浙江大学信息学部
Faculty of Information Technology
Zhejiang University

FIT

AnnualReport 2023

FACULTY OF INFORMATION TECHNOLOGY
ZHEJIANG UNIVERSITY

信息学部

浙江大学

信息学部

AnnualReport 2023
FACULTY OF INFORMATION TECHNOLOGY
Zhejiang University

Annual Report 年报 2023

学部概况　Introduction to FIT

　　信息学部涵盖了光电科学与工程学院（光电学院）、信息与电子工程学院（信电学院）、控制科学与工程学院（控制学院）、计算机科学与技术学院（计算机学院）、网络空间安全学院（网安学院）、软件学院、生物医学工程与仪器科学学院（生仪学院）、集成电路学院。学部共有13个本科专业，11个一级学科，其中光学工程、控制科学与工程、计算机科学与技术、软件工程入选国家"双一流"建设学科名单，这四个学科也被教育部评为A+学科。学部拥有5个全国重点实验室，1个国家工程实验室，3个国家工程（技术）研究中心，共有25个研究所，主要开展信息领域科学和工程技术问题的创新研究。

Faculty of Information Technology (FIT) of Zhejiang University (ZJU) comprised of seven colleges, namely College of Optical Science and Engineering (COSE), College of Information Science and Electronic Engineering (ISEE), College of Control Science and Engineering (CSE), College of Computer Science and Technology (CCST), including College of Cyber Science and Technology), College of Biomedical Engineering and Instrument Science (BME), College of Software Technology (CST) and College of Integrated Circuits (CIC). Currently, FIT has 13 undergraduate programs and 11 primary disciplines, in which there are 4 disciplines both assessed as A+ by MOE and constructed as National "Double First-Class" discipline, they are Optical Engineering, Control Science and Engineering, Computer Science and Technology, and Software Engineering. There are 5 State Key Laboratories, 1 National Engineering Laboratory, 3 National Engineering Research Centers, 25 research institutes, to devote to the innovation research on information science and technology.

主任：陈 纯
Dean : Chen Chun

副主任：李尔平
Vice-Dean : Li Erping

副主任：邱建荣
Vice-Dean : Qiu Jianrong

2023
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Faculty of Information Technology
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主 任	邱建荣	副主任	高云君	侯迪波
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学位评定委员会

主 任	邱建荣	副主任	何钦铭	
委 员	王小松	刘华锋	刘清君	许正平
	许 超	孙守迁	巫英才	李春光
	肖 俊	时尧成	何湘宁	陈红胜
	周 泓	赵道木	黄志尧	虞小鹏

Academic Exchange and Cooperation Committee

◆ **Director** Qiu Jianrong ◆ **Vice Director** Gao Yunjun Hou Dibo
◆ **Committee members**

Wang Pan	Xu Yingke	Sun Mingyang	Li Xi	Yang Qing
Yang Zongyin	Lin Xiao	Lin Hui	Lin Feng	Zhuo Cheng
Xu Yang				

Academic Degrees Committee

◆ **Director** Qiu Jianrong ◆ **Vice Director** He Qinming
◆ **Committee members**

Wang Xiaosong	Liu Huafeng	Liu Qingjun	Xu Zhengping
Xu Chao	Sun Shouqian	Wu Yingcai	Li Chunguang
Xiao Jun	Shi Yaocheng	He Xiangning	Chen Hongsheng
Zhou Hong	Zhao Daomu	Huang Zhiyao	Yu Xiaopeng

学部学院 COLLEGE OF

光电学院
Optical Science
and Engineering
1952

集成电路学院
Integrated
Circuits
2023

信电学院
Information Science
and Electronic
Engineering
1956

软件学院
Software
Technology
2001

信息学部
Faculty of Information Technology

控制学院
Control Science
and
Engineering
1956

计算机学院
Computer Science
and
Technology
1978

生仪学院
Biomedical
Engineering and
Instrument Science
1977

2019
网安学院
Cyber Science
and Technology

学术委员会

主 任	陈 纯	副主任	李尔平	庄越挺
委 员	尹建伟	匡翠方	任 奎	刘 东	孙凌云
	杨建义	时尧成	吴 飞	吴汉明	邱建荣
	张 宏	张朝阳	陈 刚	陈红胜	陈积明
	陈耀武	邵之江	赵民建	章献民	程 鹏
	鲍虎军	熊 蓉	潘 纲	戴道锌	

Academic Committee

◆ **Director** Chen Chun
◆ **Vice Director** Li Erping Zhuang Yueting
◆ **Committee members**

Yin Jianwei	Kuang Cuifang	Ren Kui	Liu Dong
Sun Lingyun	Yang Jianyi	Shi Yaocheng	Wu Fei
Wu Hanming	Qiu Jianrong	Zhang Hong	Zhang Zhaoyang
Chen Gang	Chen Hongsheng	Chen Jiming	Chen Yaowu
Shao Zhijiang	Zhao Minjian	Zhang Xianmin	Cheng Peng
Bao Hujun	Xiong Rong	Pan Gang	Dai Daoxin

学术咨询评价专门委员会

主 任	邱建荣	副主任	陈红胜	任 奎
委 员	刘 东	刘华锋	孙凌云	吴 飞
	张朝阳	陈 曦	陈 为	陈积明
	周 泓			

Academic Advisory and Evaluation Committee

◆ **Director** Qiu Jianrong
◆ **Vice Director** Chen Hongsheng Ren Kui
◆ **Committee members**

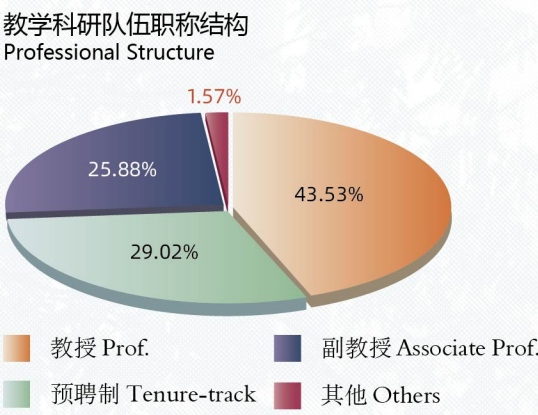| Liu Dong	Liu Huafeng	Sun Lingyun	Wu Fei
Zhang Zhaoyang	Chen Xi	Chen Wei	Chen Jiming
Zhou Hong			

师资队伍
Talent Team

学部教职员工814人，其中专任教师572人。现有中国工程院院士5人，中国科学院院士1人，国家百千万人才工程入选9人，教育部高校教学名师1人，国家杰出青年基金获得者27人，优秀青年基金获得者25人，浙江省特级专家10人。国家自然科学基金创新群体2个，教育部创新团队2个。

2023年，16位教师入选国家级高层次人才计划，其中国家杰出青年基金获得者1人，国家优秀青年基金获得者4人。2位教师获浙江省特级专家称号。3位教师评聘为长聘教授，8位教师评聘为长聘副教授，9位教师晋升教授。引进教师27人，其中预聘制教师21人。

FIT has 814 full-time faculty and staff members, including 572 faculty members. There are 5 members of Chinese Academy of Engineering and 1 member of Chinese Academy of Sciences, 9 professors of National Bai-Qian-Wan Talent Project, 1 Outstanding Teacher in Universities of MOE, 27 National Distinguished Youth Science Foundation Fellows, 25 National Excellent Youth Science Foundation Fellows, 10 Zhejiang Provincial Distinguished Experts, 2 Innovative Research Groups of NSFC and 2 Innovative Research Teams of MOE.

In 2023, 16 professors were selected into the national talent programs, including 1 winner of National Science Fund for Distinguished Young Scholar, and 4 winners of National Science Fund for Excellent Young Scholar. 2 professors was honored with Zhejiang Provincial Distinguished Experts. 11 faculty members had got their tenure, 9 teachers were promoted to full professor. 27 new faculty members joined FIT.

教学科研队伍职称结构
Professional Structure

- 43.53%
- 29.02%
- 25.88%
- 1.57%

- 教授 Prof.
- 副教授 Associate Prof.
- 预聘制 Tenure-track
- 其他 Others

2023年新增 Awarded in 2023

浙江省特级专家
Zhejiang Province Distinguished Expert

鲍虎军
Bao Hujun

徐之海
Xu Zhihai

国务院政府特殊津贴专家
Government Special Allowance Winner

何钦铭
He Qinming

杰出青年基金获得者
National Distinguished Youth Science Foundation Fellow

杨旸
Yang Yang

优秀青年基金获得者
National Excellent Youth Science Foundation Fellow

高飞
Gao Fei

马蔚
Ma Wei

邵天甲
Shao Tianjia

杨洋
Yang Yang

长聘教授
Tenured Professor

纪守领
Ji Shouling

卓成
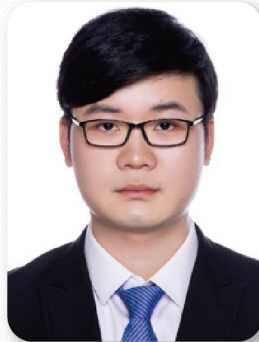Zhuo Cheng

赵博
Zhao Bo

长聘副教授
Tenured Associate Professor
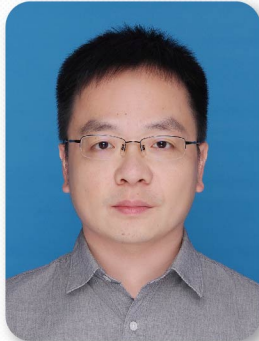
吴仍茂
Wu Rengmao

赵保丹
Zhao Baodan

高 飞
Gao Fei

刘 柳
Liu Liu

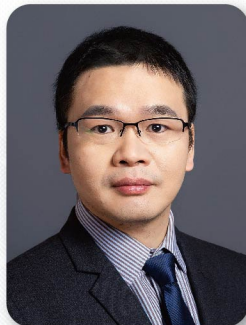沙 威
Sha Wei

周晓巍
Zhou Xiaowei

孙 煜
Sun Yu

张 祎
Zhang Yi

教授
Professor

郭 欣
Guo Xin

唐龙华
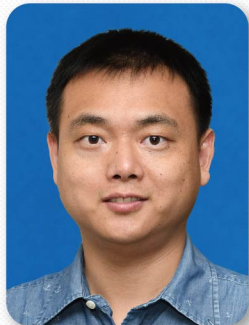Tang Longhua

潘 赟
Pan Yun

郑 斌
Zheng Bin

教授
Professor

王 越
Wang Yue

高 艺
Gao Yi

张 寅
Zhang Yin

唐志峰
Tang Zhifeng

郑音飞
Zheng Yinfei

引进教师 New Faculty Member

陈明帅 Chen Mingshuai	崔 强 Cui Qiang	范鹤鹤 Fan Hehe	冯 博 Feng Bo	管曼好 Guan Manhao	郭秀珍 Guo Xiuzhen	柯徐刚 Ke Xugang	李 环 Li Huan
李京波 Li Jingbo	李骏康 Li Junkang	李世龙 Li Shilong	李晓白 Li Xiaobai	刘 雷 Liu Lei	刘振广 Liu Zhenguang	柳 晴 Liu Qing	孙 奇 Sun Qi
王 聪 Wang Cong	王文冠 Wang Wenguan	谢颙丞 Xie Yongcheng	忻尚璟 Xin Shangjing	熊 波 Xiong Bo	张 岭 Zhang Ling	庄柳静 Zhuang Liujing	

Pankaj Kumar Choudhury　　Pintu Ghosh　　Xiang Li　　Xu Xiaoyin

科学研究
Scientific Research

2023年度财务到校科研经费逾13亿，纵向占比69%，其中国家自然科学基金共获批99项，合计经费8513万元，包含杰青1项，优青4项，重大重点等共13项，另有共9人获得科技部国家重点研发计划青年科学家项目资助。被SCI收录论文逾1100篇，其中高水平论文约68%。已获授权发明专利400余项。获省部级科技奖一等奖共8项。

In 2023, the total research funding of FIT reached over 1300 million RMB. 99 grants with the amount up to 85 million RMB were approved by the National Natural Science Foundation of China (NSFC), including 1 projects for distinguished young scholar, 4 projects for excellent young scholar and 13 vital important projects. 1100+ papers were indexed by SCI and 400+ national patents have been approved this year. There are 8 Projects achieved significant progress on the list of the 1st Prize of Zhejiang Provincial and ministerial Awards for Science & Technology (Sci. &Tech).

