Chinese Language + AI Robot Summer Program

(100% English Speaking Program)

June 17, 2024 to July 12, 2024

How to Apply?

Eligibility

a. Applicants must be non-Chinese citizens with valid passports.

b. Applicants should fill in the following link for application.
http://iso.hust.edu.cn/info/1194/4446.htm

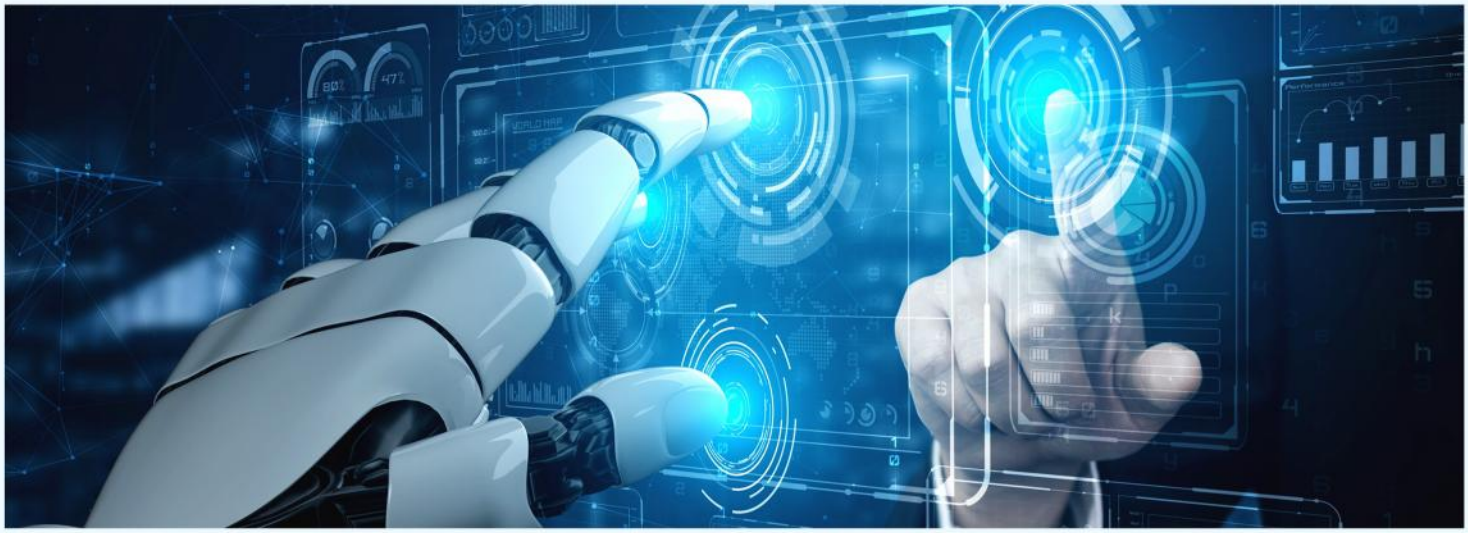
c. The university will review your application and contact you further if you are qualified.

Fees

1. **Tuition fee:** 5000 CNY, including all the lectures and study materials
2. **Accommodation fee:** 700 CNY/Month (4 weeks)
3. The living expenditure and round-trip ticket are not included.

Contact

Ms. YAN Wei (Vivian),
E-mail: vivianyan@hust.edu.cn



Schedule for Chinese Language——AI Robot Summer Program

week 1

Time	Monday	Tuesday	Wednesday	Thursday	Friday
Morning	**AI Robot Session:** Collective intelligence	**AI Robot Session:** Big data-driven intelligent manufacturing	**AI Robot Session:** Humanoid robot	**AI Robot Session:** Artificial intelligence and unmanned driving	**Chinese Cultual Experience at Hubei Provincial Museum**
Afternoon	**Chinese Culture Class:** Jing Chu culture of food and tourism	**Chinese Culture Class:** Jing Chu historical heroes and stories	**Enterprise/Lab Practice:** State Key Laboratory of Intelligent Manufacturing Equipment and Technology+ MSE East 1st Building	**Enterprise/Lab Practice:** Engineering Teaching Practice Training Center	

