

# International Forum on Data Science Approaches to the COVID-19 Pandemic

**Date: 28 and 29 May 2020  
(Thursday and Friday)**

**Time: 9:00 am – 12:00nn  
(GMT +08:00)**

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Co-organised by School of Data Science, College of Business and Hong Kong Institute for Data Science, City University of Hong Kong.

This event is sponsored by TRS Project (Grant Number: T32-102/14N) of Prof Youhua Frank CHEN.

# PROGRAM RUNDOWN

## International Forum on Data Science Approaches to the COVID-19 Pandemic 28 May 2020

<b>28 May 2020 (Thur) (GMT +08:00)</b>		
8:30am - 9:00am	Online Sign-in and Virtual Reception	
9:00am - 9:10am	Welcoming Address	Prof Way KUO (City University of Hong Kong)
9:10am - 9:40am	Keynote speech: Learning from COVID-19 Data in Wuhan, USA and the World on Intervention Strategies	Prof Xihong LIN (Harvard University)
9:40am - 9:50am	Q & A Session	Prof S Joe QIN (City University of Hong Kong)
<b>Speakers' presentation: The COVID-19 Pandemic</b> <b>Chair: Prof Houmin YAN (CityU)      Co-chair: Dr Long FENG (CityU)</b>		
9:50am - 10:10am	A Simple Projection Model for COVID-19 Pandemic	Prof Jian LU (City University of Hong Kong)
10:10am - 10:30am	COVID-19 Dashboard for New York State	Prof Fengqi YOU (Cornell University)
10:30am – 10:50am	Modeling the Heterogeneous Disease- Behavior-Information Dynamics during Epidemics	Dr Qingpeng ZHANG (City University of Hong Kong)
10:50am - 11:10am	Prevention of COVID-19 after the Relaxation of Control Measures	Dr Sean YUAN (City University of Hong Kong)
11:10am - 11:30am	Social Data for Changing and Predicting Health Behaviors	Prof Sean YOUNG (University of California, Irvine)
11:30am - 11:35am	Wrap-up for the day	Prof Houmin YAN (City University of Hong Kong)  Dr Long FENG (City University of Hong Kong)

# PROGRAM RUNDOWN

## International Forum on Data Science Approaches to the COVID-19 Pandemic 29 May 2020

<b>29 May 2020 (Fri) (GMT +08:00)</b>		
8:30am - 9:00am	Online Sign-in and Virtual Reception	
9:00am - 9:30am	Keynote speech: Supply Chain Resiliency and the Need for Stress-Tests	Prof David SIMCHI-LEVI (Massachusetts Institute of Technology)
9:30am - 9:40am	Q & A Session	Prof Frank CHEN (City University of Hong Kong)
<b>Speakers' presentation: <i>The COVID-19 Pandemic Impact and Responses</i> Chair: Dr Qingpeng ZHANG (CityU) Co-chair: Dr Xinyue LI (CityU)</b>		
9:40am - 10:00am	Mechanistically Inspired Data-driven COVID-19 Pandemic Modeling	Prof S Joe QIN (City University of Hong Kong)
10:00am - 10:20am	Modeling, State Estimation, and Optimal Control for the US COVID-19 Outbreak	Dr Michael BALDEA (The University of Texas at Austin)
10:20am - 10:40am	COVID-19 Pandemic – Impact on Food Supply Chains: Lessons Learnt for Hong Kong	Prof Frank CHEN (City University of Hong Kong)
10:40am - 11:00am	Constructing the Infection Curve of the Local Cases of the Coronavirus Disease (“COVID-19”) in Hong Kong Using Backprojection	Prof Paul YIP (University of Hong Kong)
11:00am - 11:20am	The Power of Small Data through the Lens of COVID-19 Pandemic	Prof Jie LIU (Harbin Institute of Technology)
11:20am - 12:00nn	Wrap-up Panel Discussion	Prof S Joe QIN (City University of Hong Kong)  Dr Qingpeng ZHANG (City University of Hong Kong)

