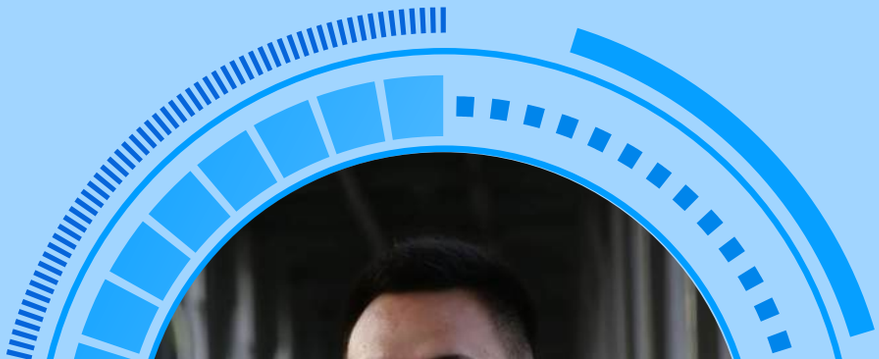
2026 School of Science and Engineering Winter Camp Schedule

Date	Time	Schedule	Instructor	Participants
Feb 7th	14:00-21:00	Sign in	/	
	19:00-21:00	Warm-up Activities	/	
Feb 8th	9:00-9:30	Opening Ceremony	/	All students
	9:30-10:00	Mathematics	Prof. WANG Dong	All students
	10:00-10:30	Physics	Prof. ZHANG Jianhui	All students
	10:30-11:00	Chemistry	Prof. ZHANG Qi	All students
	11:00-11:30	Computer Science and Engineering	Prof. CHEN Junting	All students
	12:00-14:00	Lunch	/	
	14:00-17:30	Campus Exploration Tour	/	All students
	19:00-21:00	An Evening Chat with Deans	/	All students
Feb 9th	9:00-10:00	Master Forum (For Engineering)	/	All students
	10:00-12:00	Mathematics	Prof. LEE Cheuk Yin	Mathematics Camp
		Physics	Prof. ZHOU Kai	Physics Camp
		Chemistry	Prof. KE Zhi hai	Chemistry Camp
		Computer Science and Engineering	Prof. Xu JIE	Computer Science and Engineering Camp
	12:00-14:00	Lunch	/	

	14:00-17:30	Experimental Courses	Advisors of Experimental Courses	All students
	19:30-21:00	Night talk with Senior Schoolmates	Professors + Peer Mentor	All students
Feb 10th	9:00-10:00	Master Forum (For Engineering)	/	All students
	10:00-12:00	Mathematics	Prof. QUAN Chaoyu	Mathematics Camp
		Physics	Prof. WANG Xing	Physics Camp
		Chemistry	Prof. QIU Zijie	Chemistry Camp
		Computer Science and Engineering	Prof. ZHAO Junhua	Computer Science and Engineering Camp
	12:00-14:00	Lunch	/	
	14:00-16:00	Experimental Courses	Advisors of Experimental Courses	All students
	16:00-16:30	Closing Ceremony	/	All students

Professor Introduction

Mathematics Camp



Prof. QUAN Chaoyu

Professor Profile:

Chaoyu Quan received his bachelor's degree from the University of Science and Technology of China in 2013. He obtained a MS degree in Applied Mathematics from Université Paris Dauphine (Paris 9) in 2014 and a PhD degree in Mathematics from Laboratoire Jacques–Louis Lions at the Université Pierre et Marie Curie (Paris 6) in 2017. From 2017 to 2018, he served as a Postdoctoral Researcher at the Institut des Sciences du Calcul et des Données, Sorbonne Université. Prior to joining CUHK(SZ), he held the position of Research Assistant Professor at the SUSTech International Center for Mathematics at the Southern University of Science and Technology.

Chaoyu Quan's research interests lie in highly accurate methods for phase-field equations, numerical methods for time-fractional problems, and the application of mathematical methods in quantum chemistry. He has published over 30 papers in academic journals such as SINUM, SIAM J. Sci. Comput., Math. Comput., J. Comput. Phys., M3AS, J. Differ. Equ., etc.

Course:

Computational Mathematics—Numerical Algorithms and Analysis

Abstract: Computational mathematics is an interdisciplinary field bridging mathematics and computer science, leveraging mathematical theory and computer technology to solve practical problems. In this course, we will explore a crucial branch of computational mathematics: numerical algorithms. Numerical algorithms involve using numerical methods to solve mathematical problems, such as equation solving, function approximation, and numerical solutions to differential equations. We will discuss the fundamental principles and practical applications of these algorithms, including simulations in physics and computational problems in engineering.

Prof. LEE Cheuk Yin

Professor Profile:

Prof. Cheuk Yin Lee received his BSc and MPhil degrees from The Chinese University of Hong Kong in 2014 and 2016, and his PhD degree from Michigan State University in 2020. He was a post-doc at EPFL in Switzerland during 2020-2022 and was an Assistant Professor at National Tsing Hua University during 2022-2023. He joined CUHK-Shenzhen as an Assistant Professor in August 2023.

