen Meng. BAYESIAN TRANSFORMER LANGUAGE MODELS FOR SPEECH RECOGNITION, 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.

Shoukang Hu, Sirui Xie, Hehui Zheng, Chunxiao Liu, Jianping Shi, Xunying Liu, Dahua Lin. DSNAS: Direct Neural Architecture Search without Parameter Retraining, IEEE/CVF CVPR2020, Seattle WA, USA.

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.

LONG, Zhuoyu Daniel
龍卓瑜

Associate Professor
BSc (Tsinghua University)
MS (Chinese Academy of Science)
PhD (National University of Singapore)

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

EMAIL: zylong@se.cuhk.edu.hk

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.

Awards

- 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

D. Z. Long, J. Qi, A. Zhang. "Supermodularity in Two-Stage Distributionally Robust Optimization", Management Science, forthcoming, 2023.

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.

MENG, Helen
蒙美玲

Patrick Huen Wing Ming Professor of Systems Engineering & Engineering Management
SB, SM, PhD (Massachusetts Institute of Technology)

Research Interests
> Multilingual Speech and Language Processing
> Human-AI Interaction
> Big Data Decision Analytics
> Conversational Artificial Intelligence
> Generative Artificial Intelligence

EMAIL: hmmeng@se.cuhk.edu.hk

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 Director of 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 Theme-based Research Scheme Project in Artificial Intelligence in 2019. Her recent awards include 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 a Fellow of IEEE, ISCA, HKIE and HKCS.

Selected Publications

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, June 2023.

Haohan Guo, Feilong Xie, Xixin Wu, Frank Soong, Helen Meng, "MSMC-TTS: Multi-Stage Multi-Codebook VQ-VAE Based Neural TTS", In IEEE/ACM Transactions on Audio, Speech, and Language Processing, 2023.

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 ICASSP2022, Singapore. May 2022.

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", In CHI Conference on Human Factors in Computing Systems, April 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. Dublin, May 2022. (Ranked Top in the Challenge)

Songxiang Liu, Yuewen Cao , Disong Wang , Xixin Wu, Xunying Liu, Helen Meng, "Any-to-Many Voice Conversion with Location-Relative Sequence-to-Sequence Modeling", IEEE/ACM Trans. On Audio, Speech and Language Processing, 2021.

Xixin Wu , Yuewen Cao, Hui Lu, Songxiang Liu , Shiyin Kang, Zhiyong Wu, Xunying Liu , Helen Meng, "Exemplar-Based Emotive Speech Synthesis. IEEE/ACM Transactions on Audio, Speech, and Language Processing, 2021.

Wai-Kim Leung, Xunying Liu and Helen Meng, "CNN-RNN-CTC Based End-to-end Mispronunciation Detection and Diagnosis", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2019.

King Keung Wu, Helen Meng, Yeung Yam, "Topic Discovery via Convex Polytopic Model: A Case Study with Small Corpora", in the 9th IEEE International Conference on Cognitive Infocommunications (CogInfoCom). Budapest, Hungary, 22-24 August, 2018. (Best Paper Award)

Runnan Li, Zhiyong Wu, Yuchen Huang, Jia Jia, Helen Meng, Lianhong Cai, "Emphatic Speech Generation with Conditional Input Layer and Bidirectional LSTMs for Expressive Speech Synthesis", in the Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pp. 5129-5133. Calgary, Canada, 15-20 April, 2018.

Kun Li, Shaoguang Mao, Xu Li, Zhiyong Wu, Helen Meng, "Automatic lexical stress and pitch accent detection for L2 English speech using multi-distribution deep neural networks", Speech Communication, 2018, 96: 28-36.

Pengfei Liu, King Keung Wu and Helen Meng, "A Model of Extended Paragraph Vector for Document Categorization and Trend Analysis", In Proceedings of the International Joint Conference on Neural Networks (IJCNN), Alaska, USA, May 14-19, 2017, IEEE.

Kun Li, Xixin Wu and Helen Meng, "Intonation classification for L2 English speech using multi-distribution deep neural networks", Computer Speech & Language, May 2017, Vol. 43: 18-33.

Kun Li, Xiaojun Qian, and Helen Meng, "Mispronunciation Detection and Diagnosis in L2 English Speech Using Multi-Distribution Deep Neural Networks", IEEE/ACM Trans. Audio, Speech & Language Processing, January 2017.

NGUYEN, Viet Anh
阮越英

Assistant Professor
BEng, MEng (National University of Singapore)
Diplome d'Ingenieur (Ecole Centrale Paris)
PhD (Ecole Polytechnique Federale de Lausanne)

Research Interests
> Ethical Analytics
> Data Science
> Operations Research and Management
> Responsible Decision Making under Uncertainty

EMAIL: nguyen@se.cuhk.edu.hk

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

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 distributional 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
蘇文藻

Professor
BSE (Princeton University)
MSc, PhD (Stanford University)

Research Interests
> Algorithm Design
> Data Analytics
> Optimization

EMAIL: manchoso@se.cuhk.edu.hk

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 has been a Fellow of IEEE since 2023 and an Outstanding Fellow of the Faculty of Engineering at CUHK since 2019. He currently serves on the editorial boards of Journal of Global Optimization, Mathematical Programming, Mathematics of Operations Research, Open Journal of Mathematical Optimization, Optimization Methods and Software, and SIAM Journal on Optimization. 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 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. He also co-authored with his student a paper that receives the Best Student Paper Award at the 19th IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC 2018).

Selected Publications

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.

P. Wang, Z. Zhou, A. M.-C. So, "Non-Convex Exact Community Recovery in Stochastic Block Model", Mathematical Programming, Series A, 195(1-2): 793-829, 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, "Deterministic Approximation Algorithms for Sphere Constrained Homogeneous Polynomial Optimization Problems", Mathematical Programming, Series B, 129(2): 357-382, 2011.

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
韋凱滔

Assistant Professor
BEng, MPhil (CUHK)
PhD (Arizona State University)

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

EMAIL: htwai@se.cuhk.edu.hk

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 Assistant 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 and Information Processing over Networks. His research interests are in the broad area of optimization algorithms, graph signal processing, and machine learning. He has received a Best Student Paper Award from 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

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.

T.-H. Chang, M. Hong, H.-T. Wai, X. Zhang, S. Lu, "Distributed Learning in the Nonconvex World: From batch data to streaming and beyond", IEEE Signal Processing Magazine, 2020.

H.-T. Wai, S. Segarra, A. E. Ozdaglar, A. Scaglione, A. Jadbabaie, "Blind community detection from low-rank excitations of a graph filter", IEEE Transactions on Signal Processing, 2020.

H.-T. Wai, W. Shi, C. A. Uribe, A. Nedić, A. Scaglione, "Accelerating incremental gradient optimization with curvature information", Computational Optimization and Applications, 2020.

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

WANG, Sibo
王思博

Assistant Professor
BE (Fudan University)
PhD (Nanyang Technological University)

Research Interests
> Graph Data Management
> Big Data Analysis
> Indexing
> Approximation Algorithms

EMAIL: swang@se.cuhk.edu.hk

Sibo Wang is an Assistant 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.

Qintian Guo, Chen Feng, Fangyuan Zhang, Sibo Wang. Efficient Algorithm for Budgeted Adaptive Influence Maximization: An Incremental RR-set Update Approach. *Proceedings of the ACM on Management of Data (SIGMOD)*, to appear, 2024.

Fangyuan Zhang, Mengxu Jiang, Sibo Wang. Efficient Dynamic Weighted Set Sampling and Its Extension. *Proceedings of the VLDB Endowment (PVLDB)*, to appear, 2023.

Xingyi Zhang, Shuliang Xu, Wenqing Lin, Sibo Wang. Constrained Social Community Recommendation. *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (SIGKDD)*, pages 5586-5596, 2023.

Xinyu Du, Xingyi Zhang, Sibo Wang, Zengfeng Huang. Efficient Tree-SVD for Subset Node Embedding over Large Dynamic Graphs. *Proceedings of the ACM on Management of Data (SIGMOD)*, 1(1): 96:1-96:26, 2023.