# TOPICS AND ABSTRACTS

## KEYNOTE I: Learning from COVID-19 Data in Wuhan, USA and the World on Intervention Strategies

**Speaker:** Prof Xihong LIN, Professor of Department of Biostatistics of Harvard School of Public Health, Coordinating Director of Program in Quantitative Genomics at the Harvard T. H. Chan School of Public Health, Professor of Department of Statistics at the Faculty of Arts and Sciences, Harvard University

**Abstract:** COVID-19 is an emerging respiratory infectious disease that has become a pandemic. It was first detected in early December 2019 in Wuhan, China. Until April 30, COVID-19 has quickly spread to over 150 countries worldwide and infected more than 3.3 million individuals and caused 237,000 deaths globally. In this talk, I will first provide a historical overview of the epidemic in Wuhan. I will then provide the analysis results of 32,000 lab-confirmed COVID-19 cases in Wuhan to evaluate the effects of different public health interventions on controlling the COVID-19 outbreak, such as social distancing, isolation and quarantine, as well as summarizing the epidemiological characteristics of the cases. The results show that multi-faceted intervention measures successfully controlled the outbreak in Wuhan. I will next present the estimated effects of the social distancing measure using the data in Wuhan, USA and Europe on controlling the epidemic and the factors that are useful to consider for reopening. Strategies and challenges for different types of tests, such as PCR and antibody tests, and contact tracing will be discussed. Preliminary survey results of >500,000 participants of the HowWeFeel project on symptoms and health conditions in US will be presented. I will provide several take home messages and discuss priorities.

## A Simple Projection Model for COVID-19 Pandemic

**Speaker:** Prof Jian LU, Chair Professor of Department of Biomedical Sciences, Department of Mechanical Engineering and Department of Materials Science and Engineering, Vice-President (Research and Technology), City University of Hong Kong

**Abstract:** With the worldwide outbreak of coronavirus COVID-19, a simple model to predict how the coronavirus pandemic will evolve in individual countries/ states becomes important and urgent. Our goal is to provide a prediction model for the coming days and weeks to help policy makers in different countries address the epidemic outbreak and adjust the control policies to contain the spread of the severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2) more effectively. Daily update is provided to show the latest situation in different geographic locations over the world, including America, Europe, Asia...

## COVID-19 Dashboard for New York State

**Speaker:** Prof Fengqi YOU, Roxanne E. and Michael J. Zak Professor of Energy Systems Engineering, Cornell University

**Abstract:** In this presentation, there will be a short introduction and sharing on the visualization project/ dashboard for New Your State conducted by the group headed by Prof You.

## Modeling the Heterogeneous Disease-Behavior-Information Dynamics during Epidemics

**Speaker:** Dr Qingpeng ZHANG, Assistant Professor of School of Data Science, City University of Hong Kong.

**Abstract:** The transmission of infectious diseases depends on the social networks among people and the personal protections that people have taken before being exposed to the disease. Traditional epidemiological models assume homogeneous relationships in the social network. In this study, we propose a multiplex network framework for the modeling of the heterogeneous disease-behavior-information dynamics during epidemics, such as the ongoing COVID-19 pandemic. In this framework, people's vulnerability to the disease is influenced by the transmissions of information, behavior, and disease in the social network. Analytical and simulation results are presented to validate the model.

## Prevention of COVID-19 After the Relaxation of Control Measures

**Speaker:** Dr Sean Yuan, Assistant Professor of Department of Biomedical Sciences, City University of Hong Kong

**Abstract:** The current COVID-19 outbreak has caused an unprecedented global pandemic, resulting in the largest number of lockdowns worldwide with billions of people under the restriction of movement, leading to profound socio-economic costs. On the other hand, in Hong Kong, public health interventions focusing on movement restrictions, including quarantine of close contact and isolation of cases, have successfully prevented community spread without city lockdown since the early expansion period of COVID-19 when a massive influx of travellers from mainland China arrived in Hong Kong. To avoid repeated lockdowns, it is urgent to determine the minimal intensity of movement restrictions required to prevent the resurgence of COVID-19 after the relaxation of the measures through modelling the quarantine measures and disease dynamics in Hong Kong. In this short talk, I would like to share how to determine the minimal intensity of quarantine measures and estimate their effects on transmissibility of SARS-CoV-2 through identification of viral and disease control factors in Hong Kong.