Course:

Introduction to Linear Algebra

Abstract: This introductory lecture on linear algebra will start with the problem of solving systems of linear equations, focusing on Gaussian elimination, as well as the existence and uniqueness of solutions. This naturally leads to the introduction of matrices and their operations, which play a central role in linear algebra.

Prof. WANG Dong

Professor Profile:

Dong is an Assistant Professor and Presidential Young Fellow at the Chinese University of Hong Kong, Shenzhen from Aug. 2020. He has broad research interests in computational mathematics, especially in modelling and simulation of multiphase problems, topology optimization, threshold dynamics method, and machine learning.

He received a Ph.D degree in Applied Mathematics in June 2017 at the Hong Kong University of Science and Technology under the supervision of Prof. Xiao-Ping Wang and a Bachelor degree in Mathematics in 2013 at Sichuan University. Before moving to CUHKSZ, he was an Assistant Professor Lecturer in the Department of Mathematics at the University of Utah between July 2017 and June 2020.

In addition to his primary appointment, he serves as a Research Scientist at the Shenzhen International Center for Industrial and Applied Mathematics of Shenzhen Research Institute of Big Data and as an Assistant Professor at the Shenzhen Loop Area Institute.

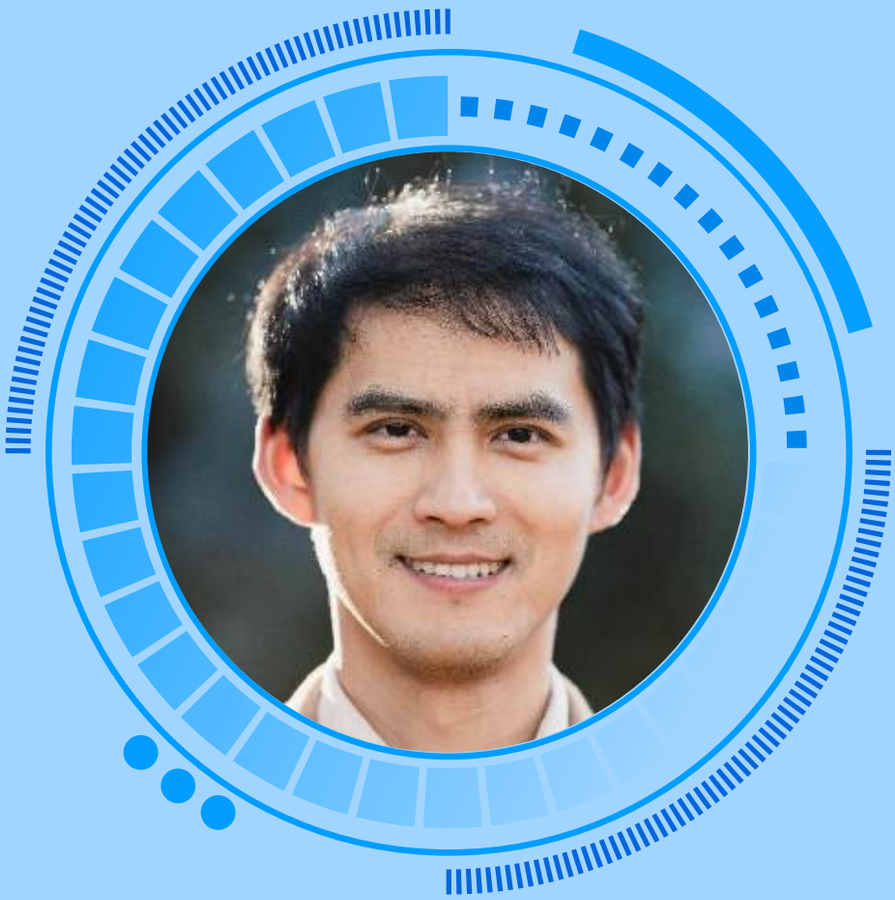
Course:

Mathematics in Filmmaking

Abstract: Have you ever been awed by the towering waves as the Titanic sank? Or wondered how Elsa’s ice magic in Frozen could look so incredibly realistic? The answer might surprise you: it all stems from the magic of mathematics! This presentation will be a fascinating journey of discovery, revealing that film visual effects (VFX) artists are actually "mathematicians casting spells with code." By

solving the "mysterious equations" that describe fluid motion, they make virtual seawater in computers obey their commands; through "mathematical incantations" simulating ice and snow, they ensure every snowflake follows the laws of real physics. From vast oceans to glistening ice crystals, we will explore the mathematical principles behind these visual wonders and how cold numbers are transformed into emotionally resonant realism on the silver screen. Let’s uncover together how the most captivating visual effects in movies have, at their core, lines of elegant mathematical code.