Saturday / Sunday Free time

week 2

Time	Monday	Tuesday	Wednesday	Thursday	Friday
Morning	**AI Robot Session:** Artificial intelligence-driven optimization design	**AI Robot Session:** Soft robot	**AI Robot Session:** Specialized robot	**AI Robot Session:** 3D printing and calligraphy robot	**Chinese Cultual Experience to Yangtze River**
Afternoon	**Chinese Culture Class:** The beauty of Jing Chu culture and art	**Chinese Culture Class:** Jing Chu fan culture	**Enterprise/Lab Practice:** Wuhan Huazhong Numerical Control Co, Ltd.+ HGTECH	**Enterprise/Lab Practice:** National Innovation Institute of Digital Design and Manufacturing	

Saturday / Sunday Free time

week 3

Time	Monday	Tuesday	Wednesday	Thursday	Friday
Morning	**AI Robot Session:** Medical surgical robot	**AI Robot Session:** Product design in the digital era	**AI Robot Session:** Intelligent factory and production scheduling	**AI Robot Session:** Intelligent manufacturing electromechanical system	**Chinese Cultual Experience to Institute of New Energy, Wuhan**
Afternoon	**Chinese Culture Class:** Jing Chu culture of graphic knowledge of Wuhan	**Chinese Culture Class:** Jing Chu culture of Chinese character	**Enterprise/Lab Practice:** HUAWEI (Wuhan)	**Enterprise/Lab Practice:** United Imaging Healthcare Co., Ltd. (Wuhan)	

Saturday / Sunday Free time

week 4

Time	Monday	Tuesday	Wednesday	Thursday	Friday
Morning	**AI Robot Session:** Micro/nano manufacturing system	**AI Robot Session:** Advanced electronic manufacturing	**AI Robot Session:** Multi-functional field composite manufacturing	**AI Robot Session:** Robotic machining and assembly	**Closing Ceremony and Learning Outcomes presentation**
Afternoon	**Chinese Culture Class:** Jing Chu Handicrafts Culture	**Chinese Culture Class:** Jing Chu Culture Minority Customs and Folklore	Preperation for Final Presentation	Preperation for Final Presentation	

Saturday / Sunday Departure from Wuhan

Roboticized Intelligent Manufacturing

SHEN WEIMING

- Lecture

Agents and Intelligent Manufacturing

Lecturer Intro

Dr. Weiming Shen is a Professor at Huazhong University of Science and Technology (HUST), China. Prior to joining HUST, he worked for 20 years at National Research Council Canada as Research Officer, Senior Research Officer, and Principal Research Officer. He is a Fellow of Canadian Academy of Engineering, Fellow of IEEE,. He is an internationally-recognized expert on Industrial Internet, Big Data, Agent-Based Collaborative Technologies and Applications. He has published over 600 papers in scientific journals and international conferences in the related areas. His work has been cited over 20,000 times. He served as General Chair/Co-Chair or Program Committee Chair/Co-Chair for over 30 international conferences. He received a number of prestigious awards, including IEEE Canada R.H. Tanner Industry Leadership Award, RPIC Excellence Award for Energy Efficiency of Federal Buildings.

Lecture Intro

Originated from distributed artificial intelligence, agents represent an exciting and promising approach to building a wide range of distributed software applications. An agent can be defined as a software system that communicates and cooperates with other software systems to solve a complex problem that is beyond the capability of each individual software system. Recent developments on Industrial Internet, reinforcement learning, and generative AI foundation models enhanced the capabilities of agents and triggered more promising industrial applications. Based on 30+ years of first-hand research experience on agents and applications, this lecture will provide an overview of agents, their recent developments, as well as their applications, particularly in intelligent manufacturing.

Roboticized Intelligent Manufacturing

Kok-Meng Lee

- Lecture

Intelligent Sensing Methods for Monitoring Internal Joint Motion/Forces of a Human Lower Extremity: Wearable Design, Modeling, and Estimation