## Social Data for Changing and Predicting Health Behaviors

**Speaker:** Prof Sean YOUNG, Executive Director of University of California Institute for Prediction Technology and the UCLA Center for Digital Behavior, University of California, Irvine



## **KEYNOTE II: Supply Chain Resiliency and the Need for Stress-Tests**

**Speaker:** Prof David SIMCHI-LEVI, Professor of Civil and Environmental Engineering; Co-Director of Leaders for Global Operations; Director of the MIT Data Science Lab, Massachusetts Institute of Technology

**Abstract:** The global pandemic has exposed serious flaws in supply chains, including critical ones for industries such as pharma and medical supplies. Shortages of personal protective equipment for health workers and ventilators in hospitals are the most prominent ones. To prevent this problem from occurring again when the next disaster strikes, governments should consider establishing a stress test for companies that provide critical goods and services that's akin to the stress tests for banks that the U.S. government and European Union instituted after the 2008 financial crisis. This test should focus on the resilience of companies' supply chains.

## **Mechanistically Inspired Data-driven COVID-19 Pandemic Modeling**

**Speaker:** Prof Joe QIN, Chair Professor of School of Data Science; Dean of School of Data Science; Director of Hong Kong Institute for Data Science, City University of Hong Kong

**Abstract:** The COVID-19 data from many countries show that the dynamics of the recovery process is significantly slower than that of the death process. This evidence makes the traditional susceptible-infectious-recovered-dead (SIRD) model inadequate, since the SIRD model leads to identical dynamics for the recovery and death processes.

Our proposed approach is to develop data-driven models with their structures to include the infected and intensely cared critical cases as inventories in the curing process. This approach is able to account for the intensively cared patients who not only have a higher death rate, but also are isolated from the population to stop further infections. We show that the model is suitable for the COVID-19 pandemic data since it yields different dynamics for the recovery and death cases. We discretize the model to give rise to a data-driven model and estimate the model relations from real data. We show that the overall models estimated from China's data, which went through a complete process early in the pandemic, predict well for other regions we tested, including Mainland China, U.S., Canada, Germany, and Spain. Model transfer techniques are proposed to predict for countries with very short data initially.

**Co-authors:** *Qingpeng Zhang, Fengshi Jing, School of Data Science, City University of Hong Kong  
Fiona Guo, and Zheyu Li, Mork Family Department of Chemical Engineering and Materials Science, University of Southern California, Los Angeles, CA 90089*

## **Modeling, State Estimation, and Optimal Control for the US COVID-19 outbreak**

**Speaker:** Dr Michael BALDEA, Associate Professor and Undergraduate Advisor Fellow of the Frank A. Liddell, Jr. Fellowship in Chemical Engineering, The University of Texas at Austin

**Abstract:** The novel coronavirus SARS-CoV-2 and resulting COVID-19 disease have had an unprecedented spread and continue to cause an increasing number of fatalities worldwide. While vaccines are still under development, social distancing, extensive testing, and quarantining of confirmed infected subjects remain the most effective measures to contain the pandemic. These measures carry a significant socioeconomic cost. In this work, we introduce a novel optimization-based decision-making framework for managing the COVID-19 outbreak in the US. This includes modeling the dynamics of affected populations, estimating the model parameters and hidden states from data, and an optimal control strategy for sequencing social distancing and testing events such that the number of infections is minimized. The analysis of our extensive computational efforts reveals that social distancing and quarantining are most effective when implemented early, with quarantining of confirmed infected subjects having a much higher impact. Further, we find that "on-off" policies alternating between strict social distancing and relaxing such restrictions can be effective at "flattening" the curve while likely minimizing social and economic cost.

## **COVID-19 Pandemic – Impact on Food Supply Chains: Lessons Learnt for Hong Kong**

**Speaker:** Prof Frank CHEN, Chair Professor of Department of Management Sciences, Head of Department of Management Sciences, City University of Hong Kong.