国家研究基地 National Research Base

国家研究基地
National Research Base

国家重点（工程）实验室
State Key (Engineering) lab

- 计算机辅助设计与图形系统全国重点实验室
  State Key Laboratory of CAD&CG
- 极端光学技术与仪器全国重点实验室
  State Key Laboratory of Extreme Photonics and Instrumentation
- 工业控制技术全国重点实验室
  State Key Laboratory of Industrial Control Technology
- 脑机智能全国重点实验室
  State Key Laboratory of Brain-Machine Intelligence
- 区块链与数据安全全国重点实验室
  State Key Laboratory of Blockchain and Data Security

国家工程研究中心
National Engineering Research Centre

- 工业控制系统安全技术国家工程实验室
  National Engineering Laboratory for Industrial Control Systems Security & Safety Technology
- 国家光学仪器工程技术研究中心
  National Engineering Research Centre for Optical Instrumentation
- 工业自动化国家工程研究中心
  National Engineering Research Centre of Industrial Automation
- 国家列车智能化工程技术研究中心
  National Engineering Reasearch Centre for Train Intelligent

研究所 Institute

学 院 College of	研究所名称 Institute	所 长 Director
光电科学与工程学院 Optical Science and Engineering	光学工程研究所 Inst. of Optical Engineering	刘 崇 Prof. Liu Chong
	光学成像与检测技术研究所 Inst. of Optical Imaging and Detection Technology	李 奇 Prof. Li Qi
	光学惯性技术工程中心 Center for Optical Inertial Technology	黄腾超 Prof. Huang Tengchao
	光电工程研究所 Inst. of Optical and Photonical Engineering	匡翠方 Prof. Kuang Cuifang
	光及电磁波研究中心 Center for Optical and Electromagnetic Research	钱 骏 Prof. Qian Jun
	微纳光子学研究所 Inst. of Microphotonics and Nanophotonics	张 磊 Prof. Zhang Lei
信息与电子工程学院 Information Science and Electronic Engineering	信息与通信网络工程研究所 Inst. of Information & Communication and Network Engineering	虞 露 Prof.Yu Lu
	智能通信网络与安全研究所 Inst. of Intelligent Communication Network and Security	赵民建 Prof. Zhao Minjian
	信号空间和信息系统研究所 Inst. of Signal Space and Information System	徐 文 Prof. Xu Wen
	微电子集成系统研究所 Inst. of Integrated Microelectronic Systems (IMS)	储 涛 Prof. Chu Tao
集成电路学院 Integrated Circuits	超大规模集成电路设计研究所 Inst. of VLSI Design	黄 凯 Prof. Huang Kai
	先进集成电路制造技术研究所 Inst. of Advanced IC Manufacturing Technology	高大为 Prof. Gao Dawei
控制科学与工程学院 Control Science and Engineering	工业控制研究所 Inst. of Industrial Process Control	陈积明 Prof. Chen Jiming
	智能感知与检测研究所 Inst. of Smart Sensing and Measurement	黄志尧 Prof. Huang Zhiyao
	智能系统与控制研究所 Inst. of Cyber-Systems and Control	苏宏业 Prof. Su Hongye
	工业智能与系统工程研究所 Inst. of Industry Intelligence and Systems Engineering	陈 曦 Prof. Chen Xi
	控制装备及综合安全研究所 Inst. of Control Equipment and Comprehensive Safety	王文海 Prof. Wang Wenhai
计算机科学与技术学院 Computer Science and Technology	人工智能研究所 Inst. of Artificial Intelligence	吴 飞 Prof. Wu Fei
	计算机软件研究所 Inst. of Computer Software	陈 刚 Prof. Chen Gang
	计算机系统结构与网络安全研究所 Inst. of Computer System and Security	潘 纲 Prof. Pan Gang
	现代工业设计研究所 Inst. of Modern Industrial Design	孙凌云 Prof. Sun Lingyun
生物医学工程与仪器科学学院 Biomedical Engineering and Instrument Science	生物医学工程研究所 Inst. of Biomedical Engineering	刘清君 Prof. Liu Qingjun
	数字技术及仪器研究所 Inst. of Digital Technology and Instrument	周 凡 Prof. Zhou Fan
	医疗健康信息工程技术研究所 Inst. of Medical and Health Information Engineering	叶学松 Prof. Ye Xuesong
	生物医学影像研究所 Inst. of Biomedical Imaging	徐晓音 Prof. Xu Xiaoyin

科研亮点 Research Highlight

1.学部个推青年创新奖   Youth Innovation Award
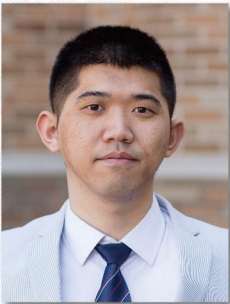
**研究方向：** 人工智能芯片与系统

简介： 在人工智能芯片及其设计自动化EDA领域，取得了存算一体芯片存储密度和处理效率的突破，实现了高密度存算一体电路单元演进路线，提出了基于跨层次设计的高能效存算架构，研制了面向复杂计算任务的模拟存算一体芯片，开拓了存算一体应用范围。成果发表于Nature Electronics，Nature Communications，IEDM等高水平期刊会议，获得吴文俊人工智能芯片专项奖，EDA四大顶会最佳论文奖及提名奖5次，作为存算一体领域唯一代表工作入选EDA领域巨头Synopsys TCAD工具应用库。

Artificial Intelligence Chips and Systems

In the field of AI chips and their design automation EDA, Researcher Yin has achieved breakthroughs in the data density and processing efficiency of compute-in-memory (CiM) chips, including the realization of high density CiM cells evolution, energy efficient cross-layer design based CiM architecture. He has also tapped out an analog CiM chip for unconventional complex computing tasks, opening up the application scope of CiM technology. These efforts were published in top venues such as Nature Electronics, Nature Communications, IEDM, etc., and won the Wu Wenjun Special Award on AI Chip, the Best Paper Award(including Nomination) up to 5 times at the four top EDA conferences. One work was selected into the EDA giant Synopsys TCAD tool's application library as the only representative in the field of CiM.
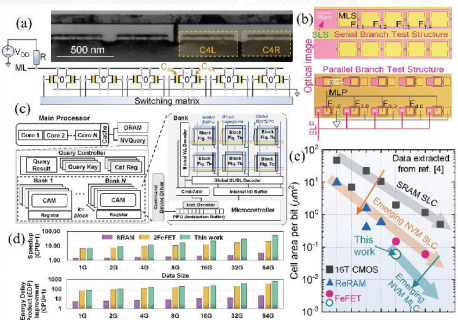
尹勋钊
百人计划研究员
信电学院

研究方向： 智能光学绘制与计算

简介： 开创新一代AI原生的全局神经绘制流水线，奠定AI PC时代的图形+AI融合GPU设计范式，挑战现有垄断格局；提出泛函学习的训练范式，实现泛在物理神经网络的黑箱训练，突破不可导、无模型、低精度、高维度物理神经网络的梯度传递难题，以极低成本实现极高精度的非相干光学神经网络。工作收录于Nature Communications等顶刊顶会，并两度获选ACM TOG封面；成果在华为、酷家乐、光线云等企业平台上线。

Intelligent Optical Drawing and Calculation

Researcher Huo has spearheaded the development of an AI-centric global neural rendering pipeline, establishing a new paradigm for GPU design that integrates CG and AI, thereby shaping the landscape of the AI PC era and challenging prevailing monopolies. In addition, he has introduced the training paradigm of functional learning, successfully achieving black-box training for ubiquitous physical neural networks. This innovative approach overcomes the complexities associated with gradient transmission in non-differentiable, model-free, low-precision, and high-dimensional physical neural networks. The result is the realization of highly precise incoherent optical neural networks at an exceptionally low cost.

His contributions have been recognized through features in esteemed publications such as Nature Communications, and his work has been showcased twice on the cover of ACM Transactions on Graphics (TOG).
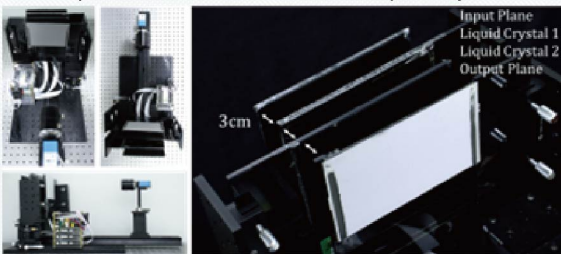
霍宇驰
百人计划研究员
计算机学院

研究方向： 磁共振成像

简介： 在磁共振CEST成像的扫描序列、图像重建、数据分析的上中下游全链条做出了一系列原创性贡献：开发了FS-CEST、SPACE-CEST、pTx-CEST等新型扫描序列；发明了SLAM、vSENSE、KIPI等新型重建算法；提出了NEMR等新型数据拟合方法，并拓展了CEST成像在癫痫和儿童肿瘤方面的临床应用。与10个国家的35名国际专家共同撰写了磁共振CEST成像领域首部国际专家共识（Magn Reson Med.），所发明的SPACE-CEST技术成为该国际专家共识推荐的三个CEST扫描序列之一，是亚洲地区唯一入选CEST国际专家共识的技术。

Nuclear Magnetic Resonance

Researcher Zhang has made a series of original contributions to the magnetic resonance CEST field, including scanning sequence, image reconstruction, and data analysis. He has developed new scanning sequences such as FS-CEST, SPACE-CEST and pTx-CEST, invented new reconstruction algorithms such as SLAM, vSENSE and KIPI, and proposed new data fitting methods such as NEMR. In addition, he has pioneered the clinical application of CEST imaging in epilepsy and pediatric tumors. Along with 35 international experts from 10 countries, he has co-authored the first international consensus paper in the CEST field (Magn Reson Med.2022; 88:546-574). Notably, the SPACE-CEST method is one of the three CEST scanning sequences and is the only included technique from Asia in the CEST consensus paper.