Lecturer Intro

Kok-Meng Lee (kokmeng.lee@me.gatech.edu) received his M. S. and Ph. D. degrees in mechanical engineering from the Massachusetts Institute of Technology in 1982 and 1985, respectively. He has been with the Georgia Institute of Technology since 1985. As a professor of mechanical engineering, his research interests include system dynamics and control, machine vision, robotics, automation, and mechatronics.
Dr. Lee is the founding Editor-in-Chief (EIC) for the Springer International Journal of Intelligent Robotics and Applications (IJIRA). Before becoming IJIRA EIC, he served as EIC for the IEEE/ASME Transactions on Mechatronics (2008-2013). He co-founded the IEEE/ASME International Conference on Advanced Intelligent Mechatronics in 1997 and hosted its following edition (AIM1999) as General Chair in Atlanta, USA. He had also held representative positions in the IEEE Robotics and Automation Society; Associate Editor for its Robotics and Automation Magazine (1994-1996) and its Transactions on Robotics and Automation (1994-1998) and Automation Science and Engineering (2003-2005). He served on the Executive Committee of ASME Dynamics Systems and Control Division (2013-2107, Chair 2016). He co-authored four books on modeling and field-based approaches for the design and control of electromagnetic actuators and flexonic systems and has held several patents on machine vision systems, ball-joint-like spherical motors, and automated systems for transferring live objects.
Dr. Lee is a Life Fellow of ASME and IEEE. Other recognition of his research contributions includes the Presidential Young Investigator (PYI) Award, Sigma Xi Junior Faculty Award, International Hall of Fame New Technology Award, Woodruff Faculty Fellow, and Michael J. Rabins Leadership Award.

Lecture Intro

Human joint motion/force measurements for machine perception of the internal joint kinematics/forces have a wide spectrum of applications including rehabilitation therapy, sports training, health monitoring, and human-machine interaction. However, they are difficult to measure directly and non-invasively due to the complex in vivo structure of the human joint and the variety of the human-dependent motion. This lecture introduces methods to instrument lower extremity exoskeletons with intelligent sensors for monitoring the internal joint motion/forces and their measurement models for internal joint parameter estimation.

Roboticized Intelligent Manufacturing

Changqing Liu

- Lecture

Advanced multifunctional heterogenous integration to underpin development of future AI and robot technologies

Lecturer Intro

Professor Liu received his PhD degree from the University of Hull, United Kingdom (UK) in 1998. He worked as a postdoctoral researcher from 1997 to 2000 at the University of Birmingham, UK. From 2000 he served Loughborough University (UK) as a postdoctoral researcher, lecturer, senior lecturer and became Professor of Electronics Manufacture from 2011. Since October 2023, he has taken up professorship and doctoral supervisor at Huazhong University of Science and Technology, China.

Lecture Intro

Ubiquitous sensory electronic devices together with the bioelectronics to enable the heterogenous integration of human-machine interfaces are becoming a critical disruptive technology that will eventually shape the development of future AI and Robot. Recent advances in electronics manufacturing and hybrid multimaterial multifunctional integration have facilitated a new conceptual design and exploitation of micro-miniature core sensing technologies that allow sensing of many fundamental parameters of interest which can also be interconnected. Driven by 'More than Moore' approaches advanced heterogenous integration is taking advantage of some remarkable developments in materials and processes which will ultimately underpin future design and embodiment of AI and robots with numerous potential settings. However, the needs and challenges exist in making electronics that can conform to complex surface profiles, which requires radical approaches to the new demands and settings, as well as a seamlessly cross-disciplinary effort from a research team consisting of life scientists, psychologists, technologists and engineers. In line with these needs two research themes will be considered for future research and development: i) Attachable electronics - reforming/reshaping rigid high performance electronics into human conformable factors that are able to stretch, bend and twist without significant mechanical and functional deterioration; and ii) Implantable electronics - probing non-invasively human tissues with bio-compatible implantable electronics for simultaneous acquisition and stimulation of bio-process of human-like activities. In this session, advanced electronics manufacturing and integration of various multifunctional components involving multi-scale, multi- material interconnections onto various base materials will be explored to address the challenges in order to meet not only functional requirement but also potentially low cost scalable production with a number of case studies.