**Abstract:** Food supply chains have not been exposed to major disruptions so far amid the pandemic, except hiccups caused by temporary export bans and plant closures. However, those hiccups have revealed potentially colossal vulnerability in territories like Hong Kong, where over 90% of food supply comes from imports. In this presentation, Prof Chen will discuss the issues of managing both the supply and demand sides.



## Constructing the Infection Curve of the Local Cases of the Coronavirus Disease (“COVID-19”) in Hong Kong Using Backprojection

*P H Chau<sup>1</sup>, W Y Li<sup>1</sup>, and Paul S F Yip<sup>2</sup>*

**Speaker:** Prof Paul YIP, Director of Centre for Suicide Research and Prevention, Associate Dean of Faculty of Social Sciences, Professor of Chair of Population Health in University of Hong Kong

**Abstract:** This study aims to estimate the infection curve of the local cases of the coronavirus disease (“COVID-19”) in Hong Kong and identify major events and preventive measures associated with the trajectory of the infection curve.

The present findings suggest that pre-implementation announcements may leave a window of infection if the public simply want to avoid any mandatory quarantine measures and do not exercise self-discipline. Hence, shorter or even no notice at all alongside the necessary supporting measures may be considered to effectively curb the spread of the COVID-19.

<sup>1</sup> *School of Nursing, Li Ka Shing Faculty of Medicine, The University of Hong Kong*

<sup>2</sup> *Hong Kong Jockey Club Centre for Suicide Research and Prevention, The University of Hong Kong*

## The Power of Small Data through the Lens of COVID-19 Pandemic

**Speaker:** Prof Jie LIU, Dean of AI Research in Harbin Institute of Technology, Shenzhen

**Abstract:** COVID-19 is the first global pandemic fully exposed to digital technologies. We have unprecedented ways to collect, analyze, and share information. From the early days of the pandemic, plenty of models were built to track severity and predict trends. While statistics-based big data approaches played an important role of policy making, individualized epidemiological approaches, which we call “small data,” revealed much richer information to help understanding the virus. As the virus may co-exist with us for a long time, we anticipate small data to be deeply integrated into our life styles, but the society may not be ready for it.

## BIOGRAPHIES AND PHOTOS



### **Prof Way KUO**

Professor Way Kuo is President of City University of Hong Kong. He is a Member of US National Academy of Engineering and Academia Sinica in Taiwan, a Foreign Member of Chinese Academy of Engineering and Russian Academy of Engineering.

Professor Kuo specializes in design for reliability of electronics and energy systems. He is the author and co-author of eight academic books and over 200 high impact papers.

His first popular science book *Critical Reflections on Nuclear and Renewable Energy* has created an impact since its publication in 2013 in Taiwan. The book has been translated into English, Japanese, French and Russian and published in Massachusetts, Tokyo, Paris, and Moscow, respectively. His new book on higher education, *The American Way in China's Higher Education*, has been jointly published by Wiley-Scrivener in May 2019.

### **Prof Frank CHEN**

Professor Frank Chen is currently the Head and Chair Professor of Management Sciences at CityU College of Business. He holds a bachelor's degree in Engineering, master's degree in Economics, and doctoral degree in Management from Tsinghua University, the University of Waterloo, and the University of Toronto, respectively. Before joining CityU in 2012, he worked at the Chinese University of Hong Kong (2001 – 2012) and National University of Singapore (1997 – 2001), respectively. His current research interests include supply chain management and healthcare management. He has published in leading management journals.





## Prof Xihong LIN

Professor Xihong Lin is Professor and former Chair of the Department of Biostatistics, Coordinating Director of the Program in Quantitative Genomics at the Harvard T. H. Chan School of Public Health, and Professor of the Department of Statistics at the Faculty of Arts and Sciences of Harvard University, and Associate Member of the Broad Institute of Harvard and MIT.

Professor Lin is an elected member of the National Academy of Medicine. She received the 2002 Mortimer Spiegelman Award from the American Public Health Association, and the 2006 Committee of Presidents of Statistical Societies (COPSS) Presidents' Award and the 2017 COPSS FN David Award. She is an elected fellow of American Statistical Association (ASA), Institute of Mathematical Statistics, and International Statistical Institute.