Kaixin Liu, Sibo Wang, Yong Zhang, Chunxiao Xing. An Efficient Algorithm for Distance-based Structural Graph Clustering. *Proceedings of the ACM on Management of Data (SIGMOD)*, 1(1): 45:1-45:25, 2023.

Guanhao Hou, Qintian Guo, Fangyuan Zhang, Sibo Wang, Zhewei Wei. Personalized PageRank on Evolving Graphs with an Incremental Index-Update Scheme. *Proceedings of the ACM on Management of Data (SIGMOD)*, 1(1): 25:1-25:26, 2023.

Fangyuan Zhang, Sibo Wang. Effective Indexing for Dynamic Structural Graph Clustering. *Proceedings of the VLDB Endowment (PVLDB)*, 15(11): 2908-2920, 2022.

Xingguang Chen, Fangyuan Zhang, Sibo Wang Efficient Approximate Algorithms for Empirical Variance with Hashed Block Sampling. *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (SIGKDD)*, pages 157-167, 2022.

Yanping Zheng, Hanzhi Wang, Zhewei Wei, Jiajun Liu, Sibo Wang. Instant Graph Neural Networks for Dynamic Graphs. *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (SIGKDD)*, pages 2605-2615, 2022.

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.

Xin Chen, You Peng, Sibo Wang, Jeffrey Xu Yu. DLCR: Efficient Indexing for Label-Constrained Reachability Queries on Large Dynamic Graphs. *Proceedings of the VLDB Endowment (PVLDB)*, 15(8): 1645-1657, 2022.

Xingyi Zhang, Kun Xie, Sibo Wang, Zengfeng Huang. Learning Based Proximity Matrix Factorization for Node Embedding. Proceedings of the *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (SIGKDD)*, pages 2243-2253, 2021.

Hanzhi Wang, Mingguo He, Zhewei Wei, Sibo Wang, Ye Yuan, Xiaoyong Du, Ji-Rong Wen. Approximate Graph Propagation. Proceedings of the *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (SIGKDD)*, pages 1686-1696, 2021.

Xingguang Chen, Sibo Wang. Efficient Approximate Algorithms for Empirical Entropy and Mutual Information. *Proceedings of the ACM SIGMOD International Conference on Management of Data (SIGMOD)*, pages 274-286, 2021.

Guanhao Hou, Xingguang Chen, Sibo Wang, Zhewei Wei. Massively Parallel Algorithms for Personalized PageRank. *Proceedings of the VLDB Endowment (PVLDB)*, 14(9): 1668-1680, 2021.

Hanzhi Wang, Zhewei Wei, Junhao Gan, Sibo Wang, Zengfeng Huang. Personalized PageRank to a Targeted Node, Revisited. *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (SIGKDD)*, pages 657-667, 2020.

Song Bian, Qintian Guo, Sibo Wang, Jeffrey Xu Yu. Efficient Algorithms for Budgeted Influence Maximization on Massive Social Networks. *Proceedings of the VLDB Endowment (PVLDB)*, 13(9): 1498-1510, 2020.

Qintian Guo, Sibo Wang, Zhewei Wei, Ming Chen. Influence Maximization Revisited: Efficient Reverse Reachable Set Generation with Bound Tightened. *Proceedings of the ACM SIGMOD International Conference on Management of Data (SIGMOD)*, pages 2167-2181, 2020.

Sibo Wang, Renchi Yang, Runhui Wang, Xiaokui Xiao, Zhewei Wei, Wenqing Lin, Yin Yang, Nan Tang. Efficient Algorithms for Approximate Single-Source Personalized PageRank Queries. *ACM Transactions on Database Systems (TODS)*, 44(4): 18:1-18:37, 2019.

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

WONG, Kam Fai
黃錦輝

Professor
BSc, PhD (The University of Edinburgh)

Research Interests
> Chinese Information Processing
> Databases
> Information Retrieval

EMAIL: kfwong@se.cuhk.edu.hk

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

Zhiming Mao, Huimin Wang, Yiming Du, Kam-Fai Wong: UniTRec: A Unified Text-to-Text Transformer and Joint Contrastive Learning Framework for Text-based Recommendation. ACL (2) 2023: 1160-1170

Huimin Wang, Wai-Chung Kwan, Kam-Fai Wong, Yefeng Zheng: CoAD: Automatic Diagnosis through Symptom and Disease Collaborative Generation. ACL (1) 2023: 6348-6361

Rui Wang, Jianzhu Bao, Fei Mi, Yi Chen, Hongru Wang, Yasheng Wang, Yitong Li, Lifeng Shang, Kam-Fai Wong, Ruifeng Xu: Retrieval-free Knowledge Injection through Multi-Document Traversal for Dialogue Models. ACL (1) 2023: 6608-6619

Liang Chen, Hongru Wang, Yang Deng, Wai-Chung Kwan, Zezhong Wang, Kam-Fai Wong: Towards Robust Personalized Dialogue Generation via Order-Insensitive Representation Regularization. ACL (Findings) 2023: 7337-7345

Lingzhi Wang, Tong Chen, Wei Yuan, Xingshan Zeng, Kam-Fai Wong, Hongzhi Yin: KGA: A General Machine Unlearning Framework Based on Knowledge Gap Alignment. ACL (1) 2023: 13264-13276

Lingzhi Wang, Mrinmaya Sachan, Xingshan Zeng, Kam-Fai Wong: Strategize Before Teaching: A Conversational Tutoring System with Pedagogy Self-Distillation. EACL (Findings) 2023: 2223-2229

Wenbo Shang, Jiangjiang Zhao, Zezhong Wang, Binyang Li, Fangchun Yang, Kam-Fai Wong: "I Know Who You Are": Character-Based Features for Conversational Humor Recognition in Chinese. EMNLP (Findings) 2022: 2927-2932

Lingzhi Wang, Xingshan Zeng, Kam-Fai Wong: Learning When and What to Quote: A Quotation Recommender System with Mutual Promotion of Recommendation and Generation. EMNLP (Findings) 2022: 3094-3105

Zhiming Mao, Jian Li, Hongru Wang, Xingshan Zeng, Kam-Fai Wong: DIGAT: Modeling News Recommendation with Dual-Graph Interaction. EMNLP (Findings) 2022: 6595-6607

WU, Xixin
吳錫欣

Assistant Professor
BS (Beihang University)
MS (Tsinghua University)
PhD (The Chinese University of Hong Kong)

Research Interests

> Generative Artificial Intelligence
> Speech and Language Processing for Health
> Affective Computing
> Human-machine Interaction

EMAIL: wuxx@se.cuhk.edu.hk

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

Estimating the Uncertainty in Emotion Class Labels With Utterance-Specific Dirichlet Priors, Wen Wu, Chao Zhang, Xixin Wu, Philip C. Woodland, IEEE Transactions on Affective Computing, 2022

Exemplar-based Emotive Speech Synthesis, Xixin Wu, Yuewen Cao, Hui Lu, Songxiang Liu, Shiyin Kang, Zhiyong Wu, Xunying Liu, Helen Meng, IEEE/ACM Transactions on Audio, Speech and Language Processing, vol. 29, 2021

Speech Emoftion Recognition Using Sequential Capsule Networks, Xixin Wu, Yuewen Cao, Hui Lu, Songxiang Liu, Disong Wang, Zhiyong Wu, Xunying Liu, Helen Meng, IEEE/ACM Transactions on Audio, Speech and Language Processing, vol. 29, 2021

Any-to-Many Voice Conversion With Location-Relative Sequence-to-Sequence Modeling, Songxiang Liu, Yuewen Cao, Disong Wang, Xixin Wu*, Xunying Liu, Helen Meng, IEEE/ACM Transactions on Audio, Speech and Language Processing, vol. 29, 2021 (*corresponding author)

Intonation classification for L2 English speech using multi-distribution deep neural networks, Kun Li, Xixin Wu and Helen Meng, Computer Speech & Language, 2016

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'23, (ACII 2022 Affective Vocal Burst (AV-B) Recognition competition 1st place, *corresponding author)

