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# 上海交通大学密西根学院 国际青年科学家论坛

THE YOUNG INVESTIGATORS SYMPOSIUM  
ON FRONTIERS IN INNOVATIVE TECHNOLOGY

时间： 2024年10月31日 上午8:30-下午3:45 (北京时间)  
2024年11月1日 上午9:00-下午4:00 (北京时间)

Time: 8:30 am-3:45 pm, October 31, 2024 (Beijing Time)  
9:00 am-4:00 pm, November 1, 2024 (Beijing Time)

地点： 上海交通大学密西根学院  
龙宾楼300号中集报告厅

Venue: CIMC Auditorium (Room 300), Long Bin Building  
UM-SJTU Joint Institute, Shanghai Jiao Tong University

# About the **Symposium**

The Young Investigators Symposium on Frontiers in Innovative Technology (FIT) hosted by the University of Michigan-Shanghai Jiao Tong University Joint Institute (JI), in conjunction with Shanghai Jiao Tong University Main Forum, will be held between October 31 and November 1, 2024, in Shanghai, P. R. China. The FIT symposium provides an academic platform for young scholars around the world to exchange ideas on their latest research, to interact and collaborate, and to find inspirations in the rapidly evolving technological fields. Seminars at FIT focus on interdisciplinary engineering research and emerging areas in electrical and computer engineering (ECE) and mechanical engineering (ME). Outstanding young international scholars are encouraged to interact directly with JI faculty members.

# Organizing Committee



**Chengbin Ma**

Professor  
Committee Chair

## Data Science



**Yifei Zhu**  
Assistant Professor



**Weikang Qian**  
Associate Professor



**Yibo Pi**  
Assistant Professor

## AI/Hardware



**Rui Yang**  
Associate Professor



**Xinfei Guo**  
Associate Professor



**An Zou**  
Assistant Professor

## Robotics and Manufacturing



**Yutong Ban**  
Assistant Professor



**Zhongqiang Ren**  
Assistant Professor



**Youyi Bi**  
Associate Professor

# Thursday, October 31, 2024

Time	Topic	Speaker	Onsite/Online	Session
8:10 am - 8:30 am	Sign up and Equipment Test	All speakers and Attendees		<b>Session Chair:</b> Chengbin Ma
8:30 am - 8:50 am	<b>Introduction to JI</b>	Prof. Chien-Pin Chen, Dean	Onsite	
8:50 am - 9:00 am	<b>Ji's tenure track system</b>	Prof. David Hung, Associate Dean	Onsite	
9:00 am - 10:00 am	<b>Keynote Speech:</b> Development of Skiing and Curling 6-Legged Robots for Beijing Winter Olympic Games	Prof. Feng Gao	Onsite	
10:00 am - 10:30 am	Development of A Robotics System For Gastrointestinal Endoscopic Surgery	Dr. Huxin Gao	Online	<b>Session Chair:</b> Weikang Qian Yutong Ban
10:30 am - 11:00 am	Contact Printed Nanowires for Next-Generation Electronic Skin	Dr. Fengyuan Liu	Online	
11:00 am - 11:30 am	Constructing High-Performance Robotics Insects with Origami Transmission Mechanism	Dr. Yide Liu	Onsite	
11:30 am - 12:00 pm	Towards Networked Video Streaming System Optimization: For Humans and For Machines	Dr. Ruixiao Zhang	Online	
12:00 pm - 1:30 pm	<b>Lunch Break</b>			
1:30 pm - 2:00 pm	Efficient and Scalable Parallel Graph Algorithms	Ms. Letong Wang	Online	<b>Session Chair:</b> Rui Yang An Zou
2:00 pm - 2:30 pm	Evolving System Stack for Heterogeneous Devices	Mr. Jian Zhang	Online	
2:30 pm - 2:45 pm	<b>Coffee Break</b>			
2:45 pm - 3:15 pm	Brain-inspired Neuromorphic Device Computation with Dendritic Morphology	Dr. Eunhye Baek	Onsite	
3:15 pm - 3:45 pm	Healthcare Services Empowered by Robotics and AI	Prof. Anqing Duan	Onsite	

# Friday, November 1, 2024

Time	Topic	Speaker	Onsite/Online	Session
9:00 am - 10:00 am	<b>Keynote Speech:</b> Networked live video analytics: from design to deployment	Prof. Jiangchuan Liu	Onsite	<b>Session Chair:</b> Yifei Zhu
10:00 am - 10:30 am	Regularization for Adversarial Robust Learning	Mr. Jie Wang	Online	<b>Session Chair:</b> Xinfei Guo Zhongqiang Ren
10:30 am - 11:00 am	Towards Safety Guarantees for Control of Fully Actuated Systems	Mr. Bohao Zhang	Online	
11:00 am - 11:30 am	Decision-making with Safety and Adpatation for Robotics	Prof. Chuangchuang Sun	Online	
11:30 am - 12:00 pm	From Origami to Robotics Locomotion: Where Soft Robots Meet Real-World Applications	Dr. Dongting Li	Online	
12:00 pm - 1:30 pm	<b>Lunch Break</b>			
1:30 pm - 2:00 pm	Advancing Immersive Computing with AI-System Co-design	Dr. Bo Chen	Onsite	<b>Session Chair:</b> Youyi Bi Yibo Pi
2:00 pm - 2:30 pm	Autonomous Agents Driven by Large Language Models	Dr. Chen Qian	Online	
2:30 pm - 2:45 pm	<b>Coffee Break</b>			
2:45 pm - 3:15 pm	Beyond Avatars: Designing Bodily Interfaces in Virtual Environments	Mr. Xiang Li	Online	
3:15 pm - 3:45 pm	AI-Driven Protein Identification from Mass Spectrometry Data in Proteomics	Mr. Jun Xia	Onsite	
3:45 pm - 4:00 pm	Closing remarks	Prof. Chengbin Ma	Onsite	