张祎
长聘副教授
生仪学院
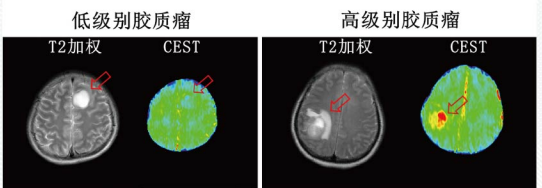
CEST成像技术应用于胶质瘤诊断实例

2.学部光谷成果转化奖 | Achievement Transformation Award

获奖成果： 复杂场景下智能移动机器人感知与控制技术研究与产业应用

简介： 智能移动机器人是指能适应复杂多变场景的智能装备，其中核心感控单元是智能移动机器人的"大脑"，目前我国机器人的感控单元主要存在智能化程度低、算力弱、可靠性差三大技术瓶颈，导致高端市场长期被国外垄断，严重制约了我国机器人行业的创新发展。刘勇教授团队成功攻克了机器人智能感知算法、单元算力硬件加速、高可靠硬件集成三大关键技术，开发了具有国际领先水平的机器人核心感知与控制单元模块，相关核心部件已经在港口运输、交通电力等国家关键性行业中实现规模化产业应用。

Research and Industrial Application of Perception and Control Technology for Intelligent Mobile Robots in Complex Scenarios

Prof. Liu's team has conquered three key technologies: intelligent perception algorithms for robots, hardware acceleration for unit computing power, and highly reliable hardware integration. They have developed core perception and control unit modules for robots with international leading levels, and related core components have been applied on a large scale in key national industries such as port transportation and transportation power.

刘勇 教授
控制学院

获奖成果： 大尺度移动增强现实技术与系统及应用

简介： 增强现实是信息领域的重要前沿方向，也是我国十四五重要战略发展方向。章国锋教授带领团队攻克了面向复杂动态环境的实时鲁棒定位、便捷高保真的虚实融合与呈现以及基于端-云协同的大尺度增强现实软件架构等一系列技术难题，将研发的增强现实系列技术转让/授权给商汤科技，带领双方组成的联合研究团队成功研制了端云协同的混合现实软件平台SenseMARS，作为主要发起人构建了OpenXRLab扩展现实开源平台。相关产品在国内外数百家单位得到了应用，为2022年北京冬奥会定制了智慧AR导航，为杭州第19届亚运会提供了AR导航和AR观赛等创新体验，取得了显著的经济和社会效益。

Large-scale Mobile Augmented Reality Technology and System with Applications

Prof. Zhang led the team to overcome a series of technical problems such as real-time robust localization for complex dynamic environments, convenient high-fidelity virtual-real fusion and rendering, and large-scale augmented reality software architecture based on end-cloud collaboration, and transferred/licensed the developed augmented reality technologies to SenseTime. He led the joint research team with ZJU and SenseTime to successfully develop SenseMARS, a mixed reality software platform based on end-cloud collaboration. He is the main initiator of the Extended Reality open source platform OpenXRLab. Achievements have been applied in hundreds of units at home and abroad, such as smart AR navigation for the 2022 Beijing Winter Olympics, AR navigation and AR viewing for the 19th Asian Games in Hangzhou.
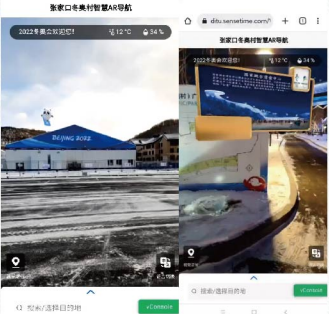
章国锋 教授
计算机学院

获奖成果： 磁致伸缩超声导波无损检测技术研发及其产业化

简介： 管道是国民经济的"动脉"，需求大，应用广，是检测监测与安全生产的关键。超声导波具有单点激励和传播距离远等特点，在管道等长距离构件的无损检测中具有独特优势。磁致伸缩超声导波检测仪长期被国外公司垄断，唐志峰/吕福在教授团队自2011年开始攻坚磁致伸缩导波检测技术，研发了系列化超声导波检测仪器，打破了国外技术垄断，整体技术达到了国际先进水平，成果广泛应用到石油化工、电力、交通和国防等领域的重点工程中，取得了显著的经济效益和社会效益，相关成果获浙江省科技进步二等奖。

R&D and Industrialization of Non-destructive Testing Technology Based on Magnetostrictive Ultrasonic Guided Waves

The team of Prof. Tang and Prof. Lv have been focusing on magnetostrictive guided wave detection technology since 2011. They have developed series of ultrasonic guided wave detection instruments, breaking the monopoly of foreign technology. The overall technology has reached the international advanced level, and achievements have been widely applied in key projects in fields such as petrochemicals, electricity, transportation and national defense. The project has won the second prize of Zhejiang Province Science and Technology Progress Award.

唐志峰 教授
生仪学院

3.重大科研成果及进展 | New Important Projects and Significant Progress

① 大口径光学元件微纳缺陷检测技术及产业化应用

光电学院刘东教授领衔的该项目获2023年浙江省科学技术进步奖一等奖。项目提出并实现了光致发光多模态成像高分辨检测方法、自适应扫描策略及智能拼接方法、高效暗场图片储存方案及实时缺陷检测算法等原始创新成果，研制的系列化大口径光学元件表面及亚表面微纳缺陷检测高端装备成功应用于我国激光聚变大科学工程，有力支撑了所用大口径光学元件表面先进制造工艺提升与技术水平评价。成果在中国工程物理研究院激光聚变研究中心、杭州利珀科技有限公司、浙江大华技术股份有限公司等单位应用，具有显著经济和社会效益。

Micro/nano Defect Detection Technology and Industrial Application of Large Aperture Optical Components

This project, led by Prof. Liu Dong from COSE, won the first prize of Zhejiang Provincial Sci & Tech Progress Award. The group present and achieve original innovative achievements such as high-resolution multimodal imaging detection technology, adaptive scanning and intelligent stitching strategies, efficient dark-field image storage scheme, and real-time defect detection algorithm. Serialized high-end equipments for micro/nano surface and sub-surface defect detection of large aperture optical components, developed by the group, have been successfully applied to the large scientific project of laser fusion in China and provided strong support for the improvement of advanced manufacturing technology and technical level evaluation of large aperture optical components utilized in the large scientific project. the achievements have been applied in Laser Fusion Research Center of CAEP, Hangzhou Leaper Technology Co., Ltd., Zhejiang Dahua Technology Co., Ltd., etc.
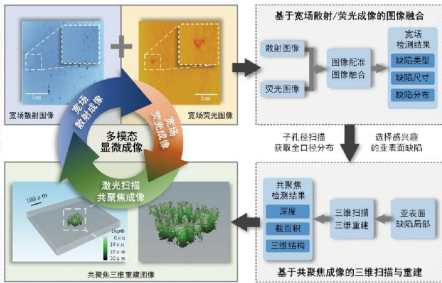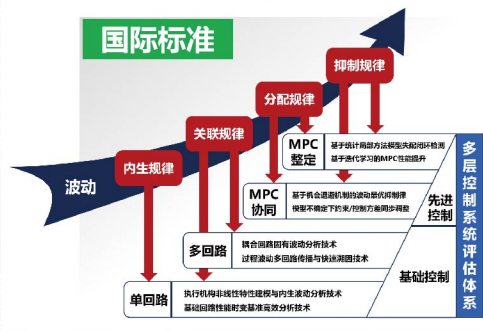
② 工业控制系统性能评估技术体系及其标准化

控制学院苏宏业教授领衔的该项目获2023年浙江省技术发明奖一等奖。项目发明了工业基础回路内生波动与最优抑制高效分析技术，突破了大规模工业控制系统性能评估实时性瓶颈。发明了多回路波动涨落、演化与回溯快速分析技术，突破了回路异常波动的精准定位瓶颈。发明了双层预测控制系统波动分配与经济性能评估技术，融合退避机制与模型失配检测，解决了性能诊断到控制参数重定的"落地"问题。主导制定并发布了先进控制与优化领域首项国际标准ISO 15746和国家标准(GB/T32854)，得到国际广泛认可。成果在巨化等多家企业进行了广泛应用与推广，具有重大工程应用价值。

Technical System and Standardization of Performance Assessment for Industrial Control System

The project, led by Prof. Su Hongye from CSE, won the first prize of Zhejiang Provincial Technological Invention Award. It invented the efficient analysis technology of endogenous fluctuation and optimal suppression of industrial basic control loops and the rapid analysis technology of multi-loop fluctuation, evolution and backtracking. The fluctuation allocation and economic performance evaluation technology of the two-layer predictive control system were invented, and the avoidance mechanism and model mismatch detection were integrated, which solved the "landing" problem from performance diagnosis to control parameter tuning. This project led the formulation and release of the first international standard ISO 15746 and national standard (GB/T32854) in the field of advanced control and optimization, which have been widely recognized internationally. The achievements have been widely used and promoted in many enterprises such as Juhua with great engineering application value.

③ 大型高炉炼铁系统高性能智能运行控制关键技术及应用

控制学院杨春节教授领衔的该项目获2023年浙江省科学技术进步奖一等奖。项目发明了数据驱动多元铁水质量在线高精度感知、多源信息融合的烧结矿FeO含量智能感知、基于深度加权联合分布适应网络的高炉炼铁故障诊断、动态贝叶斯网络驱动的高炉故障自愈控制、递推子空间辨识在线建模的铁水质量预测控制等技术。研制了高炉炼铁过程高性能智能运行控制系统，实现了炼铁生产优质、高效、低碳运行。相关技术的重要突破提升了钢铁工业智能化和绿色化水平，经济社会效益显著。

Key Technology and Application of High-Performance Intelligent Operation Control of Large Blast Furnace Ironmaking System

This project, led by Prof. Yang Chunjie from CSE, won the first prize pf Zhejiang Provincial Technology Progress Award. The group present inventions of data driven multivariate hot metal quality online high-precision perception, multisource information fusion soft sensor modeling of FeO content in sintering process, fault diagnosis of blast furnace ironmaking based on deep weighted joint distribution adaptation network, dynamic bayesian network driven self-healing control for blast furnace faults, and recursive subspace identification for online modeling and predictive control of hot metal quality, etc. The group developed a high-performance intelligent operation control system for the blast furnace ironmaking process, achieving high-quality, efficient, and low-carbon operation in iron production. Significant breakthroughs have elevated the level of intelligence and greening in the steel industry, with notable economic and social benefits.
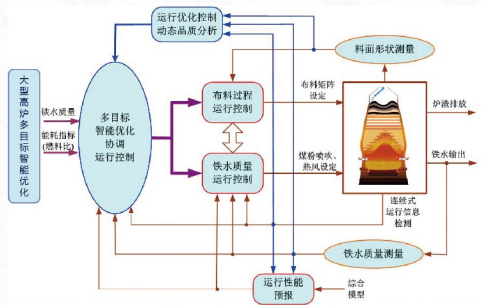
④ 大规模高维信号稀疏感知的理论与方法

信电学院史治国教授领衔的该项目获2023年度浙江省自然科学奖一等奖。项目揭示了高维感知的稀疏表达机理，形成了特征提取的稀疏重构理论和特征学习的知识理解方法，系统解决了大规模高维信号特征的高效提取与信息的准确理解难题。相关成果形成国际授权发明专利，获IEEE信号处理学会青年作者最佳论文奖等国际学术奖，其中8篇代表作被来自全球64个国家和地区学者SCI他引1061次，相关成果被编入剑桥大学出版社教材，并被美国国防部的国防技术报告和美国国家宇航局NASA技术报告收录，已应用于阿里巴巴、瑞立集团，赋能瑞立智能化产线升级并入选浙江省"未来工厂"。