Inferring Speaking Styles from Multi-modal Conversational Context by Multi-scale Relational Graph Convolutional Networks, Jingbei Li, Yi Meng, Xixin Wu*, Zhiyong Wu*, Jia Jia, Helen Meng, Qiao Tian, Yuping Wang, Yuxuan Wang, in Proc. ACM MM'22, (*corresponding author)

Exploring linguistic feature and model combination for speech recognition based automatic AD detection, Yi Wang, Tianzi Wang, Zi Ye, Lingwei Meng, Shoukang Hu, Xixin Wu, Xunying Liu, Helen Meng, in Proc. Interspeech'22

Neural Architecture Search for Speech Emotion Recognition, Xixin Wu, Shoukang Hu, Zhiyong Wu, Xunying Liu, Helen Meng, in Proc. ICASSP'22

Ensemble Approaches for Uncertainty in Spoken Language Assessment, Xixin Wu, Kate M. Knill, Mark J.F. Gales, Andrey Malinin, in Proc. Interspeech'20

Speech Emotion Recognition Using Capsule Networks, Xixin Wu, Songxiang Liu, Yuewen Cao, Xu Li, Jianwei Yu, Dongyang Dai, Xi Ma, Shoukang Hu, Zhiyong Wu, Xunying Liu, Helen Meng, in Proc. ICASSP'19

Rapid Style Adaptation Using Residual Error Embedding for Expressive Speech Synthesis, [demo], Xixin Wu, Yuewen Cao, Mu Wang, Songxiang Liu, Shiyin Kang, Zhiyong Wu, Xunying Liu, Dan Su, Dong Yu and Helen Meng, in Proc. Interspeech'18

Feature based Adaptation for Speaking Style Synthesis, Xixin Wu, Lifa Sun, Shiyin Kang, Songxiang Liu, Zhiyong Wu, Xunying Liu, Helen Meng, in Proc. ICASSP'18

XU, Huifu
徐慧福

Professor
BSc, MSc (Nanjing)
PhD (Ballarat)

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

EMAIL: hfxu@se.cuhk.edu.hk

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

S. Guo, H. Xu and S. Zhang, Utility Preference Robust Optimization with Moment-Type Information Structure. Operations Research, 2023.

E. Delage, S. Guo and H. Xu, Shortfall Risk Models When Information on Loss Function Is In complete. Operations Research, 2022.

S. Guo and H. Xu, Statistical robustness in utility preference robust optimization models, Mathematical Programming Series A, 190: 679–720, 2021.

W. Wang and H. Xu, Robust spectral risk optimization when information on risk spectrum is incomplete, SIAM Journal on Optimization, 30: 3198--3229, 2020.

E. Anderson, H. Xu and D. Zhang, Varying confidence levels for CVaR risk measures and minimax limits., Mathematical Programming Series A, 180: 327-370, 2020.

H. Xu, Y. Liu and S. Sun, Distributionally robust optimization with matrix moment constraints: Lagrange duality and cutting plane methods. Mathematical Programming Series A, 169: 489-529, 2018.

D. Ralph and H. Xu , Convergence of stationary points of sample average two stage stochastic programs: a generalized equation approach, Mathematics of Operations Research, 36: 568-592, 2011.

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

H. Xu , An implicit programming approach for a class of stochastic mathematical programs with complementarity constraints, SIAM Journal on Optimization, 16: 670-696, 2006.

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.

YANG, Chen
楊晨

Assistant Professor
BSc (Zhejiang University)
PhD (National University of Singapore)

Research Interests
> Market Frictions
> Mathematical Finance
> Financial Technology

EMAIL: cyang@se.cuhk.edu.hk

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 market frictions, mathematical finance, and financial technology. His papers are published in or accepted by top journals such as The Review of Financial Studies, Management Science, and Mathematics of Operations Research.

Selected Publications

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..

Yizhou Cao, Min Dai, Steven Kou, Lewei Li and Chen Yang, "Designing Stable Coins", submitted for publication.

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.

Min Dai, Steven Kou and Chen Yang, "A Stochastic Representation for Nonlocal Parabolic PDEs with Applications", Mathematics of Operations Research, 47(3):1707-1730, 2022.

Sebastian Herrmann, Johannes Muhle-Karbe, Dapeng Shang and Chen Yang, "Inventory Management for High-frequency Trading with Imperfect Competition", SIAM Journal on Financial Mathematics, 11(1):1-26, 2020.

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.

YU, Xu Jeffrey
于旭

Professor
BE, ME, PhD (University of Tsukuba)

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

Email: yu@se.cuhk.edu.hk

Dr. Jeffrey Xu Yu is a Professor and the Chairman of the Department of Systems Engineering and Engineering Management, The Chinese University of Hong Kong. His current main research interests include keywords search in relational databases, graph mining, graph query processing, and graph pattern matching. 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 and CIKM'19, and the conference general co-chair of APWeb'13 and ICDM'18. 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

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, Jeffrey Xu Yu, Hao Zhang, Qiyan Li, and Yu Rong: "A Learned Sketch for Subgraph Counting", in Proceedings of the 2021 ACM SIGMOD International Conference on Management of Data (SIGMOD'21), 2021.

Can Lu, Jeffrey Xu Yu, Zhiwei Zhang, and Hong Cheng: "Graph Iso/Automorphism: A Divide-&-Conquer Approach", in Proceedings of the 2021 ACM SIGMOD International Conference on Management of Data (SIGMOD'21), 2021.

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.

Rong-Hua Li, Lu Qin, Fanghua Ye, Jeffrey Xu Yu, Xiaokui Xiao, Nong Xiao, and Zibin Zheng: "Skyline Community Search in Multi-valued Networks", in Proceedings of the 2018 ACM SIGMOD InternationalConference on Management of Data (SIGMOD'18), 2018.

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.

Can Lu, Jeffrey Xu Yu, Hao Wei, and Yikai Zhang: "Finding the maximum clique in massive graphs", in Proceedings of the VLDB Endowment (PVLDB), Vol 10, No. 11, 2017.

Hao Wei, Jeffrey Xu Yu, Can Lu, and Xuemin Lin: "Speedup Graph Processing by Graph Ordering", in Proceedings of the 2016 ACM SIGMOD International Conference on Management of Data (SIGMOD'16), 2016.

HO, Sin Cheung
何倩璋

Senior Lecturer
BSc, MSc (University of Stavanger)
PhD (University of Bergen)

Research Interests
> Bike sharing
> Vehicle routing
> Transportation
> Logistics
> Metaheuristics

EMAIL: sinho@se.cuhk.edu.hk

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. Before joining CUHK, she has held a faculty position at Aarhus University in Denmark for several years.

Selected Publications

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.

NG, Chi Kong
伍志剛

Senior Lecturer
BSc, MSc, MPhil (Hong Kong Baptist University)
PhD (The Chinese University of Hong Kong)

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

EMAIL: ckng@se.cuhk.edu.hk

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.

Tsan-Ming Choi, Jianjun Gao, James H. Lambert, Chi-Kong Ng, Jun Wang (Eds.), "Optimization and Control for Systems in the Big-Data Era: Theory and Applications," International Series in Operations Research & Management Science, Vol. 252, Springer, 2017.

Chi-Kong Ng and Duan Li, "Test Problem Generator for Unconstrained Global Optimization," Computers & Operations Research, Vol. 51, pp. 338-349, 2014. (see http://www.se.cuhk.edu.hk/~ckng/generator).

Chi-Kong Ng, Duan Li and Lian-Sheng Zhang, "Global Descent Method for Global Optimization," SIAM Journal on Optimization, Vol. 20, No. 6, pp. 3161-3184, 2010.

Chi-Kong Ng, Duan Li and Lian-Sheng Zhang, "Discrete Global Descent Method for Discrete Global Optimization and Nonlinear Integer Programming," Journal of Global Optimization, Vol. 37, No. 3, pp. 357-379, 2007.

Chi-Kong Ng, Duan Li and Lian-Sheng Zhang, "Filled Function Approaches to Nonlinear Integer Programming: A Survey," In S. H. Hou, X. M. Yang and G. Y. Chen (Editors), Frontiers in Optimization and Control, Kluwer Academic Publishers, pp. 125-148, 2007.