Artificial Intelligence

Hai-Tao Zhang

- Lecture

Introduction to Swarm Intelligence and Autonomous Unmanned Systems

Lecturer Intro

Hai-Tao Zhang is deputy dean of School of Artificial Intelligence and Automation, Huazhong University of Science and Technology (HUST), Level-2 Professor, Huazhong Scholars Leader Professor and doctoral supervisor. He has been supported by the National Science Fund for Distinguished Young Scholars. He is director of Chinese Ministry of Education Engineering Research Center of Autonomous Intelligent Unmanned Systems, director of the Guangdong Province Engineering and Technology Research Center of Autonomous Unmanned Surface Vessels,and chief scientist of a National Science and Technology Innovation 2030 -- "New Generation of Artificial Intelligence" Major Project. He received Ph.D. degree from the University of Science and Technology of China in 2005, and worked as Postdoctoral Scholar at the University of Cambridge in 2007. He has been a full Professor and doctoral supervisor since 2010. His research interests include swarm intelligence, collaboration of autonomous unmanned surface vessels and collaborative manufacturing of multi-robot systems. He has published 134 SCI-indexed journal papers including 86 Nature Machine Intelligence, Nature Communications, National Science Review, Automatica and IEEE Trans./Mag. papers. He has also published two Springer monographs. His theoretical contributions have been highlighted in Nature Physics, while his practical applications have been implemented in projects by China Shipbuilding Industry Corporation and Guangzhou Shipyard International Company Limited, supporting national major marine engineering projects such as the Cross-Sea Channel in the Guangdong–Hong Kong–Macao Great Bay Area, offshore wind farms, and the exploration of oil and gas resources in the South China Sea. His achievements have been reported by websites of both Chinese Government. He has won two First-grade Prizes of Natural Science in Hubei Province and one First-grade Prize of Technological Invention in Guangdong Province. He has been selected into the Stanford Global Top 2% Scientists List. He is/was served as an editorial board member for international journals such as IEEE Transactions on Systems, Man, and Cybernetics: Systems, IEEE Transactions on Circuits and Systems II, and Engineering.

Lecture Intro

Swarm intelligence as a nascent discipline, which originates from the observations and studies of collective behaviors in biological entities. Swarm intelligence in biological systems, characterized by its dynamism, self-organization, parallelism, cooperation, simplicity, flexibility, and robustness, demonstrates significant potential and advantages in research fields such as combinatorial optimization, communication networks, robotics, aerospace, etc.

This course primarily delves into the fundamental principles, methods, existing typical algorithms of swarm intelligence, as well as the principles, models, theories, simulation, and verification of autonomous unmanned systems (such as unmanned vessels, unmanned vehicles, drones, underwater submersibles, etc.) based on swarm intelligence for cluster control. Through the study of this course, students will acquire theoretical knowledge related to swarm intelligence, autonomous unmanned systems, and the principles of cluster coordination control.

Tri-Co Robot

Zhigang Wu

- Lecture

Soft Robots

Lecturer Intro

Zhigang Wu (Professor), received his Ph.D. in Mechanical Engineering, specializing in Micro-Electro-Mechanical Systems, from Nanyang Technological University, Singapore. He has had a long tenure as an Associate Professor engaged in research and teaching at Uppsala University, Sweden. Currently, he is a Professor and doctoral supervisor at the School of Mechanical Science and Engineering, Huazhong University of Science and Technology, and also serves as a part-time professor at the School of Optical and Electronic Information. He serves as an editorial board member for internationally renowned journals such as "Journal of Micromechanics and Microengineering" and "Micromachines," and is a guest editor for "Material Today Physics."He has been extensively involved in research on the design and manufacturing of soft materials and soft robotic systems. Over the years, he has been the principal investigator for national projects, such as the Key R&D program, the General program, and has achieved multiple innovative results. His related academic achievements were honored as a "Major Academic Progress" by Huazhong University of Science and Technology in 2022. He has published over 100 academic papers in internationally renowned journals such as Sci. Robot., Nat. Commun., Adv. Mater., and Natl. Sci. Rev., with many of these articles featured as highlights or cover articles. His published papers have been cited more than 5000 times in SCI-indexed journals, with a current h-index of 30. Several of his papers have been recognized as hot articles of the year (or month) and have been frequently cited by top-tier journals including "Nature" and "Proceedings of the National Academy of Sciences of the United States of America." He has filed 6 international patents, with 4 granted, and has applied for over 60 Chinese invention patents, with 36 of these being granted. The individual co-founded the International Symposium of Flexible and Stretchable Electronics (ISFSE) and has served as the Program Chair on multiple occasions. Additionally, they have undertaken the role of Chair of the Organizing Committee for the fifth "Soft Robotics Theory and Technology Symposium and Soft Robotics Innovative Design competition".Currently, he is deeply involved in research on embodied intelligent robots in the context of digitalization and intelligence. His primary research directions include humanoid biomimetic robots, embodied intelligent soft robots, and digital (AI) driven intelligent soft design and manufacturing.

Lecture Intro

Soft robot is a new type of soft robot, which is expected to achieve human-robot integration by being able to adapt to various unstructured environments with higher safety, adaptability and biocompatibility. Soft robots generally use materials such as silicone rubber, shape memory polymers, ionic polymer-metal composites, and hydrogels as the body, and are manufactured by fused deposition, laser ablation, 3D printing, etc.; the driving methods include pneumatic-hydraulic drive, smart material drive, magnetic drive, chemical reaction drive, electric drive, light drive, humidity drive, energy gradient drive, and static electric drive, etc., and are ultimately applied in medical and healthcare, field exploration, industrial manufacturing, and observation.