Physics Camp



Prof. WANG Xing

Professor Profile:

Xing Wang received his bachelor’s degree in physics from Peking University in 2014 and his Ph.D. in theoretical physics from the same institution in 2019. He conducted postdoctoral research at Johannes Gutenberg University Mainz and Technical University of Munich from 2019 to 2024 before joining CUHK(SZ) as an assistant professor. His primary research area is elementary particle physics and its interdisciplinarity with cosmology and mathematics. His main research interests include:

(1) precision predictions for colliders in the perturbative quantum field theory framework, especially effective field theories

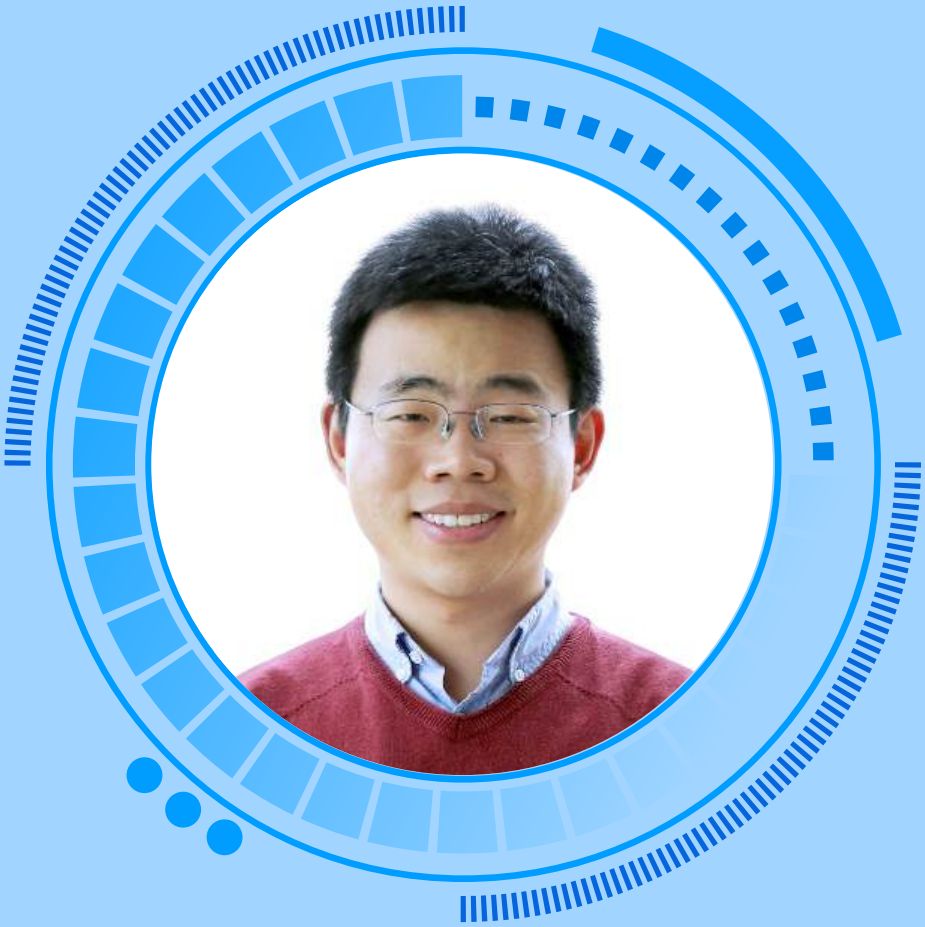
(2) hidden structures of Feynman integrals/scattering amplitudes and the applications

(3) large-scale structures of cosmology

Course:

First Experience of General Physics Course: An Exploration of the Origin of Heat Capacity

Abstract: An important mission of physics is to deconstruct our matter world. One significant category of phenomena in the matter world is related to heat. This two-session lecture aims to introduce the concept of heat capacity, which was already touched upon in high school physics. In these two classes, students can experience a undergraduate-level physics course in advance, learn how classical physics provides explanations and predictions for the heat capacity of objects, and will gain a preliminary understanding of the situations in which the explanations of classical physics fail.



Prof. ZHOU Kai

Professor Profile:

Prof. Kai Zhou received his B.Sc. degree in Physics from Xi'an Jiaotong University in 2009, and his PhD degree in Physics from Tsinghua University in 2014. After that, he worked as a Postdoctoral researcher in the Institute for Theoretical Physics (ITP) at Goethe University Frankfurt in Germany from 2014 to 2017. Since 2017 he started as a Research Fellow (W1 professor status) and Group Leader at the Frankfurt Institute for Advanced Studies (FIAS), leading the group "Deepthinkers" in AI for Science, especially Physics studies with modern computational paradigms Machine- and Deep-Learning. He also supervises Master/PhD students and Postdocs in AI for Science. He was then promoted to Fellow (W2 professor status) at FIAS from 2022. Since the end of 2023 he joined CUHK(SZ) as an Assistant Professor.

Prof. Zhou has broad interests in AI for Science, including high energy nuclear physics, statistical physics, energy, application oriented and other diverse fields. He remains committed to pushing the boundaries of physics and modern computational paradigms, especially machine learning, to provide new pathways and insights in exploring the physical world while also shaping the future of technological advances in computations with inspiration from physics knowledge. Prof. Zhou has published more than 50 peer-reviewed journal papers. He has been invited to give plenary talks in International conferences like Strange Quark Matter, Initial Stages, International Nuclear Physics Conference, ML4Lattice, etc. He has been invited as reviewer for many journals, including: PRL, PRD, PRC, PRE, Nature Communications, Astrophysical Journal-AAS, JCAP, NST, CPC, Frontier of Physics, EPJA, Particles, Measurements, Sustainability, NeurIPS, PLOS ONE. He currently serves as associate editor for the journal Modern Physics Letters A and International Journal of Modern Physics A.