Chi-Kong Ng, Lian-Sheng Zhang, Duan Li and Wei-Wen Tian, "Discrete Filled Function Method for Discrete Global Optimization," Computational Optimization and Applications, Vol. 31, No. 1, pp. 87-115, 2005.

Lian-Sheng Zhang, Chi-Kong Ng, Duan Li and Wei-Wen Tian, "A New Filled Function Method for Global Optimization," Journal of Global Optimization, Vol. 28, No. 1, pp. 17-43, 2004.

Chi-Kong Ng, "High Performance Continuous/Discrete Global Optimization Methods," Doctor of Philosophy Dissertation, Department of Systems Engineering and Engineering Management, The Chinese University of Hong Kong, 2003.

Chi-Kong Ng, Li-Zhi Liao and Duan Li, "A Globally Convergent and Efficient Method for Unconstrained Discrete-Time Optimal Control," Journal of Global Optimization, Vol. 23, No. 3-4, pp.401-421, 2002.

TSANG, Ho Tak Patrick
曾浩德

Lecturer
BEng, MPhil, PhD (The Hong Kong University of Science and Technology)

Research Interests
> Applied Operations Research
> Data Analytics
> Logistics and Supply Chain Management
> Operations Management

EMAIL: tsanght@se.cuhk.edu.hk

Patrick Ho-Tak Tsang received his BEng, MPhil and PhD degrees in Industrial Engineering and Logistics Management from The Hong Kong University of Science and Technology (HKUST). He joined The Chinese University of Hong Kong (CUHK) in 2019. He currently is a lecturer of the Department of Systems Engineering and Engineering Management. Prior to CUHK, he was on the faculty of City University of Hong Kong. His research interests cover applied operations research, data analytics and operations management with applications from a broad range of fields such as transportation, logistics, supply chain management and healthcare operations. He was the recipient of teaching awards multiple times.

Patrick has extensive industry experiences from the sectors of banking, engineering, healthcare and procurement. Also, he is a certified Carbon Auditor.

Selected Publications

T.Z. Wong, H.T. Tsang and C.M. Chan A time-series analysis and approach on Carbon Trading in China Market. Bulletins of Hong Kong Statistical Society Vol.45, No.1 (April 2023)

Tsang HT., Mak HY. (2015) Robust Optimization Approach to Empty Container Repositioning in Liner Shipping. In: Lee CY., Meng Q. (eds) Handbook of Ocean Container Transport Logistics. International Series in Operations Research & Management Science, vol 220. Springer, Cham

HON, Hsiao Wuen
洪小文

Adjunct Professor
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

H.W. Hon, "AI for System - Infusing AI into Cloud Computing Systems", Abstract Proceedings of the 2021 ACM SIGMETRICS, May 2021, page 39-40.

H. Bao, L. Dong, F. Wei, W. Wang, N. Yang, X. Liu, Y. Wang, J. Gao, S. Piao, M. Zhou, H.W. Hon, "UniLMv2: Pseudo-Masked Language Models for Unified Language Model Pre-Training", 37th International Conference on Machine Learning (ICML 2020), July 2020

J. Li, S. Koyamada, Q. Ye, G. Liu, C. Wang, R. Yang, L. Zhao, T. Qin, T.Y Liu, H.W. Hon, "Suphx: Mastering Mahjong with Deep Reinforcement Learning", arXiv, April 2020

L. Dong, N. Yang, W. Wang, F. Wei, X. Liu, Y. Wang, J. Gao, M. Zhou, H.W. Hon, "Unified Language Model Pre-training for Natural Language Understanding and Generation", 33rd Conference on Neural Information Processing Systems (NeurIPS 2019), Vancouver, Canada, December 2019

J. Liu, Q. Wang, C.Y. Lin, H.W. Hon, "Question Difficulty Estimation in Community Question Answering Services", Proceedings of the 2013 Conference on Empirical Methods in Natural Language Processing, Seattle, USA, October 2013.

J. Liu, F. Zhang, X. Song, Y.I. Song, C.Y. Lin, H.W. Hon, "What's in a name?: an unsupervised approach to link users across communities", Proceedings of the sixth ACM international conference on Web search and data mining, Rome, Italy, February 2013.

R. Song, Q. Guo, R. Zhang, G. Xin, J. Wen, Y. Yu, H.W. Hon, "Select-the-Best-Ones: A new way to judge relative relevance", Information Processing & Management, Volume 47, Issue 1, Elsevier, January 2011, page 37-52.

R. Song, Z. Luo, J. Nie, Y. Yu, and H.W. Hon, "Identification of ambiguous queries in web search", International Journal on Information Processing and Management, Volume 45, Issue 2, March 2009, page 216-229.

B Erol, J Luo, S.F. Chang, M Etoh, H.W. Hon, Q. Lin, V. Setlur, "Mobile Media Search: Has Media Search Finally Found its Perfect Platform?", in ACM Multimedia 2009, Oct. 19-23, 2009.

J Cohen, M Etoh, H.W. Hon, J Luo, J. Schalkwyk, "Mobile Multimedia Search", in IEEE International Conference on Acoustics, Speech and Signal Processing, April 19-24, 2009.

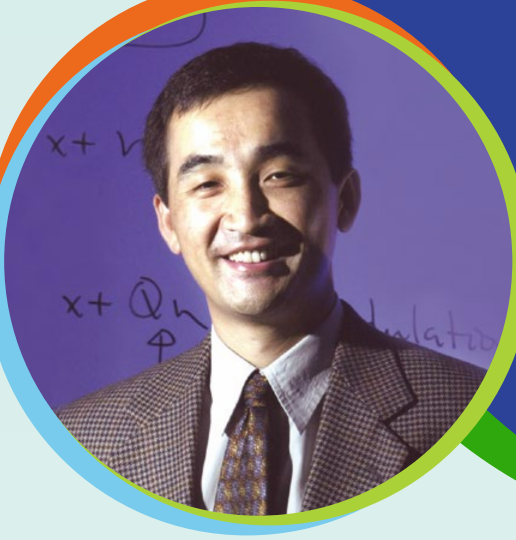
Y. Cao, C.Y. Lin, Y. Yu, and H.W. Hon. "Recommending Questions Using the MDL-based Tree Cut Model", in Proceedings of the 17th International World Wide Web Conference (WWW2008), Beijing, China, April 21-25, 2008.

R. Song, M. J. Taylor, J. Wen, H.W. Hon, and Y. Yu. "Viewing Term Proximity from a Different Perspective", Book chapter in book: Advances in Information Retrieval by Springer Berlin/Heidelberg, page 346-357.

W. Gao, C. Niu, J.Y. Nie, M. Zhou, J. Hu, K-F Wong, H.W. Hon "Cross-Lingual Query Suggestion Using Query Logs of Different Languages", 30th annual international ACM SIGIR-2007 conference, Amsterdam, Holland.

R. Song, Z. Luo, J.R. Wen, Y. Yu, H.W. Hon, "Identifying ambiguous queries in web search", Proceedings of the 16th international conference on World Wide Web 2007, Banff, Alberta, Canada.

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
羅智泉

Adjunct Professor
BS (Peking University)
PhD (Massachusetts Institute of Technology)

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

Zhi-Quan (Tom) Luo is the Vice President (Academic) of The Chinese University of Hong Kong, Shenzhen where he has been a professor since 2014. He is concurrently the Director of Shenzhen Research Institute of Big Data.

Professor Luo received his Ph.D. in Operations Research from MIT in 1989 and his B.S. degree in Mathematics in 1984 from Peking University, China. His research interests lie in the area of optimization, big data, signal processing and digital communication, ranging from theory, algorithms to design and implementation. He served as the Chair of the IEEE Signal Processing Society Technical Committee on Signal Processing for Communications (SPCOM) and the Editor in Chief for IEEE Transactions on Signal Processing (2012--2014), and was an Associate Editor for many internationally recognized journals.