Roboticized Intelligent Manufacturing

Hao Wu

- Lecture

Flexible electronics for robot tactile sensing and human-machine interaction

Lecturer Intro

Hao Wu is a professor in the School of Mechanical Science and Engineering, Huazhong University of Science and Technology (HUST), Wuhan, China. He received his B.E. from HUST and Ph.D. from Georgia Institute of Technology, Atlanta, USA, both in mechanical engineering. Prior to his appointment with HUST in 2016, he was a senior process engineer with Intel Corporation in USA. His research interests include flexible and stretchable electronics for robotic sensing, human–machine interfaces and wearable health. He has published more than 30 papers in the international prestigious journals such as Science Translational Medicine, National Science Review, Advanced Materials and others. Many of them are highlighted as cover articles. He is the recipient of the Outstanding Young Manufacturing Engineer Award from the Society of Manufacturing Engineers (2016).

Lecture Intro

Traditional rigid electronics have high modulus, poor stretchability and limited wearability; however, flexible electronics have advantages such as flexibility, softness, lightness, thinness, bendability, and conformal adhesion, leading the revolution in electronic technology. Flexible sensing is one of the important application areas of flexible electronics. By using flexible materials, sensing functions can be achieved on curved surfaces of robot, enabling the robot to obtain tactile sensations. Due to the tactile perception capability, robot can acquire the necessary information of objects and environments, which promotes the realization of humanoid dexterous manipulation. Wearable electronics is another important application area. The conformal adhesion allows electronic devices to be in closer contact with the human body, providing a more natural and comfortable wearing experience and enabling functions such as remote control, haptic feedback, and human-machine interaction. In conclusion, flexible electronics represent the development direction of the next-generation electronic information technology platform.

Artificial Intelligence

Yuan Ye

- Lecture

Big Data-Driven Smart Manufacturing

Lecturer Intro

Dr. Yuan Ye is a professor and doctoral advisor, affiliated with the School of Artificial Intelligence and Automation at Huazhong University of Science and Technology,State Specialist (Youth).His research focuses on data-driven modelling theory and its applications in industry.In the past five years, he has published more than 20 papers as first or corresponding author (including co-author) in National Science Review, Nature Communications, Nature Machine Intelligence, IEEE Trans. Automatic Control, IEEE Trans. Mechatronics, and Automatica. He serves/has served as an editor for National Science Review, National Science Open, Engineering, a member of the young editorial board of Chinese Science--Technical Science, a member of the editorial board of IEEE Trans. on Control of Network Systems. He also serves as an editor of several special issues focusing on Industrial Artificial Intelligence for Chinese Science--Technical Science, Engineering, FEM, ARC, IJRNC and IEEE Trans. on Mechatronics.He was awarded the first prize of Natural Science of Hubei Province in 2022, the Major Academic Progress of HUST in 2020, the Young Scientist Nomination Award of IEEE Technical Committee on Information Physical Systems in 2020 and the Youth Medal of May Fourth (anti-epidemic category) of HUST. His achievements have won the best paper awards in several international academic conferences, including the International Conference on Industrial Artificial Intelligence (ICIAI).

Lecture Intro

The smart manufacturing sector is envisioned to be heavily influenced by artificial intelligence-based technologies with the extraordinary increases in computational power and data volumes. However, it is difficult to accurately characterize the dynamic processes of complex, non-linear, and time-varying systems by mathematical models. Moreover, traditional methods are unable to identify the profound coupling relationship between complex nonlinear dynamic equations and discrete information flow. On the contrary, from the data-driven perspective, learning the states and dynamic processes of models from data is a new approach.

This course focuses on highlighting the prominent issues and core challenges in the application of mechanistic modeling theories based on big data in manufacturing systems. It also explores how to address common problems in smart manufacturing from a big data perspective. The purpose of this course is to enable students to understand the significance of big data-driven approaches in smart manufacturing, gain a deeper understanding of their essence, and ultimately recognize the broad application prospects of big data in the manufacturing industry.