# Keynote Speech

## Development of Skiing and Curling 6-Legged Robots for Beijing Winter Olympic Games



Prof. Feng Gao

### Abstract:

The research on the skiing and curling robots has attracted the attention of the international robot field. In 2019, the relevant articles were published in the Science Robotics to explain that the research for the skiing and curling robots was the preface of International robot science. The speech will introduce the skiing and curling robots. The first was a six-legged skiing robot. With this robot, the front and hind legs were fixed on the skis and each of the two middle legs was holding a ski stick. Each ski had five degrees-of-freedom, through which the height, body pitch-roll angles, center of gravity in relation to the four fixing legs, the edge angle of each ski, and the relative position/ orientation of the skis could be adjusted, allowing full speed and steering control of the robot. The robot could be controlled either by a joystick or operate autonomously and it was tested on both beginner and intermediate slopes to assess its performance and obstacle avoidance capabilities. The second was a six-legged curling robot. It also had six legs and the front two were used as 'hands' to control the delivering direction and rotational speed of a curling stone. The two middle legs and the bottom of the body were combined to use as the sliding foot of the robot player, whereas the two rear legs were used as the 'hack foot' to push against the hack when starting the delivery of the curling stone. The robot was integrated with both visual and force perception, allowing accurate directional control and delivery of each shot as determined by game plans and team tactics. The robot was demonstrated at the Ice Cube for the Beijing Winter Olympic and Paralympic Games. One exciting prospect of this new curling robot is that it can also be controlled remotely, online. With high level decision support, real-time dynamic modelling and shot planning, one can orchestrate defensive or offensive strategies, making this game of 'chess on ice' truly exciting. It is expected that the robot can also become a trainer for curling athletes or enthusiasts, making the sport more accessible to the general public.

### Biography:

Feng Gao earned his Ph.D. in mechanical engineering from Beijing University of Aeronautics and Astronautics in 1991, and his Master in Mechanical Engineering at Northeast Heavy Machinery Institute in 1982. From 1995 to 1997, he was a postdoctoral research associate in the School of Engineering Science at Simon Fraser University. He was a full professor at Yanshan University from 1995 to 1999. He served first as Vice President and then as President of Hebei University of Technology from 2000 to 2004. From 2009 to 2013, he served as the director of the State Key Laboratory of Mechanical Systems and Vibration at Shanghai Jiao Tong University. Since 2004, he has been the Chair Professor at Shanghai Jiao Tong University. He won the 2013 China National Natural Science Award because of his contributions in parallel mechanism design and the 8 items of awards from the provincial science and technology invention prizes in China. And he won the ASME Leonardo Da Vinci Award in USA in 2014. He has been granted 126 patents and has published 3 research books on mechanisms and robotics, as well as 210 papers in international journals and conference proceedings. He served as the General Member of the ASME Mechanisms and Robotics Committee, the Associate Editors of Mechanism and Machine Theory, ASME Journal of Mechanisms and Robotics, ASME Journal of Mechanical Design, Robotica, Engineering, and Deputy Editor in Chief for the Chinese Journal of Mechanical Engineering (in English). He gave Keynote Speeches in 36th ASME Mechanisms and Robotics International Conference(2012) and in IFToMM2015, respectively.

# Keynote **Speech**

## Networked Live Video Analytics: From Design to Deployment

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**Prof. Jiangchuan Liu**

### **Abstract:**

Live video analytics over wide-area networks have seen a wide range of applications, e.g., environment monitoring, industry automation, and self-driving, to name but a few. In this talk, based on our recent research and development experiences, I will discuss our works on the algorithm and system design in this field, from severless-based pipeline optimization, 360-degree video analytics, to streaming analytics over space networking. We will then discuss the challenges and solutions toward realworld deployment in remote ecosystems.

### **Biography:**

Jiangchuan Liu is a Full Professor in the School of Computing Science, Simon Fraser University, British Columbia, Canada. He is a Fellow of The Canadian Academy of Engineering, an IEEE Fellow, and an NSERC E.W.R. Steacie Memorial Fellow. In the past he worked as an Assistant Professor at The Chinese University of Hong Kong, a research fellow at Microsoft Research Asia, and an EMC-Endowed Visiting Chair Professor of Tsinghua University.

He received the BEng degree (cum laude) from Tsinghua University, Beijing, China, in 1999, and the PhD degree from The Hong Kong University of Science and Technology in 2003, both in computer science. He is a co-recipient of the inaugural Test of Time Paper Award of IEEE INFOCOM (2015), ACM SIGMM TOMCCAP Nicolas D. Georganas Best Paper Award (2013), ACM Multimedia Best Paper Award (2012), and IEEE ICDCS Distinguished Paper Award (2024).

His research interests include multimedia systems and networks, cloud and edge computing, social networking, online gaming, and Internet of things/RFID/backscatter. He has served on the editorial boards of IEEE/ACM Transactions on Networking, IEEE Transactions on Network Sciences and Engineering, IEEE Transactions on Big Data, IEEE Transactions on Multimedia, IEEE Communications Surveys and Tutorials, and IEEE Internet of Things Journal. He is a Steering Committee member of IEEE Transactions on Mobile Computing and Steering Committee Chair of IEEE/ACM IWQoS (2015-2017). He was TPC Co-Chair of IEEE INFOCOM'2021 and General Chair of INFOCOM'2024.