Professor Luo is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE) and the Society for Industrial and Applied Mathematics (SIAM). He received the 2010 Farkas Prize from the INFORMS Optimization Society, and the 2018 Paul Y. Tseng Memorial Lectureship from the Mathematical Optimization Society. He also received three Best Paper Awards in 2004, 2009 and 2011, a Best Magazine Paper Award in 2015, all from the IEEE Signal Processing Society, and a 2011 Best Paper Award from the EURASIP. In 2014, he was elected to the Royal Society of Canada. Professor Luo was elected to the Chinese Academy of Engineering (as a foreign member) in 2021, and was awarded the Wang Xuan Applied Mathematics Prize in 2022 by the China Society of Industrial and Applied Mathematics.

Selected Publications

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.

X. Zhao, S. Lu, Q. Shi and Z. -Q. Luo, "Rethinking WMMSE: Can Its Complexity Scale Linearly With the Number of BS Antennas?," in IEEE Transactions on Signal Processing, vol. 71, pp. 433-446, 2023.

S. Ren, K. Shen, Y. Zhang, X. Li, X. Chen and Z. -Q. Luo, "Configuring Intelligent Reflecting Surface With Performance Guarantees: Blind Beamforming," in IEEE Transactions on Wireless Communications, vol. 22, no. 5, pp. 3355-3370, May 2023.

Qingyan Meng, Shen Yan, Mingqing Xiao, Yisen Wang, Zhouchen Lin, Zhi-Quan Luo, "Training much deeper spiking neural networks with a small number of time-steps," in Neural Networks, vol. 153, pp. 254-268, 2022.

Y. -B. Zhao and Z. -Q. Luo, "Natural Thresholding Algorithms for Signal Recovery With Sparsity," in IEEE Open Journal of Signal Processing, vol. 3, pp. 417-431, 2022.

J. Zhang, S. Ge, T. -H. Chang and Z. -Q. Luo, "Decentralized Non-Convex Learning with Linearly Coupled Constraints: Algorithm Designs and Application to Vertical Learning Problem," in IEEE Transactions on Signal Processing, vol. 70, pp. 3312-3327, 2022.

N. Reyhanian, H. Farmanbar and Z. -Q. Luo, "Resource Reservation in Backhaul and Radio Access Network With Uncertain User Demands," in IEEE Transactions on Vehicular Technology, vol. 71, no. 10, pp. 10878-10893, Oct. 2022.

Y. Zhang, K. Shen, S. Ren, X. Li, X. Chen and Z. -Q. Luo, "Configuring Intelligent Reflecting Surface With Performance Guarantees: Optimal Beamforming," in IEEE Journal of Selected Topics in Signal Processing, vol. 16, no. 5, pp. 967-979, Aug. 2022.

Jiawei Zhang, Zhi-Quan Luo, "A global dual error bound and its application to the analysis of linearly constrained nonconvex optimization," in SIAM Journal on Optimization, vol. 32, no. 3, pp. 2319-2346, 2022.

Atefeh Khatiri, Ghasem Mirjalily, Zhi-Quan Luo, "Balanced resource allocation for VNF service chain provisioning in inter-datacenter elastic optical networks," in Computer Networks, vol. 203, Feb. 2022.

M. Asgarian, G. Mirjalily and Z. -Q. Luo, "Trade-Off Between Efficiency and Complexity in Multi-Stage Embedding of Multicast VNF Service Chains," in IEEE Communications Letters, vol. 26, no. 2, pp. 429-433, Feb. 2022.

N. Reyhanian and Z. -Q. Luo, "Data-Driven Adaptive Network Slicing for Multi-Tenant Networks," in IEEE Journal of Selected Topics in Signal Processing, vol.16, no. 1, pp. 113-128, Jan. 2022.

Jiawei Zhang, Yushun Zhang, Mingyi Hong, Ruoyu Sun, Zhi-Quan Luo, "When Expressivity Meets Trainability: Fewer than n Neurons Can Work," in Advances in Neural Information Processing Systems, vol. 34, December. 2021.

Siddharth Roheda, Hamid Krim, Zhi-Quan Luo, Tianfu Wu, "Event driven sensor fusion," in Signal Processing, vol. 188, pp. 108-241, November 2021.

Yun-Bin Zhao, Zhi-Quan Luo, "Analysis of optimal thresholding algorithms for compressed sensing," in Signal Processing, vol. 187, pp. 108-148, October 2021.

Z. Wang, J. Zhang, T. -H. Chang, J. Li and Z. -Q. Luo, "Distributed Stochastic Consensus Optimization With Momentum for Nonconvex Nonsmooth Problems," in IEEE Transactions on Signal Processing, vol. 69, pp. 4486-4501, 2021.

YAN, Houmin
嚴厚民

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 Hongkong Academy of Finance, he is also a member of EQUIS Committee, EFMD, and a member of CIR Committee, AACSB.

Selected Publications

Xie, Yangyang; Xie, Lei; Lu, Meng; Yan, Houmin / Performance-Price-Ratio Utility: Market Equilibrium Analysis and Empirical Calibration Studies. May 2021; In: Production and Operations Management. Vol. 30, No. 5, pp. 1442–1456

Bensoussan, Alain; Xie, Yangyang; Yan, Houmin / Joint Inventory-pricing Optimization with General Demands: An Alternative Approach for Concavity Preservation. September 2019; In: Production and Operations Management. Vol. 28, No. 9, pp. 2390-2404

Yan, Houmin; Yano, Candace Arai; Zhang, Hanqin / Inventory Management under Periodic Profit Targets. June 2019; In: Production and Operations Management. Vol. 28, No. 6, pp. 1387–1406

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

Wang, Haifeng; Liang, Xiaoying; Sethi, Suresh; Yan, Houmin / Inventory commitment and prioritized backlogging clearance with alternative delivery lead times. July 2014; In: Production and Operations Management. Vol. 23, No. 7, pp. 1227-1242

Buzacott, John; Yan, Houmin; Zhang, Hanqin / Risk analysis of commitment-option contracts with forecast updates. June 2011; In: IIE Transactions (Institute of Industrial Engineers). Vol. 43, No. 6, pp. 415-431

Wang, Haifeng; Yan, Houmin / Inventory management for customers with alternative lead times. November 2009; In: Production and Operations Management. Vol. 18, No. 6, pp. 705-720

Sethi, Suresh P.; Yan, Houmin; Zhang, Hanqin; Zhou, Jing / A supply chain with a service requirement for each market signal. May 2007; In: Production and Operations Management. Vol. 16, No. 3, pp. 322-342

Feng, Qi; Sethi, Suresh P.; Yan, Houmin; Zhang, Hanqin / Are base-stock policies optimal in inventory problems with multiple delivery modes?. July 2006; In: Operations Research. Vol. 54, No. 4, pp. 801-807

Gan, Xianghua; Sethi, Suresh P.; Yan, Houmin / Channel coordination with a risk-neutral supplier and a downside-risk-averse retailer. March 2005; In: Production and Operations Management. Vol. 14, No. 1, pp. 80-89

Gan, Xianghua; Sethi, Suresh P.; Yan, Houmin / Coordination of supply chains with risk-averse agents. June 2004; In: Production and Operations Management. Vol. 13, No. 2, pp. 135-149

Lee, Chung-Yee; Tan, Sitong; Yan, Houmin / Designing an assembly process with stochastic material arrivals. September 2003; In: IIE Transactions (Institute of Industrial Engineers). Vol. 35, No. 9, pp. 803-815

Sethi, Suresh P.; Yan, Houmin; Zhang, Hanqin / Inventory models with fixed costs, forecast updates, and two delivery modes. March 2003; In: Operations Research. Vol. 51, No. 2

Yan, Houmin; Liu, Ke; Hsu, Arthur / Optimal ordering in a dual-supplier system with demand forecast updates. March 2003; In: Production and Operations Management. Vol. 12, No. 1, pp. 30-45

MILTENBURG, John; CHENG, Chun Hung; YAN, Houmin / Analysis of wafer fabrication facilities using four variations of the open queueing network decomposition model. March 2002; In: IIE Transactions (Institute of Industrial Engineers). Vol. 34, No. 3, pp. 263-272

Sethi, S. P.; Yan, H.; Zhang, H.; Zhang, Qing / Optimal and hierarchical controls in dynamic stochastic manufacturing systems: A survey. March 2002; In: Manufacturing and Service Operations Management. Vol. 4, No. 2, pp. 133-170

Feng, Youyi; Yan, Houmin / Optimal production control in a discrete manufacturing system with unreliable machines and random demands. December 2000; In: IEEE Transactions on Automatic Control. Vol. 45, No. 12, pp. 2280-2296

Yan, Houmin; Lou, Sheldon; Sethi, Suresh P. / Robustness of various production control policies in semiconductor manufacturing. June 2000; In: Production and Operations Management. Vol. 9, No. 2, pp. 171-182

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

Cheng, Feng; Yan, Houmin; Yang, Jun / Production scheduling of continuous flow lines: Multiple products with setup times and costs. December 1998; In: Production and Operations Management. Vol. 7, No. 4, pp. 387-400

Yan, H.; Zhang, Q. / A numerical method in optimal production and setup scheduling of stochastic manufacturing systems. 1997; In: IEEE Transactions on Automatic Control. Vol. 42, No. 10, pp. 1452-1455

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.