Sparse Sensing Theories and Methods for Large-Scale and High-Dimensional Signals

This project, led by Prof. Shi Zhiguo from ISEE, won the first prize of Zhejiang Provincial Natural Science Award. The group reveals the mechanisms of sparse representation for high-dimensional sensing signals, formulating the sparse reconstruction theories for parameter extraction and the knowledge comprehension methods for data learning, providing a systematic solution for the challenging problems in efficient parameter extraction and accurate information understanding for large-scale and high-dimensional signals. the eight representative publications have received 1061 SCI-indexed citations. The group also obtained the invention patents from China, US, and Japan, and received Best Paper Awards from IEEE Signal Processing Society and IET. The research work has been included in a textbook published by Cambridge University Press, and has also been included in the U.S. National Defense Technical Report and NASA Technical Report. Achievements have been successfully applied in Alibaba Group and SORL Auto Parts, Inc., which is selected to the Zhejiang Provincial Future Factory.
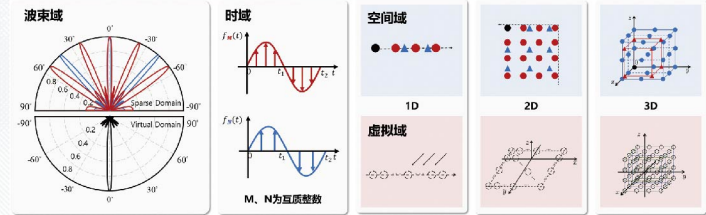
⑤ 云计算数据安全与隐私保护理论与方法

计算机学院任奎教授领衔的该项目获2023年度浙江省自然科学奖一等奖。项目主要聚焦"外包数据存储失控、加密数据搜索障碍、加密数据计算困难"三个科学问题，揭示了数据外包服务效率与安全性之间平衡的相关规律，提出了远程数据安全存储、搜索、计算的新理论、技术和方法，突破了用户数据上云后安全性保障严重不足的难题，在确保数据安全性的情况下实现了数据外包计算的高服务效率，理论意义重大。发表高水平论文谷歌学术引用累计超三万次，其中8篇代表性论文谷歌学术引用超2700次，Web of Science他引1235次。项目成果在华为、杭州城市大脑、新华三等公司的云计算平台成功应用。

Data Security and Privacy Protection of Cloud Computing: Theories and Methods

This project, led by Prof. Ren Kui from CCST, won the first prize of Zhejiang Provincial Natural Science Award. The project focuses on three key scientific issues: "loss of access control of outsourced data, obstacles to search encrypted data, and difficulties in encrypted data calculation". The project reveals the relevant laws of the balance between outsourcing service efficiency and security. It also proposes new theories, technologies and methods for remote data secure storage, search and calculation. The project addresses the serious problem of insufficient security guarantee after user data is uploaded to the cloud, and ensures data security while keeping high computing efficiency, which is of great theoretical significance. The researchers have published 134 high-level papers, with a total of more than 30,000 Google Scholar citations. The project outcomes have been successfully applied in the cloud computing platforms of Huawei, Hangzhou City Brain, H3C and other companies.
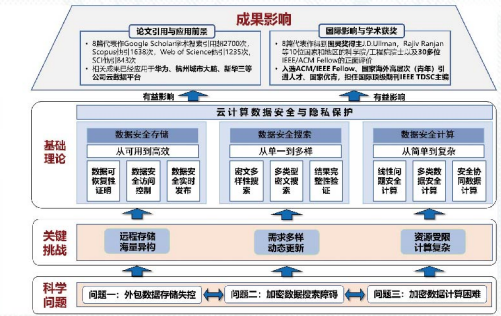
⑥ 国产化PET分子影像探针制备关键技术体系创新与应用

生仪学院张宏教授领衔的该项目获得2022年高等学校科技进步一等奖。项目首创了基于微流控的放射性合成技术，自主研制了2代PET分子影像探针微流控模块化集成合成系统，实现耗材利用率提升95%、能耗减少90%，提出"透明病理"新理论，建立多模态分子影像+病理学的疾病评价新模式。形成我国该领域完整核心专利群，成果在50余家三甲医院和医药企业推广应用，每年完成10余万例临床病人PET分子影像诊断。有效推动了我国医学高端装备国产化，整体提高了我国PET分子影像临床实践，支撑了重大疾病的精准诊治。

Innovations and Applications of the Key Domestic Technology System for the Synthesis of PET Molecular Imaging Probes

The project, led by Prof. Zhang Hong from BME, won the first prize of Sci & Tech Progress Award of MOE. It pioneered the radioactive synthesis technology based on microfluidics, and independently developed two generations of PET molecular imaging probe microfluidic modular integrated synthesis system, which achieved a 95% increase in utilization rate of consumables and a 90% reduction in energy consumption. A novel theory named "transpathology" was proposed. It established a novel pattern of disease evaluation that combined multimodal molecular imaging and pathology and formed a complete core patent group in this field in China. The significant breakthrough from this project has effectively promoted the domesticalization of high-end medical equipment in China, improved the overall clinical practice of PET molecular imaging, and supported the precise medicine for major diseases.

❼ **大规模图神经网络模型端云协同计算平台和应用示范**

计算机学院吴飞教授领衔的该项目获2022年度高等学校科学技术进步奖一等奖。项目开放开源了超大规模图神经网络学习框架等代码资源，取得了体系化和平台化的技术创新，支撑端到端方式下的端云模型协同进化链条化技术，在"泛在互联、移动优先、AI赋能"时代支撑计算模式从云服务和端智能向端云协同跨越，推动新的计算模式形成。研究成果应用于政务、公检法等领域百余家企事业单位，赋能视觉类、推荐类等核心场景，支持3亿多活跃用户每日千亿次端侧推理实时在线需求，重塑在线经济和智能司法等业务模式。

The Computing Architecture of Device-Cloud Collaborative Graph Neural Network Learning Over Distributed Environments as Well as Its Applications

This project, led by Prof. Wu Fei from CCST, won the first prize of Sci & Tech Progress Award of MOE. The project released some open resources of large-scale graph neural network learning frameworks, achieving systematic technological innovation, supporting end-to-end evolution of device-cloud models over distributed environments. This research transforms computing mechanism from cloud services and end intelligence to end-to-end cloud collaboration in the era of ubiquitous interconnection, mobile first, and AI empowerment. The research has been applied to more than 100 enterprises and institutions in many fields, empowering core scenarios such as visual and recommendation, supporting over 300 million active users with real-time online demand for 100 billion times daily end-to-end inference, and reshaping business models such as online economy and intelligent justice.

❽ **探月工程探测器CMOS光学观测系列相机技术**

光电学院徐之海教授领衔的该项目获2022年高等学校科学技术进步奖一等奖。项目提出了一系列适应于地月空间环境的高可靠超小型CMOS光学相机设计与研制方法，实现了自主创新和技术突破，形成了具有自主知识产权的嫦娥系列光学观测相机技术，打破了国外技术封锁，先后在国家探月工程嫦娥二号到五号任务中研制了多台相机并全部取得了成功，创造和参与创造了3个国际首次，3个中国首次，为中国探月工程的圆满成功做出了重要贡献。

CMOS Optical Observation Camera Technology for Lunar Exploration Probes

This project, led by Prof. Xu Zhihai from COSE, won the first prize of Sci & Tech Progress Award of MOE. The research team proposed a series of highly reliable and ultra-small CMOS optical camera design and development methods suitable for the Earth Moon space environment, achieved independent innovation and technological breakthroughs, and formed the Chang'e series optical observation camera technology with independent intellectual property rights. All cameras developed by the team have successively been applied in the national lunar exploration projects Chang'e-2, to Chang'e-5 missions, and have created three international firsts, also have created three firsts in China, and have made important contributions to the successful completion of China's lunar exploration project.


❾ **新型X射线探测材料与成像**

由光电学院杨旸长聘教授负责的该项目获批2023年国家杰出青年科学基金资助。项目以高性能X射线探测器为目标牵引，围绕X射线探测材料和器件中激发态能量损失抑制、载流子异向输运调控和阵列化异质集成三个关键难题，融合物理、材料和信息等多学科交叉背景，沿着"机理−材料−器件−样机"的创新链条开展研究，项目目标是发展具有高灵敏度和高光谱感知能力的新型X射线成像技术。

Novel X-ray Detection Materials for Imaging

The project, directed by Prof. Yang Yang from COSE, was supported by NSFC for Distinguished Young Scholars in 2023. This project is dedicated to advancing high-performance X-ray detectors, targeting three critical challenges within X-ray detection materials and devices: ① mitigating excitation state energy loss, ② manipulating anisotropic carrier transport, and ③ heterogeneous integration of detector arrays ,through the integration of interdisciplinary knowledge in physics, materials science, and information technology. By integrating interdisciplinary knowledge from physics, materials science, and information technology, the goal of the project is to pioneer a state-of-the-art X-ray imaging technology with high sensitivity and spectral discrimination.
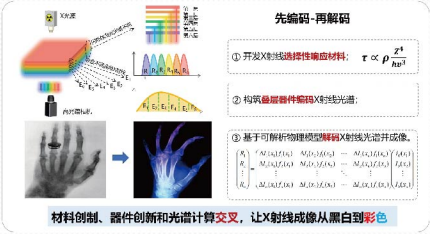
❿ **微型无人机集群**

由控制学院高飞长聘副教授负责的该项目获批2023年国家优秀青年科学基金项目资助。高飞长期从事无人机单机及集群自主导航与快速避障方法研究。本项目以多源信息融合的鲁棒集群感知、旋翼无人机高速规划的几何方法、大规模集群无人机运动规划、微型无人机与大规模集群架构设计为核心，致力于研发新型通用集群平台，突破集群关键理论与技术难点，推动机器人领域轨迹规划、定位感知、集群智能等研究方向发展。
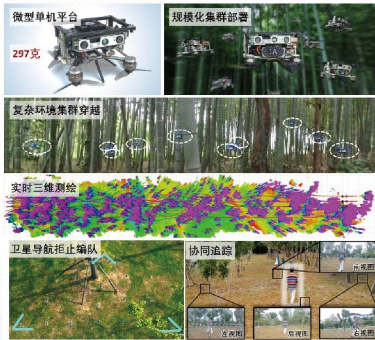
Swarm of Micro Flying Robots

The project, directed by tenured associate prof. Gao Fei from CSE, was supported by NSFC for Excellent Young Scientists in 2023. Gao has been devoted to the research of aerial robots. For the autonomous navigation and fast collision avoidance of single and multiple flying agents. The research will focus on the multi-sensor fusion-based robust distributed perception, the geometric method for high-speed multirotor planning, the large-scale aerial swarm motion planning, and the micro aerial robot and large-scale swarm architecture design. It aims to develop fully autonomous single and multiple micro drone platforms, make breakthroughs in the fundamental theoretical and technical difficulties of swarm robots, and promote the development of trajectory planning, perception, and swarm intelligence in the robotics area.