Course:

Rotations Between Time and Space: An Introduction to Special Relativity

Abstract: This lecture will introduce the revolutionary ideas behind Einstein's theory of relativity. It begins by outlining the two fundamental postulates of special relativity: the laws of physics are the same in all inertial frames of reference, and the speed of light is constant in any inertial frame, independent of the motion of the light source. Through a series of thought experiments, the lecture challenges our conventional notions, demonstrating that events perceived as simultaneous in one frame of reference may not be so in another, thereby intertwining the concepts of space and time. Overall, this lecture lays the groundwork for understanding how Lorentz transformations reshape our understanding of time dilation, length contraction, and the nature of spacetime.

Prof. ZHANG Jianhui

Professor Profile:

Prof. Jianhui Zhang obtained his Bachelor's degree from University of Science and Technology of China in 2002, and his Master's degree in 2005 from University of Heidelberg, Germany. He received his PhD degree in 2009 from Technical University of Munich, Germany. Then he worked as a postdoctoral fellow at CEA-Saclay, Shanghai Jiaotong University and University of Regensburg, before joining Beijing Normal University where he became a professor in 2020. In 2022, he joined The Chinese University of Hong Kong, Shenzhen as an associate professor.
His research interests include perturbative and non-perturbative aspects of quantum chromodynamics (QCD), in particular, hadron structure studies and their interplay with phenomenology at high-energy colliders such as the Electron-Ion Collider. He is also interested in developing new techniques for ab initio lattice QCD calculations and collider phenomenology.

Course:

Catalytic Precision: The Nobel Prize Revolution of Organocatalysis and Click Chemistry

Abstract: Many cutting-edge questions in natural science are not as distant from daily life as they seem. In this lecture, I will start with a single drop of water to explore several closely related yet unsolved fundamental scientific puzzles. My aim is to spark curiosity about exploring uncharted territories in science.

Chemistry Camp

Prof. ZHANG Qi

Professor Profile:

Dr. Qi Zhang is currently an Assistant Professor and Presidential Young Fellow in School of Science and Engineering. He received his B.Eng. and Ph.D. degrees from Sun Yat-sen University and Zhejiang University, respectively. He worked in GE Global Research Center (Shanghai), McMaster University and Zhejiang University of Technology, before joining CUHK, Shenzhen in March 2018. Dr. Zhang's research interests are in the areas of stimuli-responsive smart materials, polymerization reaction engineering, colloid and interfaces. He has published more than 60 peer-reviewed papers on prestigious journals (e.g., Adv. Funct. Mater., ACS Appl. Mater. Interfaces, ACS Macro Lett.) with more than 1800 citations and H index of 24, many of which have been selected as hot articles or journal covers. Dr. Zhang was elected as "2021 Future Chemical Engineering Scholar".

Course:

Polymer Materials in Daily Life

Abstract: Why can rubber bands stretch, and why are mineral water bottles lightweight yet tough? How do polymer "black technologies"—such as superabsorbent resins, shape-memory materials, self-healing coatings, hydrogels,

and biodegradable sutures—enter the fields of wearables and medicine? How are microplastics generated, and are they truly as alarming as claimed? This lecture uses everyday examples to clarify what polymers are, guides you to view daily life through a scientific lens, and explores how material innovation contributes to environmental protection and health.

Prof. KE Zhihai

Professor Profile:

Ke received his PhD degree from The Chinese University of Hong Kong (CUHK) in 2012. From 2012 to 2015, he conducted postdoctoral research at the National University of Singapore. He is the director of UG Chemistry Programme, Presidential Young Scholar at The Chinese University of Hong Kong, Shenzhen (CUHKSZ). Before joining CUHKSZ in 2020, he was a research assistant professor in the Department of Chemistry at CUHK. He has secured multiple grants (NSFC, Guangdong BABRF, Guangdong TIG, 3 RGC GRF, CUHK-CUHKSZ-GDST Joint Collaboration Fund, Shenzhen Key Lab). Honors include Asian Core Program Lectureship and Open Science Excellent Author Program.

Ke's research interests include organocatalysis, click chemistry, organic framework catalysis, etc. As the corresponding/first author, he has published more than 40 SCI papers in peer-reviewed international journals such as J. Am. Chem. Soc., Angew. Chem., ACS Catal., Adv. Sci., h-index 22. Some of the catalytic methodologies have been highlighted and applied by international colleagues.