Analysis of Drawdown Risk

L. Li

Investors demand protection against sharp price falls, which are not uncommon in financial markets. A key concept in measuring the severity of price drops is drawdown, which shows how much the asset price falls relative to its historical maximum. In this project, we study how to price and hedge several types of drawdown derivatives that can provide effective protection against drawdown risk.

Data-Driven Deep Learning Methods for Financial Decision Making

L. Li

Investors demand protection against sharp price falls, which are not uncommon in financial markets. A key concept in measuring the severity of price drops is drawdown, which shows how much the asset price falls relative to its historical maximum. In this project, we study how to price and hedge several types of drawdown derivatives that can provide effective protection against drawdown risk.

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.

Markov Chain Approximation for Option Pricing and Hedging

L. Li

Markov chain approximation provides a general approach to handle Markovian asset price models in a unified and efficient way. In this project, we develop algorithms using Markov chain approximation for pricing and hedging exotic options with complex features and solve the challenging problem of convergence rate analysis.

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 extreme-yet-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-yet-plausible 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.

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 next-generation 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 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 real-world 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.

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.

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 semi-structured 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 pattern-based 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.

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.

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.

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.

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.

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 non-industrial 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.

Capacity Planning in Project Management

Z. Y. Long

This work studies a financially significant planning problem that arises in project management. Companies that face uncertainties in project execution may need to reserve capacity with outsourced providers. Given that decision, they further need to plan their operational decisions to protect against a bad outcome. We model and solve this problem via adjustable distributionally robust optimization. While this problem involves two-stage decision making, which is computationally challenging in general, we develop a computationally efficient algorithm to find the exact optimal solution for instances of practical size.

Impact of Penalty Cost on Booking Decisions

Z. Y. Long

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. The results and insights from our study provide guidelines for firms to set their optimal penalty prices.

Inventory Routing 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.

Preservation of Supermodularity and Its Application on Supply Chain

Z.Y. Long

We conduct 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. Further, we identify some classes of polyhedral sets which satisfy these concepts. Finally, we illustrate the use of our results in assemble-to-order systems.

The Impact of a Target on Newsvendor Decisions

Z.Y. Long

We investigate the impact of a target on newsvendor decisions. Different to the existing approach that maximizes the probability of the profit reaching the target, we model the effect of a target by maximizing the satisficing measure of a newsvendor's profit with respect to that target. We study two satisficing measures: i) CVaR satisficing measure that evaluates the highest confidence level of CVaR achieving the target; and ii) Entropic satisficing measure that assesses the smallest risk tolerance level under which the certainty equivalent for exponential utility function achieves the target. For both satisficing measures, we find that the optimal ordering quantity increases with the target level. Further, the newsvendor orders more than the risk-neutral solution (over-order) sometimes and less than that (under-order) other times, depending on the target level. The more interesting finding is that if the target is proportional to the unit marginal profit and is also determined by only one other demand-related factor, then the newsvendor over-orders low-profit product and under-orders high-profit product.

What is Operations Research?

Operations research combines the applications of optimization, probability and statistics to solve problems in different domains 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.

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.

Distributionally Robust Discrete Optimization

Z. Y. Long

We study the discrete optimization problem under the distributionally robust framework. We optimize the Entropic Value-at-Risk, which is a coherent risk measure and is also known as Bernstein approximation for the chance constraint. We propose an efficient approximation algorithm to resolve the problem via solving a sequence of nominal problems. The computational results show that the number of nominal problems required to be solved is small under various distributional information sets.

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.

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 closely-related 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.

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.

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 large-scale 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 objective-level 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.

Risk in Project Selection

Z. Y. Long

We consider a project selection problem where each project has an uncertain return with partially characterized probability distribution. The decision maker selects a feasible subset of projects so that the risk of the portfolio return not meeting a specified target is minimized. We minimize the underperformance risk of the project portfolio, which we define as the reciprocal of the absolute risk aversion (ARA) of an ambiguity averse individual with constant ARA who is indifferent between the target return with certainty and the uncertain portfolio return. Our model captures correlation and interaction effects such as synergies. We solve the model using binary search, and obtain solutions of the subproblems from Benders decomposition techniques. A computational study shows that project portfolios generated by minimizing the underperformance risk are more than competitive in achieving the target with those found by benchmark approaches, including maximization of expected return, minimization of underperformance probability, mean-variance analysis, and maximization of Roy's (1952) safety first ratio. As a simpler alternative, we describe a greedy heuristic, which routinely provides project portfolios with near optimal underperformance risk.

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.

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.

Target-based Dynamic Decision Making

Z. Y. Long

We investigate a dynamic decision model that facilitates a target-oriented decision maker in regulating her risky consumption based on her desired target consumption level in every period in a finite planning horizon. We focus on dynamic operational decision problems of a firm where risky cash flows are being resolved over time. The firm can finance consumption by borrowing or saving to attain prescribed consumption targets over time. To evaluate the ability of the consumption in meeting respective targets, we propose the Consumption Shortfall Risk (CSR) criterion, which has salient properties of attainment content, starvation aversion, subadditivity and positive homogeneity. We show that if borrowing and saving are unrestricted and their interest rates are common, the optimal policy that minimizes the CSR criterion is to finance consumption at the target level for all periods except the last. For general convex dynamic decision problems, the optimal policies correspond to those that maximize an additive expected utility, in which the underlying utility functions are concave and increasing. Despite the interesting properties, this approach violates the principle of normative utility theory and we discuss the limitations of our target-oriented decision model.

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.

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 Courses	14 units
Total:		75 units

Term 1

	Course Title	Unit
FINA2310	Fundamentals of Business Finance	6
MATH1510	Calculus for Engineers	
		6

Term 2

	Course Title	Unit
ENGG1110/ESTR1002	Problem Solving By Programming	9
ENGG1120/ESTR1005	Linear Algebra for Engineers	
ENGG1130/ESTR1006	Multivariable Calculus for Engineers	
ECON2011	Basic Microeconomics	3
		12

Term 3

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

Term 4

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

Term 5

	Course Title	Unit
CSCI4130/IERG4130/ESTR4306	Introduction to Cyber Security	9
FTEC3001/	Financial Innovation and Structured Products	
FTEC3002	Introduction to Financial Infrastructures	
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, 4003, FTEC4004/IERG4004, FTEC4005, 4006, 4007, 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
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
FTEC4003	Data Mining for FinTech
FTEC4004/ IERG4004	E-payment Systems and Cryptocurrency Technologies
FTEC4005	Financial Informatics
FTEC4006	Internet Finance
FTEC4007	Introduction to Blockchain and Distributed Ledger Technology
IERG4080/ ESTR4312	Building Scalable Internet-based Services
IERG4210	Web Programming and Security
MKTG4120	Quantitative Marketing
SEEM3410	System Simulation
SEEM3450/ ESTR3502	Engineering Innovation and Entrepreneurship
SEEM3570/ ESTR3508	Stochastic Models
SEEM3580	Risk Analysis for Financial Engineering
SEEM4730/ ESTR4508	Statistics Modeling and Analysis in Financial Engineering

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.