Roboticized Intelligent Manufacturing

Zhao Huan

- Lecture

Robotic machining and assembly

Lecturer Intro

Zhao Huan, Professor and Doctoral supervisor at Huazhong University of Science and Technology (HUST), specializing in robot machining and assembly, as well as medical surgical robot technology. He was recognized as a national-level high-level young talent in 2019 and received the Hubei Provincial Distinguished Youth Scholar award in 2020. He has also been honored as one of the top ten young faculty members at HUST and received the Silver Award for Excellent Mechanical Engineering Doctoral Thesis from the Shang Yin Foundation and the Excellent Doctoral Thesis Award from the Shanghai Municipality.

He has published over 90 papers in international academic journals and conferences, with more than 30 of them indexed by SCI. He holds 54 granted national invention patents. He has served as the principal investigator for three projects funded by the National Natural Science Foundation of China, one project from the National Key Research and Development Program, one major project for "bottleneck" technology in Wuhan City, and one key project funded by the Hubei Provincial Natural Science Foundation for Distinguished Youth Scholars.

Zhao Huan has received several awards for his contributions in research, including the Special Prize for Technological Invention at the 2022 Mechanical Industry Science and Technology Awards, the first prize in Science and Technology in Jiangsu Province in 2018, the Silver Award for Excellent Mechanical Engineering Doctoral Thesis in 2014, the Excellent Doctoral Thesis Award in Shanghai in 2015, the third High-Impact Paper Award from the Journal of Mechanical Engineering in 2019, and the sixth Outstanding Paper Award from the China Association for Science and Technology. He holds various academic positions such as the Deputy Director of the State Key Laboratory of Intelligent Manufacturing Equipment and Technology, Guest Editor for IJIRA, member of the National Robot Standardization Technical Committee, and Deputy Secretary-General of the Robotics Branch of the China Mechanical Engineering Society.

Lecture Intro

The current main approach for the machining of large and complex curved surface parts involves a combination of manual labor and a small number of CNC machine tools. However, CNC machining has limitations such as a restricted machining range, fixed machining modes, difficulties in handling complex operations, and high costs. In comparison, robots can offer advantages such as high maneuverability, large workspace, flexible and adaptable topological structure, and strong capability for multi-robot parallel and coordinated operations. Therefore, robotic machining can overcome limitations in part size and tool space, providing an innovative solution for the machining of large and complex curved surface parts.

This course focuses on the prominent issues and core challenges in applying robots to the machining of large and complex curved surfaces. It also covers relevant research work conducted both domestically and internationally, as well as the cutting-edge work carried out at the School of Mechanical Science and Engineering, Huazhong University of Science and Technology. The objective of this course is to help students understand the core principles of robotized intelligent manufacturing and grasp the vast application prospects of robots in intelligent manufacturing.

Artificial Intelligence

Zhu Lijun

- Lecture

Control and Perception of Humanoid Robots

Lecturer Intro

Zhu Lijun is a Professor and Doctoral supervisor at Huazhong University of Science and Technology (HUST), and recognized as a national-level high-level oversea young talent. His research interests include bio-inspired robot, robot swarm and unmanned system. He received the Ph.D. degree in Electrical Engineering from University of Newcastle, Australia and was a post-doctoral fellow at the University of Hong Kong and a post-doctoral researcher at the University of Newcastle. He has served as the principal investigator/participant for four projects funded by the National Natural Science Foundation of China and the National Key Research and Development Program. He has published over 60 papers and held more than 10 granted national invention patents.

Lecture Intro

The industrial robots are used in the factory to increase production efficiency, improve product quality, and achieve automation and intelligence in the manufacturing process. Compared to traditional industrial robots, humanoid robots are supposed to have better mobility and adaptability in the complex environmental, Human-like manipulation capabilities, and natural human-robot interaction interface. This course aims to introduce the research problems and major challenges of using humanoid robots or legged robots in the complex environment. In particular, the course covers the up-to-date research progress in problems such as locomotion control, perception, motion planning as well as the research outcome by teams in Huazhong University of Science and Technology. The purpose of this course is to help students understand the core issues in the field of humanoid robots and to envision the potential applications of humanoid robots in the future.

Roboticized Intelligent Manufacturing

Wei Guo

- Lecture

Robotic Laser Manufacturing

Lecturer Intro

Prof. Dr. Wei Guo is currently a professor in the School of Mechanical Science and Engineering in Huazhong University of Science and Technology. His research interest is mainly focused on high power laser processing (welding and additive manufacturing) and materials performance characterization under extreme environment (high/low temperature, radiation, corrosion, etc.) for civil nuclear and aerospace applications. Prof. Guo is the Guest Editor of the Photonics Special Issue "Laser Processing and Modification of Materials". He has published more than 30 peer-reviewed papers in Additive Manufacturing, CIRP Annals - Manufacturing Technology, Materials Science & Engineering A, Optics & Laser Technology and so on. He was elected for National High-level Young Talent Program of China, Senior Member of the Chinese Mechanical Engineering Society, Chartered Engineer (CEng) and Member of The Welding Institute (MWeldI) of the UK.