⓫ **计算机图形学与虚拟现实**

由计算机学院邵天甲百人计划研究员负责的该项目获批2023年国家优秀青年科学基金项目资助。邵天甲长期从事计算机图形学与虚拟现实研究和应用，特别聚焦于有限条件下的精准三维建模与推演等关键技术研究。本项目拟重点研究高阶可微分的几何−物理计算理论与方法，致力于建立贯穿数据采集、几何建模、物理推演全过程的高阶可微分计算理论与框架。

**Computer Graphics and Virtual Reality**

The project, directed by Researcher Shao Tianjia from CCST, was supported by NSFC for Excellent Young Scholars in 2023. Researcher Shao has been devoting to the research of computer graphics and virtual reality for over a decade with the focuses on precise 3D modeling and simulation under limited conditions. This project will focus on the theory and method for high-order differentiable geometry-physics computing, aiming at establishing the high-order differentiable computing theory and framework for the full process throughout data acquisition, geometry modeling and physics simulation.
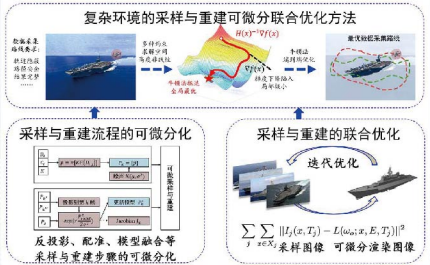
⑫ 知识发现与知识工程

由计算机学院杨洋副教授负责的该项目获批2023年国家优秀青年科学基金项目资助。杨洋长期从事图计算与社会理论相结合的社交网络挖掘研究。本项目拟结合网络科学理论，分析不同领域之间图结构的共性特征，并融合大模型预训练技术，实现跨领域可泛化的通用大图模型。
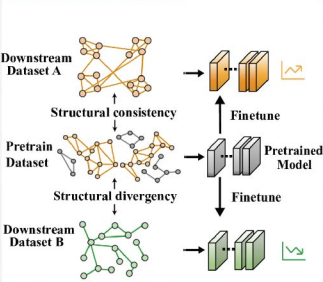
### Knowledge Discovery and Knowledge Engineering

The project, led by Associate Professor Yang Yang from from CCST, was supported by NSFC for Excellent Young Scholars in 2023. Prof. Yang has long been engaged in research on social network mining combining graph computation with social theory. This project aims to integrate network science theory to analyze common characteristics of graph structures across different fields. It also seeks to incorporate large-scale pre-training techniques to achieve a universally applicable large graph model with cross-disciplinary generalization.

⑬ 算法驱动光学超构材料

由信电学院马蔚百人计划研究员负责的该项目获批2023年国家优秀青年科学基金项目资助。马蔚长期从事微纳光学、集成光电子学相关研究工作，特别专注于微纳光学与人工智能的交叉领域。本项目聚焦于超构材料等微纳光学结构的设计难题，基于机器学习、拓扑优化等模型和算法开展微纳光学软硬件协同设计的研究，为未来各类小型化、智能化、集成化光电感知系统提供基础设计理论和关键技术支撑。

Algorithm-Driven Optical Metamaterials

The project, directed by Researcher. Ma Wei from ISEE, was supported by NSFC for Excellent Young Scholars in 2023. Ma has been engaged in researching on micro-nano optics and integrated optoelectronics for a long time, with a particular focus on the interdisciplinary field of micro-nano optics and artificial intelligence. This project focuses on the design of micro-nano optical structures such as metamaterials, and conducts research on the co-design of micro-nano optical software and hardware based on machine learning, topology optimization and other models and algorithms. It provides basic design theory and key technical support for various miniaturized, intelligent and integrated optoelectronic sensing systems in the future.
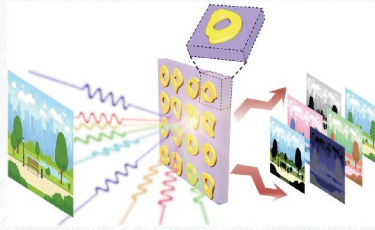
⑭ 智能超表面辅助毫米波通感一体化理论与方法

由信电学院黄崇文百人计划研究员负责的该项目获批2023年基金委重点项目资助。该项目拟建立RIS辅助毫米波通感一体远近场建模、基础理论与容量域分析体系，研究RIS电磁调控环境对通感系统容量和感知精度、分辨率等性能的影响，实现传输机制的设计，从系统级仿真和硬件实验等多个维度交叉验证，形成一套面向6G实际应用需求的RIS辅助毫米波通感一体化关键技术与理论体系。

Fundamentals and Design Methods for Reconfigurable Intelligent Surface Assisted Millimeter Wave Integrated Sensing and Communications
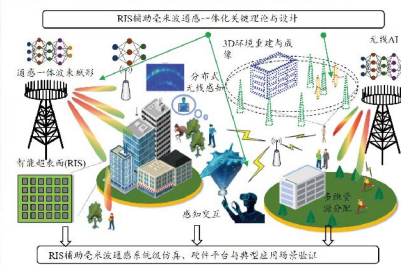

The project, led by Researcher Huang Chongwen from ISEE, was supported by the NSFC key Program in 2023. This project aims to build the fundamental theory and a series of physical layer design technologies for RIS assisted millimeter wave Integrated sensing and communications, Furthermore, it will investigate the essential influence of RIS electromagnetic control environment on the communication capacity and sensing accuracy and resolution and physical layer transmission mechanism design. A system-level simulation and field experiment platform are built and a set of fundamental theories and the technical framework for RIS assisted millimeter wave integrated sensing and communications are built, which can meet the stringent requirements of future 6G application scenarios.

⑮ 文物原真数字化表达和重建的理论与方法研究

由计算机学院吴鸿智教授负责的该项目获批2023年基金委重点项目资助。项目拟建立能高精度逼近已采集数据，且保证未采集条件下重建质量的高保真模型优化框架，提出可微分几何与材质联合表达，发展复杂外观的高精度重建方法，研制高性能主动式采集设备，突破文物数字化的质量瓶颈，实现文物外观在任意光照与视角下的照片级重建（SSIM>0.95/PSNR>30dB）。项目对提升我国高端文物数字化设备的研究和应用水平具有重要意义。

Research on Theory and Method of Representation and Reconstruction of Realistic Digitization of Cultural Relics

The project, led by Prof. Wu Hongzhi from CCST, was supported by the NSFC key Program in 2023. The project plans to establish a high-fidelity model optimization framework that can accurately approximate the collected data and ensure reconstruction quality under non-collection conditions, propose a joint expression of differentiable geometry and materials, develop a high-precision reconstruction method for complex appearances, and develop high-performance active acquisition The equipment breaks through the quality bottleneck of cultural relic digitization and achieves photo-level reconstruction of the appearance of cultural relics under any lighting and viewing angle (SSIM>0.95/PSNR>30dB). This project is of great significance to improving the research and application level of high-end cultural relics digital equipment in our country.
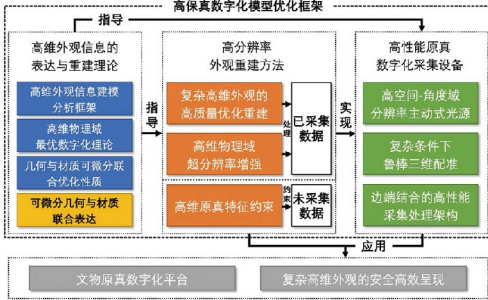

⑯ 面向晶圆级光子集成的硅基异质外延III-V可调谐半导体激光器研究

由光电学院戴道锌教授负责的该项目获批2023年基金委国际(地区)合作与交流项目资助。硅片上激光器是硅基光电子领域最受关注的方向之一，亟需取得根本性突破以支撑大规模光电子集成持续发展。项目着重突破硅基异质外延III-V半导体横向选区生长技术，研制出新体系高性能光子器件，实现近100nm波长调谐范围的新一代硅基异质外延III-V半导体激光器，并将其应用于光学层析成像系统。项目有望为发展晶圆级大规模硅基光电子集成提供了片上光源等核心器件支撑，具有重要意义。

Monolithic Tunable Lasers by direct Heteroepitaxy of III-V on Silicon for Wafer-scale Photonic Integration

This project, led by Prof. Dai Daoxin from COSE, was supported by the NSFC International Cooperation and Exchange Program in 2023.The project aims to achieve wafer-level high-quality III-V direct heteroepitaxy on silicon with a new lateral

aspect ratio trapping technology, low-loss thick-silicon photonic waveguides and effective mode manipulation as well as high-efficiency and low-reflectivity butt-coupling between the III-V active region and silicon photonic waveguides. Finally, this project will develop a new-generation tunable monolithic-integrated tunable III-V laser on silicon with a very large tuning range of ~100 nm and demonstrate an integrated optical system with the developed silicon/III-V laser. This project provides the key elements as the solid foundation for the future development of wafer-level large-scale silicon photonics.
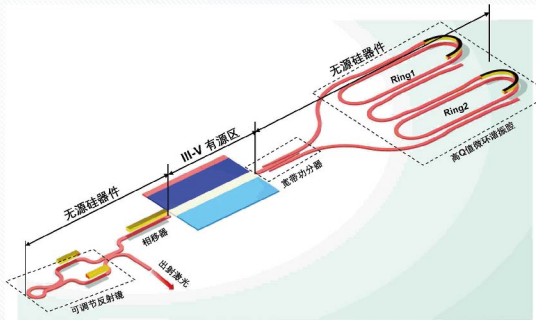
⑰ 多模态网络内生安全机制研究与试验

由计算机学院任奎教授负责的该项目获批2023年重点研发计划项目资助。项目聚焦于多模态网络内生安全，研究基于结构加密的多模态网络内生安全架构，构建多模态网络空间可信标识体系与认证机制，提出主动防御自适应控制技术，搭建软硬件协同的多模态网络内生安全验证平台，形成完整的多模态网络内生安全防御与验证体系。项目有望从架构层面解决多模态网络环境中网络安全与功能安全交织的问题，有效应对未知威胁，提高网络空间的整体安全性。

Research and Verification on Endogenous Safety and Security Mechanism for Polymorphic Networks

This project, led by Prof. Ren Kui from CCST, was supported by the Key R&D program in 2023. This project focuses on polymorphic networks endogenous safety and security (PINet-ESS), which encompasses the research on the PINet-ESS architecture based on structural encryption, building a trusted identification system and authentication mechanism for the polymorphic network (PINet) space, proposing active defense adaptive control technology, developing a hardware and software collaborative verification platform for PINet-ESS, and establishing a complete PINet-ESS defense and verification framework. This project is expected to solve the issues of intertwining network security and functional security in PINet's environments from the architectural level, to address unknown threats effectively and enhance the overall security of cyberspace.
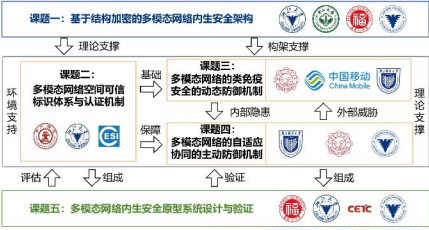
⑱ 面向终端的高隐蔽传播网络公害识别、取证和归因研究

计算机学院张帆教授负责的该项目获批2023年重点研发计划项目资助。项目围绕高隐蔽传播网络公害匿迹机理与终端表象，和驻留体带外活动特征与行为体主动影响机理两大科学问题，提出高隐蔽传播网络公害识别取证归因理论框架，设计基于带外分析的公害终端检测取证方法和基于极致仿真的微蜜罐公害主动诱捕方法，研制面向终端的高隐蔽传播网络公害检测系统，并依托CNCERT和南网科研院开展国家级、行业级网络公害治理示范，支撑推动国家网络空间安全和数字经济高质量发展。

Host-based Identification, Forensics and Attribution of Highly-Concealed Cyber Threats