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	3
MATH1510	Calculus for Engineers	3
		6

Term 2

	Course Title	Unit
ENGG1120/ESTR1005	Linear Algebra for Engineers	6
ENGG1130/ESTR1006	Multivariable Calculus for Engineers	
ENGG1310/ESTR1003/	Engineering Physics: Electromagnetics, Optics and Modern Physics	2
ENGG2720/ESTR2014/	Complex Variables for Engineers	
ENGG2740/ESTR2016/	Differential Equations for Engineers	
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	
SEEM2602	Systems Engineering Practicum	
		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
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	Statistics Modeling and Analysis in Financial Engineering
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: http://www.cuhk.edu.hk/gss

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 http://www.cuhk.edu.hk/gss 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
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
ENGG5103	Techniques for Data Mining
ENGG5104	Image Processing and Computer Vision
ENGG5105	Computer and Network Security
ENGG5106	Information Retrieval and Search Engines
ENGG5108	Big Data Analytics
ENGG5202	Pattern Recognition
ENGG5281	Advanced Microwave Engineering
ENGG5282	Nanoelectronics
ENGG5291	Fiber Optics: Principles and Technologies
ENGG5301	Information Theory
ENGG5303	Advanced Wireless Communications
ENGG5383	Applied Cryptography
ENGG5392	Lightwave System Technologies
ENGG5402	Advanced Robotics
ENGG5403	Linear System Theory and Design
ENGG5404	Micromachining and Microelectromechanical Systems
ENGG5501	Foundations of Optimization
ENGG5601	Principles of Biomechanics and Biomaterials
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 2023-2024, the monthly stipend is around HK$18,360 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: http://www.cuhk.edu.hk/gss

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 (Full-time 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	
ECLT5740	Cryptography, Information Security and E-Commerce
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

* 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: http://www.cuhk.edu.hk/gss

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 (Full-time 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
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

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 All Nippon Airways, Convoy Financial Services, Deloitte Touche Tohmatsu, ESRI, FTI Consulting, HSBC, IKEA, Mitsui O.S.K. Lines, Prudential Brokerage, Toshiba, UOB Kay Hian, Hang Seng, Bowtie, Animae Technologies Limited and Intact Financial (HK) Limited.

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 RFID-enabled 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:

	Grant	Project TItle	Amount
D. Ahn	CUHK - Research Committee - Direct Grants	Tail Risk Quantification under Model Uncertainty	HK$43,170
D. Ahn	Research Grants Council (RGC) - Early Career Scheme (ECS)	Multivariate Stress Testing of Financial Networks for Systemic Risk Management	HK$529,972
N. Chen	Applied Simulations Research Ltd	Robust Optimization of Speculative Trading Portfolios and Its Applications in Horse Racing Betting	HK$750,000
N. Chen	Research Grants Council (RGC) - General Research Fund (GRF)	Probability Density Expansion of Multivariate Jump-Diffusion Processes and Its Applications in Finance	HK$873,995
N. Chen	Research Grants Council (RGC) - General Research Fund (GRF)	Duality-Based Dynamic Programming: A Model-Free Learning Approach to Stochastic Control Problems	HK$978,709
H. Cheng	CUHK - Research Committee - Direct Grants	Scalable Clustering for Evolving Networks	HK$88,621
H. Cheng	Huawei Technologies Co., Ltd	Application of Fault Prediction and Classification Technology Based on Neural Network in Intelligent Maintenance	HK$1,050,750
H. Cheng	Huawei Technologies Co., Ltd	Discriminative Pattern Mining and Causal Analysis Technology Research	HK$955,125
X.F. Gao	Research Grants Council (RGC) - General Research Fund (GRF)	Robust Learning on Dynamic Graphs	HK$1,086,185
X.F. Gao	Research Grants Council (RGC) - General Research Fund (GRF)	Logarithmic Regret Bounds for Learning in Continuous-Time Markov Decision Processes	HK$745,437
X.F. Gao	Research Grants Council (RGC) - General Research Fund (GRF)	Multi-Armed Bandit Problems with Regime-Switching Rewards	HK$775,200
X.F. Gao	Research Grants Council (RGC) - General Research Fund (GRF)	Temperature Control for Langevin Diffusions	HK$706,936
X.F. Gao	Research Grants Council (RGC) - General Research Fund (GRF)	Online Learning In Games and Algorithmic Collusion	HK$658,524
X.D. He	Research Grants Council (RGC) - General Research Fund (GRF)	Portfolio Diversification with Realization Utility	HK$675,611
X.D. He	Research Grants Council (RGC) - General Research Fund (GRF)	Study of Two Time-Inconsistent Asset Pricing Problems	HK$614,675

	Grant	Project TItle	Amount
W. Lam	Alibaba DAMO Academy (Hangzhou) Technology Co., Ltd	Cross-Lingual Transfer Learning for Fine-Grained Low-Resource Language Processing	HK$750,000
W. Lam	Alibaba DAMO Academy (Hangzhou) Technology Co., Ltd	Time-Aware Knowledge Learning for Language Model Pre-Training	HK$543,000
W. Lam	CUHK - Research Committee - Direct Grants	Continual Learning of Heterogeneous Natural Language Understanding Tasks	HK$43,170
W. Lam	Research Grants Council (RGC) - General Research Fund (GRF)	Complex Question Answering Via Reasoning Across Multiple Text Passages and Application for E-Commerce	HK$731,089
W. Lam	Research Grants Council (RGC) - General Research Fund (GRF)	Knowledge-Guided Text Response Generation for Information-Seeking User Utterances from Heterogeneous Information Sources	HK$602,349
W. Lam	Transport Department, HKSAR Government	Study on Large Vehicle Detection and Notification System for Tai Tam Road (Dam Section)	HK$800,000
L.F. Li	Research Grants Council (RGC) - General Research Fund (GRF)	Data-Driven Deep Learning Methods for Financial Engineering	HK$701,160
L.F. Li	Research Grants Council (RGC) - General Research Fund (GRF)	Pricing and Hedging Drawdown Derivatives in Financial Engineering	HK$507,780
L.F. Li	Research Grants Council (RGC) - General Research Fund (GRF)	Reinforcement Learning for the Optimal Trade Execution Problem in Financial Engineering	HK$715,891
X.Y. Liu	Innovation and Technology Commission - Innovation and Technology Support Programme (ITSP)	Towards Energy Efficient AI Technologies: Development of Low-Gootprint and High-accuracy Audio-visual Multi-Channel Microphone Array Based Multi-Domain Speech Recognition Systems for Cocktail Party Mixed Speech	HK$1,399,999
X.Y. Liu	Research Grants Council (RGC) - General Research Fund (GRF)	Deep Learning Architectures for Automatic Recognition of Dysarthric Speech	HK$845,055
X.Y. Liu	Research Grants Council (RGC) - General Research Fund (GRF)	High-Performance Low-Footprint Speech Recognition Using Mixed Precision Deep Neural Network Quantization	HK$838,393
Z.Y. Long	National Natural Science Foundation (NSFC) of China - 國家自然科學基金 - 面上項目	(Non-CUHK Project) The Role of Supermodularity in Robust Optimization: Theory and Its Application in Supply Chain Management (Total awarded amount:RMB490,000, no funding transferred to CUHK)	CNY490,000
Z.Y. Long	Research Grants Council (RGC) - Collaborative Research Fund (CRF) for 2020/21 One-off CRF Coronavirus Disease (COVID-19) and Novel Infectious Disease (NID) Research Exercise	(Non-CU) Mitigation Strategies and Operations in Confronting Novel Infectious Disease (Awarded amount: HK$1,058,400; total direct project cost HK$630,000 transferred to CUHK as 1st installment)	HK$3,902,764
Z.Y. Long	Research Grants Council (RGC) - General Research Fund (GRF)	Supermodularity in Two Stage Distributionally Robust Optimization	HK$712,306
Z.Y. Long	Research Grants Council (RGC) - General Research Fund (GRF)	Assortment Optimization with Distributionally Uncertainty	HK$711,143
H. MENG, X.Y. Liu	Research Grants Council (RGC) - Theme-based Research Scheme (TRS)	Research and Development of Artificial Intelligence in Extraction and Identification of Spoken Language Biomarkers for Screening and Monitoring of Neurocognitive Disorders [(Project Coordinator: Professor MENG Helen Mei-ling - CUHK; Total approved budget: HKD50M; RGC fund received by CUHK: HKD40.680M; CUHK matching: HKD4.52M (incl. on-costs and PC allowance)]	HK$50,000,000
H. Meng	Microsoft Hong Kong Ltd	2022 Proposal for the CUHK MoE-Microsoft Key Laboratory of Human-centric Computing and Interface Technologies	HK$352,000
H. Meng	Microsoft Research Asia	2022 Proposal for the CUHK MoE-Microsoft Key Laboratory of Human-centric Computing and Interface Technologies	HK$233,000
H. Meng	Research Committee Group Research Scheme	Hyperscanning to Explore the Human Mind in Ensemble	HK$50,000