Course:

Organocatalysis and Click Chemistry—An Introduction to the Nobel Prize in Chemistry

Abstract: The Nobel Prize in Chemistry in 2021 and 2022 recognized two complementary paradigms that have redefined the efficiency, precision, and environmental footprint of chemical synthesis: Organocatalysis and Click Chemistry.This lecture will explore how these fields earned chemistry's highest honor. We will begin with organocatalysis, pioneered by Benjamin List and David MacMillan (2021 Nobel). They demonstrated that small, abundant organic molecules—often derived from natural sources—can serve as powerful, selective, and less toxic catalysts, rivaling traditional metals and enzymes. This "third pillar" of catalysis has democratized asymmetric synthesis, enabling the efficient construction of complex pharmaceutical and bioactive molecules with minimal environmental impact.We will then delve into click chemistry, masterminded by Barry Sharpless, Morten Meldal, and Carolyn Bertozzi (2022 Nobel). Inspired by a desire for molecular simplicity and reliability, click chemistry describes reactions that are wide in scope, high-yielding, and generate harmless byproducts. The quintessential example—the copper-catalyzed azide-alkyne cycloaddition (CuAAC)—creates a perfect molecular "click." Carolyn Bertozzi's groundbreaking extension, bioorthogonal chemistry, removed the toxic copper, allowing these rapid, selective reactions to be performed inside living organisms. This breakthrough opened a new era for labeling, imaging, and targeting biomolecules in vivo, with profound implications for drug delivery and diagnostics.Together, these Nobel-awarded advancements provide chemists with an unparalleled toolkit: organocatalysis for expertly building intricate molecular architectures, and click chemistry for seamlessly and selectively connecting molecular modules, even within the complexity of life itself. This lecture will illustrate the conceptual beauty, transformative applications, and synergistic power of these two pillars of modern chemistry.

Prof. QIU Zijie

Professor Profile:

Prof. Zijie Qiu is currently an assistant professor, Presidential Young Fellow, Programme Director of the New Energy Science and Engineering at the Chinese University of Hong Kong, Shenzhen. He is concurrently a guest scientist at the Max Planck Institute for Polymer Research (MPIP). In 2014, he received his B.Sc in Chemistry from Fudan University (Shanghai Graduate with Honor). He received funding from the Hong Kong PhD Fellowship Scheme (HKPFS) from 2014 to 2018, and obtained a PhD degree in Chemistry from the Hong Kong University of Science and Technology in 2018. He then joined MPIP for postdoctoral research as Alexander von Humboldt Fellow in Germany, and was promoted to Scientific Group Leader in April 2020.

Prof. Qiu has published more than 60 papers in journals such as J. Am. Chem. Soc., Angew. Chem. Int. Ed., Adv. Mater., Matter, Chem. Sci., etc. as well as 2 Chapters in Springer and John Wiley & Sons, with more than 2,700 citations (H-index 26). He has been granted 3 Chinese patents and 3 US patents, and is the PI for 5 research fundings. As an active scientist, Prof. Qiu won the Early Career Award at the 2023 Materials Research Society Spring Meeting and an Emerging Investigator selected by Mater. Chem. Front. His current research interests include the precise synthesis of Aggregation-Induced Emission and chiral organic functional materials, as well as their applications in optoelectronic devices, smart sensing, energy and other related fields.

Course:

Fantastic Luminescent Materials: From Natural Mysteries to Technological Revolutions

Abstract: Luminescence pervades our world—from the twinkling of fireflies on summer nights and the ethereal blue glow of deep-sea creatures, to the illumination of mobile phone screens—all rely on the magical role of "luminescent materials." In this lecture, we will trace the development of luminescent materials, from the discovery of fluorescent minerals to their widespread applications in modern OLED lighting and bioimaging. Through vivid case studies and interactive

demonstration, students will understand how basic science drives modern technology and be inspired to devote themselves to new material research and societal development.

Computer Science and Engineering Camp

Prof. XU Jie

Professor Profile:

Jie Xu is currently an Associate Professor with the School of Science and Engineering, the Shenzhen Future Network of Intelligence Institute (FNii-Shenzhen), and the Guangdong Provincial Key Laboratory of Future Networks of Intelligence, The Chinese University of Hong Kong, Shenzhen, China. His research interests include wireless communications, network AI, edge computing, integrated sensing and communication (ISAC), wireless information and power transfer, and UAV communications. He has published more than 200 papers in international journals and conferences, with more than 18500 citations in Google Scholar.

He is the Chair of the IEEE Wireless Communications Technical Committee (WTC) and the Vice Co-chair of the IEEE Emerging Technology Initiative (ETI) on ISAC. He served or is serving as an Associate Editor-in-Chief of the IEEE Transactions on

Mobile Computing, an Editor of the IEEE Transactions on Wireless Communications, IEEE Transactions on Communications, IEEE Wireless Communications Letters, and Journal of Communications and Information Networks, and a Guest Editor of the IEEE Wireless Communications, IEEE Journal on Selected Areas in Communications, IEEE Internet of Things Magazine, Science China Information Sciences, and China Communications. He has served as a Co-Chair for more than 20 symposiums and workshops at international conferences such as IEEE ICC, IEEE Globecom, IEEE INFOCOM, and IEEE/CIC ICCC. He was a recipient of the 2017 IEEE Signal Processing Society Young Author Best Paper Award, the IEEE/CIC ICCC 2019 Best Paper Award, the 2019 IEEE Communications Society Asia-Pacific Outstanding Young Researcher Award, the 2019 IEEE Wireless Communications Technical Committee Outstanding Young Researcher Award, the First Prize of the 2024 China Institute of Communications Science and Technology Award. He has been listed as the Highly Cited Chinese Researchers (Elsevier) since 2021. He is an IEEE Fellow and a Distinguished Lecturer of IEEE Communications Society.