This project, led by Prof. Zhang Fan from CCST, was supported by the Key R&D program in 2023. The project focuses two scientific problems, i.e., the stealth mechanism of cyber threats on end host, as well as their out-of-band characteristics and how to perform deception-based active defense. It will propose a theoretical framework for identification, forensics and attribution of highly concealed cyber threats. In addition, the researchers propose out-of-band analysis-based cyber threat detection and forensics methods, and design ultimate emulation-based micro-honeypots for active entrapment. Finally, they will develop an end host-based highly-concealed cyber threat detection prototype system, and conduct evaluation for national and industry-level cyber threat mitigation. The output of the project is expected to provide strong support for promoting national cybersecurity and high-quality development of the digital economy.
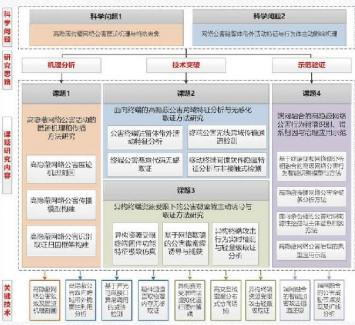
⑲ 人工智能基础模型关键技术研究

计算机学院沈春华教授负责的该项目获批2023年重大项目2030项目资助。基础模型是使用大规模图像数据集训练的人工智能模型，用于执行各种视觉任务。项目第一阶段主要聚焦视觉基础模型，包括：(1)扩大模型规模和训练数据，开发高效的软硬件协同的训练平台。(2)开发零样本部署的高效模型，从而实现更有效的学习和更好的泛化。(3)开发实时和嵌入式视觉，可以在边缘设备上高效运行并实时运行。(4)从图像和文本等多模态学习，启用视觉问答和多媒体分析等新应用。
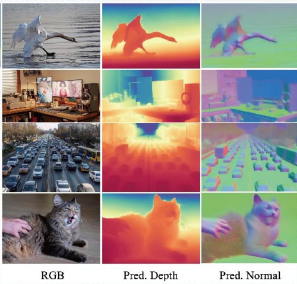
Research on Key Technologies of Artificial Intelligence Foundation Models

This project, led by Prof. Shen Chunhua from CCST, was supported by the Major R&D program in 2023. Foundation models are artificial intelligence models trained on large-scale image datasets to perform various visual tasks. The project will mainly focuses on vision foundation models in the first phase, including Scaling up model size and training data and develop an efficient software-hardware cooperative training platform、developing efficient models for zero-shot deployment and enabling more efficient learning and better generalization、developing real-time and embedded vision to running efficiently on edge devices and in real-time, and researching multi-modal learning to enabling new applications.

RGB   Pred. Depth   Pred. Normal

4.年度代表性论文 | Recommended Paper

① Multichip Multidimensional Quantum Networks with Entanglement Retrievability

作者: Zheng Yun, Liu Dajian, Dai Daoxin；等
来源: SCIENCE 卷:381 期:6654 页:221-226 出版时间:JUL 2023

We demonstrate a multichip multidimensional quantum entanglement network based on mass-manufacturable integrated-nanophotonic quantum node chips fabricated on a silicon wafer by means of complementary metal-oxide-semiconductor processes. Using hybrid multiplexing, we show that multiple multidimensional entangled states can be distributed across multiple chips connected by few-mode fibers. We developed a technique that can efficiently retrieve multidimensional entanglement in complex-medium quantum channels, which is important for practical uses. Our work demonstrates the enabling capabilities of realizing large-scale practical chip-based quantum entanglement networks.
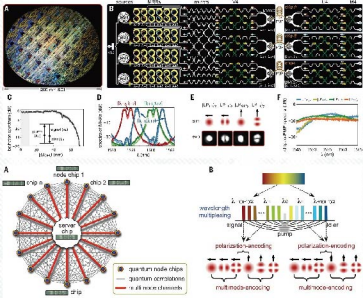
② Autonomous Self-Burying Seed Carriers for Aerial Seeding

作者: Luo Danli, Sun Lingyun, Wang Guanyun；等
来源: NATURE (Cover Paper) 卷:614 期:7948 页:463-470 出版时间:FEB 2023

Inspired by Erodium seeds, we design and fabricate self-drilling seed carriers, turning wood veneer into highly stiff and hygromorphic bending or coiling actuators with an extremely large bending curvature. It will improve the effectiveness of aerial seeding to relieve agricultural and environmental stresses, and has potential applications in energy harvesting, soft robotics and sustainable buildings.

### ③ Recurrent Graph Optimal Transport for Learning 3D Flow Motion in Particle Tracking

作者: Liang Jiaming, Xu Chao, Cai Shengze；等
来源: NATURE MACHINE INTELLIGENCE 卷:5 期:5 页:505-517 出版时间:MAY 2023

Flow visualization technologies such as particle tracking velocimetry are broadly used for studying three-dimensional turbulent flow in natural and industrial processes. We present an end-to-end solution called graph optimal transport (GotFlow3D) to learn the three-dimensional fluid flow motion from consecutive particle images. Experimental evaluations demonstrate that GotFlow3D achieves state-of-the-art performance, which may provide deeper insight into the complex dynamics of many physical and biological systems.
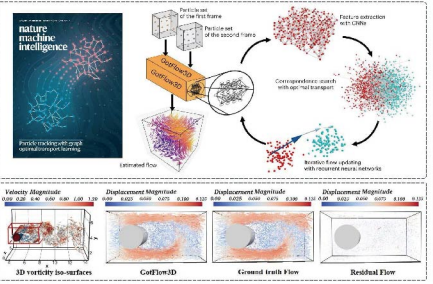
④ Knowledge Graph-Enhanced Molecular Contrastive Learning with Functional Prompt

作者: Fang Yin, Zhang Qiang, Chen Huajun；等
来源: NATURE MACHINE INTELLIGENCE 卷:5 期:5 页:542-553 出版时间:MAY 2023
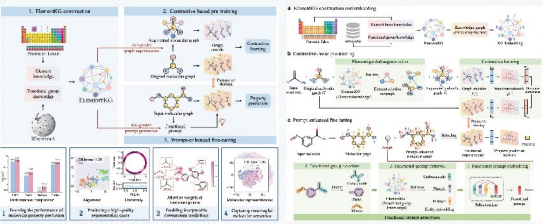
Deep learning models excel in predicting molecular properties, accelerating the discovery of potential drug candidates. We introduce a chemical element-oriented knowledge graph to summarize basic knowledge of elements and their associated functional groups, and propose a framework building on it to incorporate domain knowledge in both pre-training and fine-tuning to offer interpretable prediction.

⑤ **Single Multimode Fibre for in Vivo Light-Field Encoded Endoscopic Imaging**

作者: Wen Zhong, Liu Xu, Yang Qing；等

来源: NATURE PHOTONICS 卷17 期8 页:679-687 出版时间:AUG 2023

We have pioneered a spatial frequency domain tracking adaptive beacon light field encoding method (STABLE). This innovation facilitates the tracking and detection of the fiber's transmission matrix at millisecond speeds, which is four orders of magnitude faster than previously reported methods. This marks the first international achievement in high-fidelity super-resolution microscopy imaging of multimode fibers under actual motion. Furthermore, the integration of multimode fibers with white-light endoscopy has demonstrated a cross-scale imaging in a bronchial model. High-resolution imaging within the fiber lumen in living mice has been achieved.
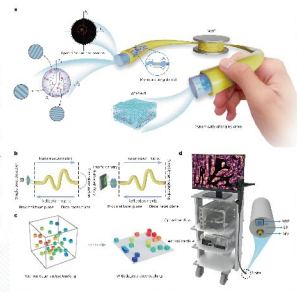
⑥ **Coherent Control of a High-Orbital Hole in a Semiconductor Quantum Dot**

作者: Yan Junyong, Jin Chaoyuan, Liu Feng；等

来源: NATURE NANOTECHNOLOGY 卷:18 期:10 页:1139-1146 出版时间:OCT 2023
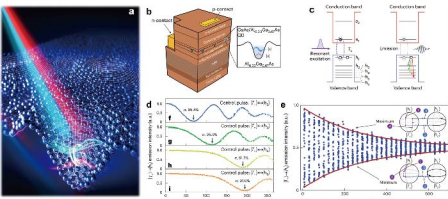
We demonstrate an all-optical method to control high-orbital states of a hole via a stimulated Auger process. The coherent nature of the Auger process is proved by Rabi oscillation and Ramsey interference. Harnessing this coherence further enables the investigation of the single-hole relaxation mechanism. Our work opens new possibilities for understanding the fundamental properties of high-orbital states in quantum emitters and for developing new types of orbital-based quantum photonic devices.

⑦ **Observability is Sufficient for the Design of Globally Exponentially Stable State Observers for State-Affine Nonlinear Systems**

作者: Wang Lei, Ortega Romeo, Bobtsov Alexey

来源: AUTOMATICA 卷:149 页(号):110838 出版时间:MAR 2023

State observation of state-affine nonlinear systems is widely used in practical applications, e.g., vehicle localization. We present a new observer design method by introducing dynamic extensions to transforming the problem to a parameter estimation problem, and firstly show that the necessary observability condition is also sufficient to design a globally exponentially stable observer, in contrast with existing results that require the strictly stronger assumption of uniform complete observability of the system.
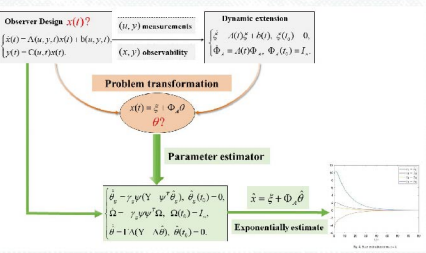
⑧ **Local-Global Context Aware Transformer for Language-Guided Video Segmentation**

作者: Liang Chen, Wang Wenguan, Yang Yi；等

来源: IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE
卷: 45 期: 8 页: 10055-10069 出版时间: AUG 2023
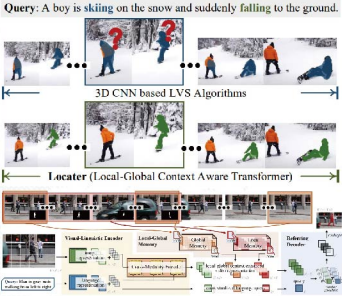
In this article, a local-global context aware Transformer (Locater) is devised to capture both short- and long-term context and encourage visual-linguistic alignment in language-guided video segmentation. By incorporating an extra memory into the Transformer architecture, Locater persistently preserves global video content while dynamically gathering local temporal context and segmentation history. Locater won 1st place in Referring Video Object Segmentation Track of 3rd Large-scale Video Object Segmentation Challenge at CVPR 2021 and achieved state-of-the-art performance on three public datasets.