Professor Lin's research interests lie in development and application of statistical and computational methods for analysis of massive data from genome, exposome and phenome, and scalable statistical inference and learning for big genomic, epidemiological and health data. Examples include analytic methods and applications for large scale Whole Genome Sequencing studies, biobanks and electronic health records, whole genome variant functional annotations, genes and environment, multiple phenotype analysis, risk prediction, integrative analysis of different types of data, causal mediation analysis and causal inference, analysis of epidemiological and complex observational study data. Her theoretical and computational statistical research includes statistical methods for testing a large number of complex hypotheses, causal inference, statistical inference for large covariance matrices, prediction models using high-dimensional data, cloud-based statistical computing, and statistical methods for epidemiological studies.

## Prof Jian LU

Prof Jian Lu's research interests are biomedical sciences and engineering, surface science and engineering, processing of nanomaterials and advanced materials and nanomaterial-based biosensors. He has published more than 360 SCI journal papers including papers in Nature (cover story), Science, Science Advances, Nature Materials, Nature Communications, Materials Today, Advanced Materials, PRL, and 32 granted patents (including 22 USA patents). His publications have been cited more than 24,000 times (Google Scholar).

He was awarded in 2006 the French Knight Order of National Merit (Chevalier de l'Ordre National du Mérite); and in 2017 the Knight of the National Order of the French Legion of Honour (Chevalier de la Legion D'honneur). In 2011, he was elected as an Academician of the National Academy of Technology of France. He was the recipient of the 12<sup>th</sup> Guanghua Engineering Science and Technology Award in 2018.





## Prof S Joe QIN

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

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

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

## Prof David SIMCHI-LEVI

Professor David Simchi-Levi is a Professor of Engineering Systems at MIT and serves as the head of the MIT Data Science Lab. He is considered one of the premier thought leaders in supply chain management and business analytics. His Ph.D. students have accepted faculty positions in leading academic institutes including U. of California Berkeley, Carnegie Mellon U., Columbia U., Duke U., Georgia Tech, Harvard U., U. of Illinois Urbana-Champaign, U. of Michigan, Purdue U. and Virginia Tech. Professor Simchi-Levi is the current Editor-in-Chief of Management Science, one of the two flagship journals of INFORMS. He served as the Editor-in-Chief for Operations Research (2006-2012), the other flagship journal of INFORMS and for Naval Research Logistics (2003-2005). He is an INFORMS Fellow, MSOM Distinguished Fellow and the recipient of the 2014 INFORMS Daniel H. Wagner Prize for Excellence in Operations Research Practice; 2014 INFORMS Revenue Management and Pricing Section Practice Award; 2009 INFORMS Revenue Management and Pricing Section Prize and Ford 2015 Engineering Excellence Award. He was the founder of LogicTools which provided software solutions and professional services for supply chain optimization. LogicTools became part of IBM in 2009. In 2012 he co-founded OPS Rules, an operations analytics consulting company. The company became part of Accenture in 2016. In 2014, he co-founded Oplytics, a cloud analytics platform company focusing on operations and supply chain intelligence. The company became part of the Accenture Applied Intelligence in 2018.





## Prof Jie LIU

Prof Jie Liu is a Chair Professor at Harbin Institute of Technology (HIT), Shenzhen and the Dean of its AI Research Institute. Before joining HIT, he spent 18 years at Xerox PARC, Microsoft Research and Microsoft product teams. He was a partner of Microsoft. As a Principal Research Manager at MSR, he led the Sensing and Energy Research Group (SERG). In MSR-NExT and product groups, he incubated smart retail solutions, which became part of Microsoft Business AI offering. Jie Liu's research interests root in understanding and managing the physical properties of computing. He has published more than 120 peer-reviewed papers and has received 6 Best Paper Awards from top academic conferences (h-index = 62). He has filed more than 100 patents, with 50+ awarded. He has chaired a number of top-tier conferences in sensing and pervasive computing. Currently, he is the Steering Committee Chair for Cyber-Physical Systems and Internet of Things Week (CPS-IoT Week), Steering Committee Chair for ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN). He was an Associate Editor for IEEE Transactions on Mobile Computing and ACM Transactions on Sensor Networks. He is an IEEE Fellow and an ACM Distinguished Scientist.