Course:

6G Wireless Communication and Network Intelligence

Abstract: This lecture focuses on 6G wireless communication and network intelligence, providing a comprehensive exploration of the topic covering multiple key areas. It begins by defining 6G and introducing the fundamental principles of wireless communication. Subsequently, the discussion delves into the core technologies driving 6G, emphasizing their significance and potential applications. Finally, the lecture explores the concept of network intelligence in the context of 6G, elaborating on its mechanisms and implications for future communication systems.

Prof. ZHAO Junhua

Professor Profile:

Dr. Junhua Zhao is currently a professor at the School of Science and Engineering, The Chinese University of Hong Kong, Shenzhen. He is also the Executive Director of CUHKSZ - CSIJRI Joint Centre of Smart Energy Storage, the Director of the Energy Market and Energy Finance Laboratory at Shenzhen Finance Institute (SFI) and a researcher at Shenzhen Institute of Artificial Intelligence and Robotics for Society (AIRS). Before returning to China, he acted as the Principal Research Scientist of the Centre for Intelligent Electricity Networks, the University of Newcastle, Australia, with 11 years of working experience in the power industry in Australia. He has been engaged in research on smart grid, electricity market, low-carbon transition, and artificial intelligence for a long time. Dr. Junhua Zhao has published 300+ research papers in famous domestic and international journals and international conferences, including one in Joule (Cell Press), one in Patterns (Cell Press), two in Scientific Data (Nature Publishing Group), and one in Engineering (Published by the Chinese Academy of Engineering). More than 60 papers have been published in IEEE Transactions. The published papers have been cited 15000+ times, and the H-index is 61 (according to Google Scholar statistics). Dr. Junhua Zhao also co-authored two books in English.

Dr. Junhua Zhao was elected to IET Fellow (Institution of Engineering and Technology, UK) in 2023. He was named as the Intelligent Computing Innovator of China in 2023. From 2021 to 2023, he was consecutively selected as “Elsevier Highly Cited Scholar of China”. He received International Financial Forum (IFF) “Global Green Finance Award” in 2023, the Outstanding Contribution Award of Electric Science and Technology of Guangdong Province in 2022, the second prize of the Zhejiang Natural Science Award in 2020, the most influential paper of the year in Energy Conversion and Economics 2020, "Young Scientist of the Future" award by ADC Forum in 2017, "One Hundred Most Influential Chinese Scientific and Technological Journals in China" by the Ministry of Science and Technology (China) in 2017, the best reviewer award by IEEE Transactions on Smart Grid in 2016, the Best Paper Award of IEEE PES General Meeting in 2014. He won the second prize in the Science and Technology Progress Award of Hunan Province twice. In 2020, he won the second prize in the selection of key topics of the Financial Association, Shenzhen. The research results have had an important impact on the industry. He served as an expert group member of China's first provincial electricity spot market and the first regional electricity spot market and participated in the design of

China's first cross-border carbon trading product. In addition, several software products he participated in were successively applied to Consolidated Edison Company of New York, The Hongkong Electric Company, Guangdong Energy Group, China National Offshore Oil Corporation, Datang International Power Generation company, etc.

Dr. Junhua Zhao is the specially invited energy industry expert of China Merchants Bank headquarters, the specially invited external expert for the Australian National Outlook, and the co-chair of IEEE Special Interest Group (SiG) on Active Distribution Grids and Microgrids. He is also the Secretary of the Asia Pacific Working Group, IEEE PES SBLC (Smart Building, Load and Customer). He served as the Member of the Expert Group of "Interfaces of Grid Users/ Focus on EV and Local Storage", GSGF. He is the editorial board member of several international journals, such as IEEE Transactions on Network Science and Engineering, Energy Conversion and Economics, etc.

Prof. Junhua Zhao jointly cultivates doctoral students with Prof. Chaoyang Dong from City University of Hong Kong and Prof. Yingjun Zhang from The Chinese University of Hong Kong. Excellent doctoral students can choose to exchange to the headquarters of City University of Hong Kong or The Chinese University of Hong Kong for a year to carry out cooperative research.

Course:

Future Code: Build Your First AI Prediction Model in 2 Hours

Abstract: In this 2-hour "black technology"-packed workshop, you will no longer be just a code copycat, but a "magician" who can command AI. Designed specifically for high school students with basic Python skills, we will skip tedious mathematical derivations and dive straight into hands-on practice.

You will use the renowned Palmer Penguins dataset and Python’s scikit-learn library to build a machine learning model, teaching computers to identify penguin species from just a few lines of data. Even more excitingly, the course will conclude by introducing Silicon Valley’s trending "Vibe Coding" paradigm—you will learn to "instruct" large language models (LLMs) to write complex interactive visualization code using natural language, and create stunning data charts with your own hands.

Prof. CHEN Junting

Professor Profile:

Junting Chen received the B.Sc. degree in Electronic Engineering from Nanjing University, Nanjing, China, in 2009, and the Ph.D. degree in Electronic and Computer Engineering from The Hong Kong University of Science and Technology (HKUST), Hong Kong, SAR, China, in 2015. He is currently an assistant professor with the School of Science and Engineering (SSE) and the Future Network of Intelligence Institute (FNii) at The Chinese University of Hong Kong, Shenzhen (CUHK-Shenzhen), China. Prior to joining CUHK-Shenzhen in 2019, he held various research positions worldwide, including Post-Doctoral Research Associate at University of Southern California (USC), Los Angeles, CA, USA, Postdoc Research Fellow at EURECOM, Sophia-Antipolis, France, and visiting researcher at MIT, Cambridge, MA, USA. He was a recipient of the HKTIIT Post-graduate Excellence Scholarship in 2012 from HKUST.