⑨ **Semi-Dense Feature Matching with Transformers and Its Applications in Multiple-View Geometry**

作者: Shen Zehong, Bao Hujun, Zhou Xiaowei；等

来源: IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE
卷: 45 期: 6 页: 7726-7738 出版时间: JUN 2023

We propose a novel framework named LoFTR for local image feature matching, which is a fundamental problem in computer vision. Unlike traditional methods that perform feature detection, description, and matching sequentially, LoFTR proposes to establish pixel-wise dense matches in a coarse-to-fine manner using Transformers, getting rid of the need of feature detection and largely improving matching robustness for challenging scenarios such as low-texture regions and large illumination/viewpoint changes.
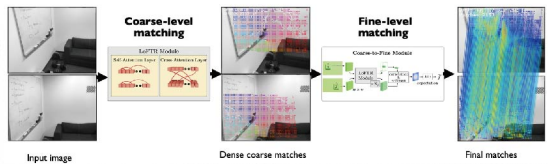
⑩ **Free-Electron Brewster-Transition Radiation**

作者: Chen Ruoxi, Chen Hongsheng, Lin Xiao；等

来源: SCIENCE ADVANCES 卷:9 期:32 页(号):eadh8098 出版时间:AUG 2023

We reveal a mechanism to enhance particle-matter interactions by exploiting the pseudo-Brewster effect of gain materials. This enhanced free-electron radiation is featured with ultrahigh directionality and appears always at the Brewster angle, regardless of the electron velocity. Counterintuitively, we further find that a weaker gain could lead to a stronger enhancement for light emission.
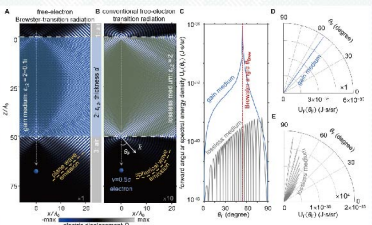
⑪ **Generating Synthetic Mixed-Type Longitudinal Electronic Health Records for Artificial Intelligent Applications**

作者: Li Jin, Cairns Benjamin J., Li Jingsong；等

来源: NPJ DIGITAL MEDICINE 卷:6 期:1 页(号):98 出版时间:MAY 2023
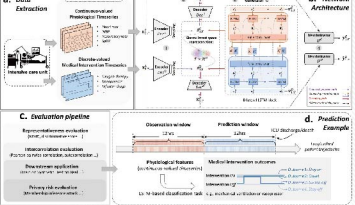
Electronic health records (EHRs) offer opportunities for AI research, but patient privacy concerns limit data sharing. This study introduces EHR-M-GAN, a generative adversarial network that synthesizes mixed-type timeseries EHR data mimicking clinical decision-making. Experimental evaluations demonstrate that EHR-M-GAN outperformed benchmarks in generating high-fidelity, privacy-preserving clinical timeseries, improving predictive models for patient outcomes when augmenting training data.

⑫ **A 1 V 1.07 μW 15-Bit Pseudo-Pseudo-Differential Incremental Zoom ADC**

作者: Lu Zhaonan, Ji Huaikun, Tan Zhichao；等

来源: IEEE JOURNAL OF SOLID-STATE CIRCUITS
卷: 58 期: 9 页: 2575-2584 出版时间: SEP 2023

As battery-powered IoT devices rapidly take over the portable electronics market, low-power, high-precision ADCs are urgently needed. We present a pseudo-pseudo-differential-based incremental ADC with common-mode signal decoupling techniques. Measurement results demonstrate that this prototype achieves state-of-the-art performance, which may create a new path for IoT sensor-oriented ADC design.
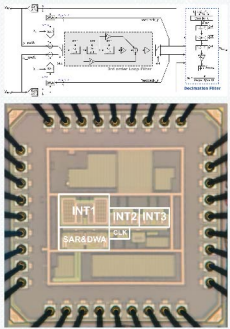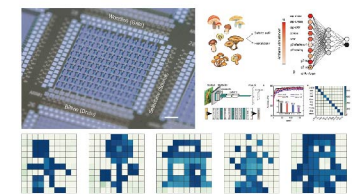
⑬ Open-Loop Analog Programmable Electrochemical Memory Array

作者: Chen Peng, Lin Peng, Pan Gang；等

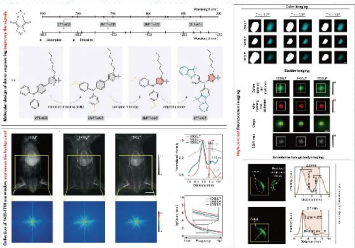来源: NATURE COMMUNICATIONS 卷:14 期:1 页(号):6184 出版时间:OCT 2023

Learning-on-chip is a highly desired computing technology that directly update the hardware-based synaptic weights for training neural networks. We utilized an electrochemical device as artificial synapse that can be programmed from one state to the other without any feedback adjustments. We showed, for the first time, that such open-loop programmability can be experimentally achieved in arrays, which offers a unique solution to accelerate training tasks.

⑭ Engineered NIR-II Fluorophores with Ultralong-Distance Molecular Packing for High-Contrast Deep Lesion Identification

作者: Feng Zhe, Chen Siyi, Qian Jun；等

来源: NATURE COMMUNICATIONS 卷: 14 期: 1 页(号): 5017 出版时间: AUG 2023

The limited signal of long-wavelength near-infrared-II (NIR-II, 900–1880 nm) fluorophores, combined with the strong background caused by diffused photons, makes high-contrast deep optical imaging very challenging. We develop bright and long-wavelength NIR-II dyes through novel molecular design and collect the tailing NIR-IIx+NIR-IIb (1400-1700 nm) emission to suppress the imaging background, thereby improving the signal-to-background ratio. This method can open new avenues for the biomedical imaging of deep and highly scattering tissues.

⑮ Graphene/Silicon Heterojunction for Reconfigurable Phase-Relevant Activation Function in Coherent Optical Neural Networks

作者: Zhong Chuyu, Hu Xiaoyong, Lin Hongtao；等

来源: NATURE COMMUNICATIONS 卷:14 期:1 页(号):6939 出版时间:OCT 2023

Artificial neural networks rely on nonlinear activation functions to solve complicated tasks. A novel graphene/silicon heterojunction device that allows reconfigurable optical activation functionalities with low-power consumption, low-power threshold, and low-time delay is developed. The nonlinear functions generated from the heterojunction device were applied for digital complex-valued ONNs to finish handwritten letters and image recognition tasks.
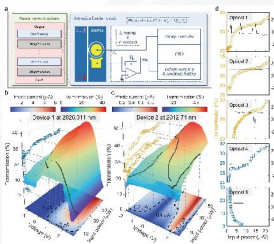
⑯ 3D Imprinting of Voxel-Level Structural Colors in Lithium Niobate Crystal

作者: Wang Zhuo, Zhang Bo, Qiu Jianrong；等

来源: ADVANCED MATERIALS 卷:35 期:47 页(号): 2303256 出版年: JUN 2023

A facile voxel-level programmable 3D structural coloration in LiNbO3 is proposed by ultrafast-laser-induced micro-amorphization strategy and pulse-internal-coupling effect is revealed during laser–crystal interaction (Fig. 1). Micro–nanoscale colorful voxels is fast inscribed and flexibly manipulated in 3D space (Fig. 2). Multidimensional data storage with large capacity, high writing/readout speed, long lifetime, and excellent stability is achieved.
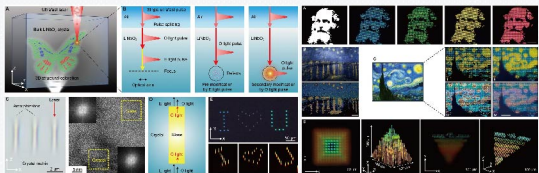
### ⑰ An Electromagnetic Perspective of Artificial Intelligence Neuromorphic Chips

作者: Li Erping, Ma Hanzhi, Manareldeen Ahme；等

来源: ELECTROMAGNETIC SCIENCE 卷:1 期:3 页(号):0030151 出版年:SEP 2023

Intelligent neuromorphic chips have been proposed to mimic the efficiency of the human brain, with the aim of addressing the 'memory wall' challenge associated with von Neumann architectures. This paper presents a comprehensive review of neuromorphic circuit design, focusing particularly on electromagnetic challenges. We explore current modeling and design strategies, and outline future trends aimed at enhancing reliability and functionality within an electromagnetic framework.
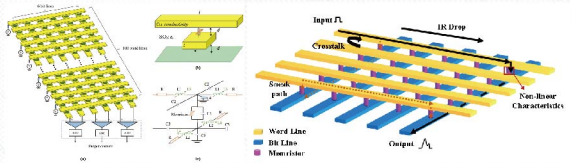
⑱ Detecting Logic Bugs of Join Optimizations in DBMS

作者: Tang Xiu, Wu Sai, Chen Gang；等

来源: PROCEEDINGS OF THE ACM ON MANAGEMENT OF DATA 最佳会议论文

会议地点: Seattle, USA 会议时间: JUN 2023
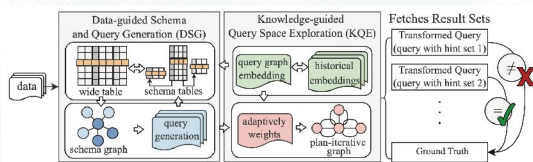
Generation-based testing techniques have shown their effectiveness in detecting logic bugs of DBMS, which are often caused by improper implementation of query optimizers. We propose TQS, a novel testing framework targeted at detecting logic bugs derived by queries involving multi-table joins. Experimental results show that TQS is effective in finding logic bugs of join optimization in database management systems.

⑲ SePanner: Analyzing Semantics of Controller Variables in Industrial Control Systems Based on Network Traffic

作者: Meng Jie, Deng Ruilong, Chen Jiming；等

来源: ANNUAL COMPUTER SECURITY APPLICATIONS CONFERENCE（ACM ACSAC）最佳会议论文

会议地点: Austin, TX, USA 会议时间: DEC 2023

We propose a novel framework named SePanner to extract the semantics of controller variables from proprietary industrial control protocols based on network traffic. SePanner conducts the multi-state comparison to locate the semantic fields directly and removes the interfering fields by the single-state comparison and filtering criteria. Our experiments demonstrate that SePanner can precisely extract the semantics of controller variables and provide protection for PLCs while remaining compatible with various proprietary binary protocols.
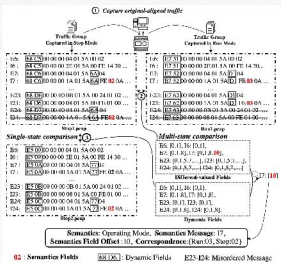
⑳ Simultaneous Communication and Localization for Double-RIS Aided Multi-UE ISAC Systems

作者: Gan Xu, Huang Chongwen, Yang Zhaohui；等

来源: IEEE 23RD INTERNATIONAL CONFERENCE ON COMMUNICATION TECHNOLOGY 最佳会议论文

会议地点: WuXi , CHINA 会议时间: OCT 2023

The spectral efficiency of RIS-aided ISAC uplink transmissions may be drastically reduced by the heavy burden of pilot overhead for realizing sensing capabilities. We tackle this bottleneck by proposing a superimposed symbol scheme, which superimposes sensing pilots onto data symbols over the same time-frequency resources. Numerical results show that our proposed algorithm can achieve centimeter-level localization and provide an effective throughput improvement over 143%.
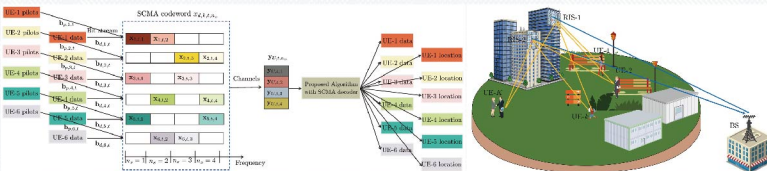
人才培养

Education

学部共有11个一级学科博士学位授予点，22个二级学科博士学位授予点，13个本科专业，其中10个本科专业入选国家级一流本科专业建设点。在校生（包含本科生和研究生）11229人，在国内外各类学科竞赛中成绩优异，本科生深造率接近67%。依托学部建设"信息+X"多学科交叉人才培养中心，推进具有多学科交叉创新研究能力的拔尖人才培养。

There are totally 11 doctorate programs of primary discipline, 22 doctorate programs of secondary discipline, 13 undergraduate programs. 10 undergraduate programs were selected in the country's construction plan list of first-class undergraduate programs. About 11229 full-time undergraduate and graduate students are enrolled in the faculty. They have made outstanding achievements in various international and domestic disciplinary competitions. Nearly 67% undergraduate students continue their studies at home or aboard. The "Information + X" Multidisciplinary Talent Training Center is developed to promote the cross-innovation capability of graduate student.