	Grant	Project TItle	Amount
H. Meng	Research Grants Council (RGC) - Collaborative Research Fund (CRF)	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)	HK$16,660,300
H. Meng	Research Grants Council (RGC) - General Research Fund (GRF)	Research and Development of a Convex Polytopic Model for Task-Oriented Dialog Modeling with Minimal Supervision	HK$731,089
H. Meng	Research Grants Council (RGC) - Research Impact Fund (RIF)	Innovative Diagnosis And Treatment for Shrimp Allergy (Amount awarded from RGC: $8,397,098; Matching from CUHK: $3,598,756)	HK$8,397,098
H. Meng	The Hong Kong Jockey Club - The Hong Kong Jockey Club Charities Trust	CUHK Jockey Club A1 for the Future Project	HK$59,980,000
V.A. Nguyen	CUHK - Research Committee - Direct Grants	Efficient Failure Pattern Identification of Analytics Systems	HK$150,000
M.C. So	Research Grants Council (RGC) - General Research Fund (GRF)	Design and Analysis of First-Order Methods for Wasserstein Distributionally Robust Risk Minimization in Machine Learning	HK$614,675
M.C. So	Research Grants Council (RGC) - General Research Fund (GRF)	Towards Provably Efficient and Effective Methods for Non-Convex Group Synchronization	HK$815,601
M.C. So	Research Grants Council (RGC) - General Research Fund (GRF)	Towards Understanding the Hardness of Structured Non-Smooth Non-Convex Optimization Problems	HK$946,348
M.C. So	The Hong Kong Jockey Club - Hong Kong Jockey Club	Odds Verification for the Forecast, Tierce and Trio Merged Pool	HK$500,000
M.C. So	Research Grants Council (RGC) - General Research Fund (GRF)	Towards Understanding the Complexity of Approximate Stationarity Concepts in Structured Non-Convex, Non-Smooth Optimization	HK$1,068,950
H.T. Wai	CUHK - Research Committee - Direct Grants	Communication Efficient Stochastic Optimization Algorithms on Network	HK$43,170
H.T. Wai	CUHK - Research Committee - Direct Grants	Inferring Coarse Features of Network under Less Assumption on Data	HK$124,311
H.T. Wai	Research Grants Council (RGC) - Early Career Scheme (ECS)	Multiple Structure Factor Analysis with Applications to Multi-Graph Learning	HK$726,432
H.T. Wai	Research Grants Council (RGC) - ECS Grant / Award	Multiple Structure Factor Analysis with Applications to Multi-Graph Learning	HK$50,000
S.B. Wang	CUHK - Research Committee - Direct Grants	Efficient Algorithms for Influence Maximization	HK$126,688
S.B. Wang	Huawei Tech. Investment Co. Ltd	Distributed Linear Algebraic Graph Algorithms	HK$1,105,000
S.B. Wang	Research Grants Council (RGC) - Collaborative Research Fund (CRF)	(Mis)communication, Trust, and Information Environments: A Comparative Study of the COVID-19 "Infodemics" in Four Chinese Societies	HK$3,067,301
S.B. Wang	Research Grants Council (RGC) - Early Career Scheme (ECS)	Efficient Random Walk Based Query Processing on Massive Graphs	HK$611,442
S.B. Wang	Research Grants Council (RGC) - ECS Grant / Award	Efficient Random Walk Based Query Processing on Massive Graphs	HK$50,000
S.B. Wang	Research Grants Council (RGC) - General Research Fund (GRF)	Large Scale Graph Embedding	HK$690,300
K.F. Wong	CUHK - Research Committee - Direct Grants	An Explainable AI Framework for Mental Health with Robot for Child Well-being Therapy	HK$43,170
K.F. Wong	CUHK - Research Committee - Direct Grants	An Explainable Framework for Medical Diagnosis by Analyzing Medical Dialogue	HK$88,621
K.F. Wong	Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies Limited	Providing R&D and System Support for the Trolley Management System	HK$167,000

	Grant	Project TItle	Amount
K.F. Wong	Innovation and Technology Commission - General Support Program; Hong Kong Science & Technology Parks Corp.; Find Solution AI Limited	Innovation and Technology Student Club 2021-23	HK$1,323,366
K.F. Wong	Innovation and Technology Commission - General Support Program; Mitsubishi Electric (Hong Kong) Ltd; Hong Kong Science and Technology Parks Corporation	Robotics, STEM and Green Innovation (Phase 2)	HK$3,823,266
K.F. Wong	Innovation and Technology Commission - General Support Program; Trumptech Digital Education Services Ltd	ASSETE: ASsessment Scheme for Engineering and Technology Education	HK$7,080,469
K.F. Wong	Innovation and Technology Commission - Innovation and Technology Fund Public Sector Trial Scheme (PSTS)	Trial: Augmented Recommendation System to Identify Potential Inward Investment in Hong Kong	HK$3,194,882
K.F. Wong	Innovation and Technology Commission - Innovation and Technology Fund Research Talent Hub (Dr LIANG Bin, Dr LIU Fang, LING Neiwen)	A Knowledge Graph Based Dynamic Video Extractive Summarisation System (PRP/054/21FX Research Talent: Dr LIANG Bin)	HK$1,302,365
K.F. Wong	Innovation and Technology Commission - Partnership Research Programme (PRP); Find Solution AI Limited	A Knowledge Graph Based Dynamic Video Extractive Summarisation System	HK$1,587,000
K.F. Wong	The Chinese University of Hong Kong - Research Committee Funding for Research Sustainability of Major RGC Funding Schemes	Research and Development of Embodied Conversational Agent (ECA) on Mental Health	HK$400,000
K.F. Wong	Knowledge Transfer Project Fund (KPF)	ECA on Mental Health with Humanoid Robot for Child Well-being Therapy	HK$400,000
H. Xu	Research Grants Council (RGC) - General Research Fund (GRF)	Multi-Attribute Utility Preference Robust Optimization and Robust Spectral Risk Optimization	HK$1,155,000
H. Xu	Research Grants Council (RGC) - General Research Fund (GRF)	Statistical Robust Analysis of Stochastic Generalized Equations with Applications in Machine Learning and Stochastic Equilibrium Problems	HK$815,601
C. Yang	Research Grants Council (RGC) - Early Career Scheme (ECS)	High-Dimensional Continuous-Time Portfolio Selection with Capital Gains Tax	HK$523,231
C. Yang	Research Grants Council (RGC) - General Research Fund (GRF)	Continuous-Time Nonconcave Portfolio Selection with General Payoffs and Transaction Costs	HK$670,802
J. Yu	Research Grants Council (RGC) - General Research Fund (GRF)	Incremental Graph Computing	HK$1,057,394
J. Yu	Research Grants Council (RGC) - General Research Fund (GRF)	To Support Machine Learning by Query Processing Techniques	HK$731,089
-	Donation + Matching	Patrick Huen Wing Ming Professorship of Systems Engineering and Engineering Management	-
-	Donation	Department of SEEM Distinguished Lecture Series and Dr. Ina Chan Fellowship	HK$3,000,000

Department of Systems Engineering and Engineering Management
系統工程與工程管理學系

Tel: (852) 3943 8215 / 8313 / 8468 / 8470

Fax: (852) 2603 5505

https://seem.se.cuhk.edu.hk