Prof. Chen’s research focuses on signal processing, machine learning, and optimization for radio map sensing and reconstruction with applications to wireless communications and localization. He is interested in enhancing the sensing capability for future communication networks, using emerging platforms such as unmanned aerial vehicles (UAVs) and Internet-of-Things (IoT) networks.

Course:

How Computers Think: From Ohm's Law to Mathematical Logic

Abstract: This lecture will uncover the mystery of how computers "think." Starting from the physical laws governing electronic components, it will follow a knowledge chain encompassing Ohm's Law, transistor principles, logic gate construction, Boolean algebra, and Turing machine models to解析 how machines convert electrical pulses into logical reasoning. Through visual demonstrations and interactive sessions, it will showcase the circuit implementation of addition operations, the logical essence of programming languages, and the mathematical foundations of AI decision-making. This will help listeners build a complete cognitive framework from microphysics to abstract thinking, understanding how modern computing devices achieve intelligent behavior through the "physics-mathematics-logic" trio.

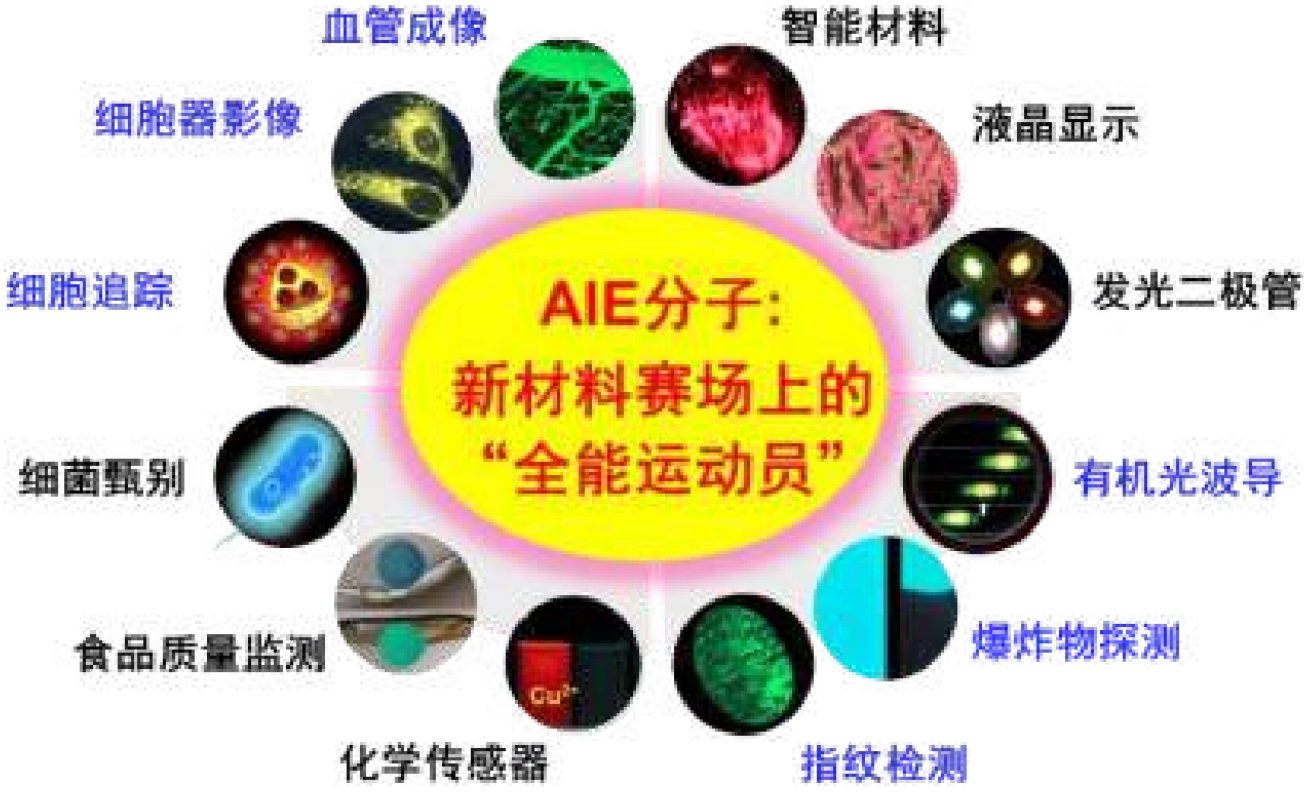
Professor Introduction

Experimental Course Experience 1:

Introduction to Aggregation-Induced Emission (AIE) Experimental Course

Aggregation-Induced Emission (AIE) is an original scientific concept first proposed internationally by Chinese scientist Academician Tang Benzhong. It has revolutionized the design strategies of organic luminescent materials and enriched the fundamental theories of photophysics and photochemistry. Currently, AIE materials, with their superior operational performance compared to traditional luminescent materials, have been successfully applied in fields such as high-efficiency optoelectronic conversion devices, high-sensitivity sensors, intelligent response systems, high-resolution specific imaging, and precision medicine. They are playing an increasingly significant role in areas vital to national economy and people's livelihood, including health, environment, and materials science. This course will demonstrate AIE phenomena and introduce their discovery process.