Lecture Intro

Laser is called "the fastest knife", "the most accurate ruler", and "the brightest light". Together with the atomic energy, computer, and semiconductor, they are called the four new inventions in the 20th century. In 2020, the laser celebrated its 60th anniversary. As one of the most advanced manufacturing and processing technologies in the world, laser technology has been widely used in industrial production, communications, information processing, medical beauty, 3D sensing, military, cultural education, and scientific research. This lecture will focus on introducing the basic principles of the physics and the construction of a laser, and providing a review of the overall state of laser science and applications. In addition, this lecture will give typical application examples of robotic laser manufacturing and how to maximize the capability in advanced manufacturing with the combination of robots and lasers.

Artificial Intelligence

Zeng Xiangrui

- Lecture

Artificial Intelligence and Autonomous Driving

Lecturer Intro

Xiangrui Zeng is a professor with the School of Mechanical Science and Engineering at Huazhong University of Science and Technology, Wuhan, Hubei, China. His research interests cover various topics in modeling, analysis, estimation, and control of connected and automated vehicles and robotics systems. He received his B.S. degree and his M.S. degree from Tsinghua University, Beijing, China in 2009 and 2012, respectively, and his Ph.D. from The Ohio State University, Columbus, Ohio USA in 2016. From 2016 to 2019, he worked at Ford Motor Company in Dearborn, Michigan, USA. From 2020 to 2021, he was an assistant professor in Robotics Engineering at Worcester Polytechnic Institute, Worcester, Massachusetts, USA. He has published more than 20 papers on journals and conferences including Applied Energy and IEEE Transactions on Control Systems Technology. He has applied for 12 patents in the USA, Germany, and China. He serves as a reviewer for more than 30 journals and conferences. He is an associate editor of Mechatronics, and was a guest editor at IEEE/ASME Transactions on Mechatronics.

Lecture Intro

The lecture will introduce the perception, positioning, planning, and control technologies of autonomous driving vehicles, as well as the applications of artificial intelligence in related fields such as simulation modeling, data generation, and accelerated testing in autonomous driving.

Tri-Co Robot

Bo Ma

- Lecture

MEMS Ultrasonic Transducers Technology

Lecturer Intro

Bo Ma, PhD, Research Fellow, received his B.S. and M.S. degree in Electrical Engineering from Jilin University in 2008 and 2010, and the Ph.D. degree in Mechanical Engineering from Tsinghua University in 2016. In January 2017, he joined the group of Professor Khuri-Yakub at Stanford University as a postdoctoral fellow, and became a Research Associate in 2020. Then, He founded Orchard company with Professor Khuri-Yakub. In August 2022, he joined the School of Mechanical Science and Engineering of Huazhong University of Science and Technology. His interests mainly include advanced micro/nano fabrication and 3D microsystems integration technology, high-end MEMS chips and intelligent sensors, future ultrasound imaging and therapeutic chips and microsystems.

Lecture Intro

MEMS is an emerging technology in the 21st century, and as a cutting-edge interdisciplinary technology, it plays a crucial role in the major national strategic planning. MEMS ultrasonic transducers (MUTs), due to their significant advantages such as small size, low power consumption, high sensitivity, ease of large-scale array manufacturing, and easy integration with electronic circuits, have shown great advantages in intelligent medical such as intravascular and personal handheld ultrasound, wearable medical, high-intensity focused ultrasound non-invasive diagnosis and treatment, and have also shown the huge potential in robotics, small drones, autonomous driving, mobile phones, AR/VR and wearable devices, smart homes, and IoT. This course will briefly review the development history of MEMS ultrasonic transducers, analyze their working principles in detail, and list some potential application scenarios.