## Prof Houmin YAN

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

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

## Prof Paul YIP

Professor Paul YIP is an Associate Dean (Research), Faculty of Social Sciences, a chair professor (population health), the director of HKJC Centre for Suicide Research and Prevention at the University of Hong Kong.

Professor Paul YIP has been awarded the outstanding researcher, knowledge exchange awards at the University of Hong Kong.



## Prof Fengqi YOU

Professor Fengqi You is the Roxanne E. and Michael J. Zak Professor at Cornell University, and is affiliated with the Graduate Fields of Chemical Engineering, Electrical and Computer Engineering, Operations Research and Information Engineering, Systems Engineering, Mechanical Engineering, Civil and Environmental Engineering, and Applied Mathematics. He also serves as Chair of Cornell Systems Engineering PhD Studies and Associate Director of Cornell Energy Systems Institute. He was on the faculty of Northwestern University from 2011 to 2016, and worked at Argonne National Laboratory as an Argonne Scholar from 2009 to 2011. He has published more than 150 peer-reviewed journal

articles, and has an h-index of 58. Some of his research results have been editorially highlighted in *Science* and *Nature*, featured on journal covers (e.g. *Energy & Environmental Science*, *ACS Sustainable Chemistry & Engineering*, and *Industrial & Engineering Chemistry Research*), and covered by major media outlets (e.g. *The New York Times*, *BBC*, *BusinessWeek*, and *National Geographic*). His recent awards include American Institute of Chemical Engineers (AIChE) W. David Smith, Jr. Publication Award (2011), Northwestern-Argonne Early Career Investigator Award (2013), National Science Foundation CAREER Award (2016), AIChE Environmental Division Early Career Award (2017), AIChE Sustainable Engineering Research Excellence Award (2017), Computing and Systems Technology (CAST) Outstanding Young Researcher Award from AIChE (2018), Cornell Engineering Research Excellence Award (2018), ACS Sustainable Chemistry & Engineering Lectureship Award (2018), AIChE Excellence in Process Development Research Award (2019), Curtis W. McGraw Research Award from ASEE (2020), and American Automatic Control Council (AACC) O. Hugo Schuck Award (2020), as well as a number of best paper awards. He is currently an Editor of *Computers & Chemical Engineering*, a Consulting Editor of *AIChE Journal*, an associate editor of AAAS journal *Science Advances*, and an editorial board member of several leading journals (e.g. *ACS Sustainable Chemistry & Engineering* and *Industrial & Engineering Chemistry Research*). His research focuses on novel computational models, optimization algorithms, statistical machine learning methods, and multi-scale systems analytics tools for smart manufacturing, digital agriculture, energy systems, and sustainability. For more information about his research group: [www.peese.org](http://www.peese.org).

## Prof Sean YOUNG

Professor Sean Young, PhD, MS, is the Executive Director of the University of California Institute for Prediction Technology, the UCLA Center for Digital Behavior, a Medical School and Informatics Professor with the UCI Departments of Emergency Medicine and Informatics, and the #1 Wall Street Journal and International Best-Selling author of *Stick With It*.

Professor Young received his PhD in Psychology and Master's degree in Health Services Research from Stanford University, worked in technology and user behavior/human factors at NASA Ames Research Center and Cisco Systems, taught at the Stanford University Graduate School of Business, and has advised various companies and start-ups. He is an internationally-recognized speaker, having presented at forums such as the European Parliament, mHealth Conference, World Congress, as well as corporations, academic institutions, and organizations. Before recently moving to UCI, he was a medical school professor in the UCLA Department of Family Medicine, where he continues to hold a joint appointment.