Aggregation-Induced Emission Phenomenon



Application Scenarios of Aggregation-Induced Emission Materials

Experimental Course Experience 2:

Introduction to Optoelectronic Chip Experimental Course

The Optoelectronic Chip Laboratory (also known as the Shenzhen Key Laboratory of Semiconductor Lasers) is dedicated to the design, development, manufacturing, and performance testing of semiconductor laser chips, specifically including SOI optoelectronic integrated chips, photonic crystal lasers (PCSEL), and topological optics. Here, you can experience using machine learning algorithms to assist optical design and enhance your coding skills. Additionally, you will learn to operate various high-end chip testing and processing equipment, such as ICP-RIE etching machines, PECVD coating machines, lithography systems, ultra-low-temperature multi-functional liquid helium closed-cycle cryostats, femtosecond lasers, and picosecond lasers. Students are warmly welcome to visit and study in the laboratory to contribute to the semiconductor industry!

Experimental Course Experience 3:

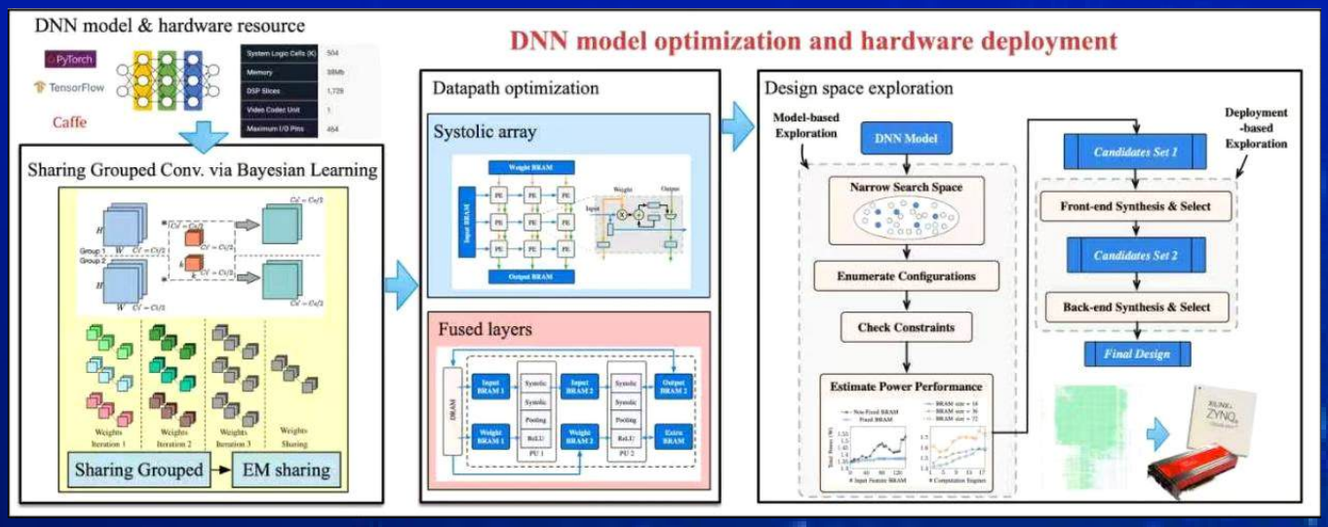
Introduction to New Energy Science Experimental Course

Building a clean, low-carbon, safe, and efficient modern energy system is crucial to achieving China's "dual carbon" goals (carbon peak and carbon neutrality). Aligned with the national strategic needs for the "dual carbon" targets, this course will focus on introducing the basic knowledge, theories, and methods in the field of hydrogen energy. Subsequently, the course will offer the following two experiments:

Demonstration Experiment of Fuel Cell-Powered Hydrogen Energy Drone: This includes the working principle of hydrogen-oxygen fuel cells, differences between fuel cell-driven drone technology and traditional battery-driven drone technology, and an introduction to stack assembly and testing. If weather conditions permit, an on-site flight demonstration will be arranged.

Assembly and Testing Experiment of Hydrogen-Oxygen Fuel Cell-Powered Car: Students will personally assemble a hydrogen-oxygen fuel cell model, gaining in-depth understanding of the working principles of each component in the fuel cell device and how these components integrate into the overall energy supply system based on hydrogen technology (e.g., electric cars).

Experimental Course Experience 4:

Design Automation Laboratory

The Design Automation Laboratory focuses on the design and development of integrated circuit (IC) design software and AI accelerators, dedicated to overcoming core technological bottlenecks in China's IC design automation tools and industrial software. This course will offer the following experiments: designing a chaser light control circuit using hardware description language (HDL), including clock division technology and LED control techniques; subsequently, using commercial design automation tools to implement logic synthesis, layout, and routing, followed by programming programmable logic devices; and finally verifying the LED behavior.