Artificial Intelligence

Akhil Garg

- Lecture

Introduction to AI approach of Genetic programming

Lecturer Intro

Akhil Garg is an associate professor and tutor of master's degree in mechanical engineering, Huazhong University of Science and Technology. In August 2014, he received a doctorate degree in mechanical and aerospace engineering from Nanyang Technological University, Singapore. In August 2019, he joined School of Mechanical Science and Engineering at Huazhong University of Science and Technology.
The main research directions include the application of evolutionary algorithm and artificial intelligence in engineering design or design optimization, such as energy storage system design. In the past five years, SCI papers has been published in International Journals such as Structural and Multidisciplinary Optimization, Swarm and Evolutionary Computation, Applied Soft Computing, Expert Systems with Applications, Engineering Applications of Artificial Intelligence, Journal of Intelligent Manufacturing, Journal of Power Sources, Energy and other journals. 240 papers, including 2 ESI hot papers and 13 ESI highly cited papers, H index 25

Lecture Intro

This lecture comprises of fundamentals of AI, working principles of genetic programming and its application in manufacturing and energy systems. Students at the end of lecture shall be able to learn the following aspects:
(a) Fundamentals of AI and its applications.
(b) Working principle of AI approach of genetic programming.
(c) Trends and challenges in manufacturing and energy systems
(d) Short Demonstration of genetic programming in manufacturing and energy systems.

Tri-Co Robot

LING Ling

- Lecture

Soccer robot

Lecturer Intro

Dr. Ling Ling has been working in the School of Mechanical Science and Engineering of HUST since 2001. She devotes herself in teaching and research of machine design and theory. From Jan 2013 to Jan 2014, she worked as a visiting scholar in University of Washington (USA) with the support of China Scholarship Council.
She teaches many compulsory courses for Chinese and overseas students, including Mechanical Design Theory and Methods (II), Machine Design, Theory of Machines and Mechanisms, and Mechanical Engineering Training. She is also a teacher of MOOC: Machine Design of HUST. In 2015, she won the first-class prize in the HUST Teaching Competition. In 2018 and 2022, she won the first-class prize of National Teaching Achievement twice. She has been a Graduate tutor since 2008.
Her research interests include Intelligent Design, Optimization Design, Knowledge Engineering, and Mechanical System Dynamics. She has been involved in many research projects including a NSFC project and an 863 project. More than 20 journal papers are published, and some of them are cited by SCI or EI. She also published a book Decision Support Systems with Prof. Hu Yujin in 2006.

Lecture Intro

The lecture introduces the Robot World Cup (RoboCup) competition, the participation of college students from the School of Mechanical Engineering at Huazhong University of Science and Technology, and several key technologies in the design and manufacturing of soccer robots.

Tri-Co Robot

Ji Qian

- Lecture

Industrial Design in the New Design Context

- **Lecturer Intro**

Doctor Qian Ji works as an associate professor for Department of Industrial Design, School of mechanical science and engineering, Huazhong University of Science and Technology. She has presided over the National Natural Science Foundation of China and the project of Hubei Natural Science Foundation of China. Her research focuses on social innovation design，traditional culture design and Human-Computer Interaction.

- **Lecture Intro**

Nowadays, changes in the concept and object of design, business and society have changed design itself. The course will redefine and reconstruct the system of design from the design of physical logic, to the design of interaction logic, to the design of system logic, to the development trend of design-driven industry and society. The course will focus on the five aspects of new retail, new intelligence, new travelling, new arts and culture and new equipment, which are extended by the integration and development of design and different industries.

Tri-Co Robot

Yiwei Wang

- Lecture

Advancing Healthcare: Exploring the Synergy of Medical Robotics and Artificial Intelligence

- **Lecturer Intro**

Yiwei Wang received the B.Eng. degree from Huazhong University of Science and Technology, Wuhan, China, in 2013, the M.Sci. degree, and the Ph.D. degree from Arizona State University, Tempe, AZ, USA, in 2014 and 2021, respectively. He is currently a Postdoctoral Researcher with State Key Laboratory of Intelligent Manufacturing Equipment and Technology, Huazhong University of Science and Technology, where he directs iROBOTCare medical robotics research lab. His research interests include physical human-robot interaction, cognitive robotics, and surgical robots.

- **Lecture Intro**

Join us for the seminar lecture, "Advancing Healthcare: Exploring the Synergy of Medical Robotics and Artificial Intelligence," where we delve into the transformative intersection of cutting-edge technologies. Discover how the fusion of medical robotics and artificial intelligence is reshaping the landscape of healthcare, revolutionizing diagnostics, surgery, and patient care. Explore the collaborative potential of these innovations, their impact on medical professionals, and the promising future they hold in enhancing precision, efficiency, and patient outcomes. Don't miss this opportunity to gain insights into the forefront of medical advancements and the exciting possibilities that lie ahead in the synergy between robotics and AI.