## Dr Michael BALDEA

Dr Michael Baldea is Associate Professor and Frank A. Liddell, Jr. Centennial Fellow in the McKetta Department of Chemical Engineering, and a core faculty member in the Oden Institute for Computational Engineering and Sciences (ICES) at The University of Texas at Austin. He obtained his Diploma and M.Sc. in Chemical Engineering from "Babes-Bolyai" University in Cluj-Napoca, Romania, and a doctorate in Chemical Engineering from the University of Minnesota. Prior to joining The University of Texas, he held industrial research positions with Praxair Technology Center in Tonawanda, NY and GE Global Research in Niskayuna, NY. He has received several research and service awards, including the AIChE Institute Award for Excellence in Industrial Gases Technology, the Outstanding Young Researcher Award from the Computing and Systems Technology Division of AIChE, the NSF CAREER award, the Moncrief Grand Challenges Award, the ACS Doctoral New Investigator award, and the Model-Based Innovation Prize from Process Systems Enterprise (twice). He was also recognized with referee awards by the Journal of Process Control and Industrial & Engineering Chemistry Research. His research covers topics in nonlinear dynamics, optimization and control, with applications to process and energy systems, areas in which he has co-authored three books, four book chapters and over 170 peer-reviewed journal and conference articles. Dr. Baldea serves on the advisory boards of several commercial and non-profit entities, and as a member of the editorial boards of several leading technical journals, including the Journal of Process Control and Chemical Engineering Research and Design.





## Dr Sean YUAN

Dr Yuan received his Bachelor of Science degree in Electrical Engineering from National Central University in Taiwan in 1999. He received his Master of Science in Biomedical Engineering from National Taiwan University in 2001 working on Artificial Intelligence with a focus on Medical Natural Language Processing. He received his second Master degree in Microbiology (Immunology Division) from National Taiwan University under the guidance with Prof. Yuan-Tsong Chen at Academia Sinica. His thesis work focused on the Pharmacogenetic study of Warfarin responsiveness. In 2007, Dr Yuan pursue his PhD degree in Computational Biology & Bioinformatics in the Lab of Katia Koelle at Duke University focusing on mathematical modelling of influenza antigenic drift. After

the completion of the graduate school in 2013, Dr Yuan moved to London to study the impact of herd immunity on influenza outbreak with Prof. Steven Riley at Imperial College London. Dr Yuan joined CityU as an Assistant Professor in January 2018.

## Dr Qingpeng ZHANG

Dr Qingpeng Zhang is an Assistant Professor with the School of Data Science at City University of Hong Kong. During 2014-2018, he was with the Department of Systems Engineering and Engineering Management, where he is still an affiliate member. Qingpeng received the B.S. degree in Automation from Huazhong University of Science and Technology and the Ph.D. degree in Systems and Industrial Engineering from The University of Arizona. Prior to joining CityU, he worked as a Postdoctoral Research Associate with The Tetherless World Constellation, Department of Computer Science at Rensselaer Polytechnic Institute. He also worked at the Pacific Northwest National Laboratory and Chinese Academy of Sciences during summers. His research interests include medical informatics and network science.



## Dr Long FENG

Dr Long Feng obtained his PhD in Statistics from Rutgers University in 2017 and BSc in Statistics and Mathematics from Renmin University of China in 2012. Before Joining CityU, he was a Postdoctoral Associate at Yale University.

Long's current research interests focus on the interaction of theory, computation, and application of statistical machine learning and high-dimensional statistics. He also studies imaging and tensor data, empirical Bayes methods, and convex/non-convex optimizations.

## Dr Xinyue LI

Dr Xinyue Li received her PhD in Biostatistics from Yale University in 2019. Prior to Yale University, she spent one year at Peking University and three years at the University of Chicago, receiving her B.A. and M.S. in Statistics from the University of Chicago.



## ORGANIZING COMMITTEE

Name	Affiliation	Position
Prof S Joe QIN	City University of Hong Kong	Dean, School of Data Science Director, Hong Kong Institute for Data Science Chair Professor, School of Data Science
Prof Houmin YAN	City University of Hong Kong	Acting Dean, College of Business Chair Professor, Department of Management Sciences
Prof Frank CHEN	City University of Hong Kong	Head, Department of Management Sciences Chair Professor, Department of Management Sciences
Dr Qingpeng ZHANG	City University of Hong Kong	Assistant Professor, School of Data Science
Dr Long FENG	City University of Hong Kong	Assistant Professor, School of Data Science