本科专业 UG Program

学 院 College of	本科专业 UG Program
光电科学与工程学院 Optical Science and Engineering	光电信息科学与工程 Optoelectronic Information Science and Engineering
信息与电子工程学院 Information Science and Electronic Engineering	信息工程 Information Engineering
	电子科学与技术 Electronic Science and Technology
	微电子科学与工程 Microelectronic Science and Engineering
控制科学与工程学院 Control Science and Engineering	自动化 Automation
	机器人工程 Robot Engineering
计算机科学与技术学院 Computer Science and Technology 软件学院 Software Technology	计算机科学与技术 Computer Science and Technology
	软件工程 Software Engineering
	信息安全 Information Safety
	工业设计 Industrial Design
	产品设计 △ Product Design △
	人工智能 ★ Artificial Intelligence ★
生物医学工程与仪器科学学院 Biomedical Engineering and Instrument Science	生物医学工程 Biomedical Engineering

★ 仅在竺可桢学院招生 Enrolling in Chu Kochen Honors College
△ 2021年取消招生 Cancelled in 2021

学科 Discipline

光学工程 Optical Engineering

光学工程 Optical Engineering
光通信技术 Optical Communication Technique
信息传感及仪器 Information Sensing and Instruments

电子科学与技术 Electronics Science and Technology

物理电子学 Physical Electronics
微电子学与固体电子学 Microelectronics and Solid State Electronics
电路与系统 Circuits and Systems
电磁场与微波技术 Electromagnetic Field and Microwave Technology

信息与通信工程 Information and Communication Engineering

通信与信息系统 Communication and Information Systems
信号与信息处理 Signal and Information Processing

控制科学与工程 Control Science and Engineering

控制理论与控制工程 Control Theory and Control Engineering
检测技术与自动化装置 Detection Technology and Automatic Equipment
系统工程 Systems Engineering
模式识别与智能系统 Pattern Recognition and Intelligent Systems
导航、制导与控制 Navigation, Guidance and Control

计算机科学与技术 Computer Science and Technology

计算机应用技术 Computer Applied Technology
计算机系统结构 Computer Systems Organization
数字化艺术与设计 Digital Art and Design
电子服务 Electronic Service

软件工程 Software Engineering

计算机软件与理论 Computer Software and Theory

生物医学工程 Biomedical Engineering

生物医学工程 Biomedical Engineering
电子信息技术及仪器 Electronic Information Technologies and Instruments

网络空间安全 Cyberspace Security

人工智能 Artificial Intelligence

集成电路科学与工程 Integrated Circuit Science and Engineering

设计学 Design

设计艺术学 Art of Design

学生（人）　Student

学 院 College 学 生 Students		光电学院 COSE	信电学院 ISEE	控制学院 CSE	计算机学院 CCST	软件学院 CST	生仪学院 BME	集成电路学院 CIC	合计 Total
在校生 Enrollments	博士生 Doctor	423	517	399	1074	50	253	119	2835
	硕士生 Master	360	573	456	1078	1157	249	251	4124
	本科生 Undergraduate	402	1099	621	1688	/	460	/	4270
招生数 Freshmen	博士生 Doctor	115	145	103	281	21	51	42	758
	硕士生 Master	137	231	160	376	378	90	87	1459
	本科生* Sophomore*	92	220	129	253	/	128	/	822
毕业生 Graduates	博士生 Doctor	65	77	60	110	/	51	4	367
	硕士生 Master	99	184	106	302	312	75	19	1097
	本科生 Undergraduate	103	308	154	470	/	99	/	1134
本科生深造与对外交流 Further Study and International Exchange of Undergraduate	毕业生* Graduate*	103	260	138	390	/	99	/	990
	出国（境）深造率 Ratio of Further Studies Abroad	5.83%	7.31%	14.40%	17.44%	/	18.18%	/	13.23%
	国内读研率 Ratio of Further Studies at Home	66.99%	64.23%	52.8%	42.31%	/	51.51%	/	53.03%
	对外交流人次 International Exchange	93	280	159	545	/	105	/	1182

*不包括竺可桢学院学生　Except the students belong to Chu Kochen Honors College

浙江省优秀博士学位论文　Zhejiang Provincial Excellent Doctoral Dissertation

作者姓名 Author	指导教师 Supervisor	一级学科 Discipline	论文题目 Title
王南朝 Wang Nanchao	吴 兰 刘 东 Wu Lan Liu Dong	光学工程 Optical Engineering	面向云与气溶胶相互作用的高光谱分辨率激光雷达关键技术研究 Research on Key Technologies of High-spectral-resolution Lidar for Aerosol-cloud Interaction Studies
张 莉 Zhang Li	陈红胜 Chen Hongsheng	电子科学与技术 Electronics Science and Technology	新型光学拓扑绝缘体的理论与实验研究 Theoretical and Experimental Investigation of Novel Photonic Topological Insulators
邵晓丹 Shao Xiaodan	陈晓明 Chen Xiaoming	信息与通信工程 Information and Communication Engineering	大规模免授权随机接入理论和关键技术研究 Research on Theories and Key Techniques of Massive Grant-Free Random Access
柴 铮 Chai Zheng	赵春晖 Zhao Chunhui	控制科学与工程 Control Science and Engineering	面向工业监控典型欠数据场景的知识迁移方法研究 Knowledge Transfer Methods for Typical Industrial Monitoring Scenarios with Limited Data
张培歆 Zhang Peixin	王新宇 Wang Xinyu	计算机科学与技术 Computer Science and Technology	深度神经网络的公平性测试 Fairness Testing of Deep Neural Network
程 晨 Cheng Chen	刘清君 Liu Qingjun	生物医学工程 Biomedical Engineering	基于电化学检测技术的贴皮式与摄入式在体原位传感方法研究 Research on Epidermal in Situ and Ingestible in Vivo Sensing Method Based on Electrochemical Detection Technology
冯 哲 Feng Zhe	钱 骏 Qian Jun	光学工程 Optical Engineering	近红外二区光学生物成像窗口探索及应用★ The Exploration of the Near-Infrared-II Optical Bioimaging Window and Related Applications★
曾慧然 Zeng Huiran	李 凯 Li Kai	电子科学与技术 Electronics Science and Technology	电离层中甚低频天线／天线阵及海底岩石层波导中极低频波传播研究★ VLF Antenna/Antenna Array Theory in the Ionosphere and ELF Wave Propagation in the Oceanic Lithosphere★
施琳琳 Shi Linlin	张森林 Zhang Senlin	控制科学与工程 Control Science and Engineering	多自主水下航行器的协同流场估计与分布式目标围捕★ Cooperative Flow Field Estimation and Distributed Target Enclosing of AUVs★

浙江省优秀博士学位论文 Zhejiang Provincial Excellent Doctoral Dissertation （续）

作者姓名 Author	指导教师 Supervisor	一级学科 Discipline	论文题目 Title
王闻箫 Wang Wenxiao	蔡登 Cai Deng	计算机科学与技术 Computer Science and Technology	基于卷积神经网络与变换器的高效高性能视觉骨干模型★ Efficient and High-performance Visual Backbones Based on Convolutional Neural Network and Transformer★
许佳敏 Xu Jiamin	鲍虎军 Bao Hujun	计算机科学与技术 Computer Science and Technology	面向三维重建与绘制的高效几何与外观表达方法研究★ Efficient Geometric and Appearance Representations for 3D Reconstruction and Image-based Rendering★
陈泽涛 Chen Zetao	刘清君 Liu Qingjun	生物医学工程 Biomedical Engineering	生物化学电势调控局域表面等离子体共振及其传感研究★ Research on Biochemical Modulation of Localized Surface Plasmon Resonance (LSPR) and Its Sensing★

★浙江省优秀博士学位论文提名论文　Zhejiang Provincial Excellent Doctoral Dissertation Nomination Dissertation

专项奖 Special Award

奖项 Award	获奖学生 Winners	学院 College of
2022-2023学年浙江大学竺可桢奖学金 Chu Kochen Scholarship	朱少廷 Zhu Shaoting	控制科学与工程学院 Control Science and Engineering
	王卓 Wang Zhuo	光电科学与工程学院 Optical Science and Engineering
	赵宇骐 Zhao Yuqi	光电科学与工程学院 Optical Science and Engineering
	袁泽清 Yuan Zeqing	计算机科学与技术学院 Computer Science and Technology
	陈翔 Chen Xiang	计算机科学与技术学院 Computer Science and Technology
	黄融杰 Huang Rongjie	软件学院 Software Technology

学科竞赛 Disciplinary Competition

竞赛名称 Competition	奖项 Award	获奖人员、队名/作品 Winners List	指导教师 Advisor
RoboCup机器人世界杯 RoboCup	小型组亚军 Second Place in Small Size League	ZJUNlic： 赵安可　林康　余鹏飞　杨嘉磊 沈凝　王斯　于佳正　陈芷轲 陈泽希　黄哲远	熊蓉
RoboCup机器人世界杯中国公开赛 RoboCup China Open	小型组一等奖（冠军） First Place in Small Size League	ZJUNlic： 赵安可　林康　余鹏飞　杨嘉磊 沈凝　王斯　于佳正　陈芷轲 陈泽希	熊蓉
	类人组二等奖（第五名） Second Place in Humanoid League	ZJUDANCER： 于瑞骐　余味　王惜昀　程之梵 方润达　毕研成　王率　戴承江 王毅然　黄贤敏　周意尧　沈易可 张帅辰　丁愉涵　吴欣宁　吴灏	熊蓉 周忠祥
RoboCup 2023机器人世界杯平昌亚太赛 RoboCup Asia-Pacific 2023 PyeongChang	类人组季军 Third Place in Humanoid League	ZJUDancer： 于瑞骐　余味　方润达　王率 戴承江　黄贤敏　周意尧　沈易可 张帅辰　苏浩	熊蓉 周忠祥
国际大学生机器人设计大赛 IDC Robocon 2023	冠军 First Place	李子木	王西 朱秋国
	亚军 Second Place	鲍安格	
	八强 Top 8	朱柏玉	
2023 红点设计大奖 Reddot Design Award 2023	设计概念奖 Design Concept	Eureka smart glove： 郑琛达　王梓豪　罗晓涵　付彦博 李晋宣　张礼义　吴菲杨　覃睿 和涛	邹宁 王冠云
		MechCircuit： 冯书阅　林伟嘉　马嘉依　姚嘉玉 张超	姚玲 王冠云
2023 iF设计学生奖 2023 iF Design Student Award	设计学生奖 Design Student Award	Body Hopscotch： 冯源　张怡卿　冷诗阳　吴悉尼	张克俊
2023 意大利A设计奖 2023 A Design Award	银奖 Silver Award	MechCircuit： 林伟嘉　冯书阅　姚嘉玉　马嘉依 Masulani Bokola	姚玲 王冠云

学科竞赛 Disciplinary Competition （续）

竞赛名称 Competition	奖项 Award	获奖人员、队名/作品 Winners List	指导教师 Advisor
2023戴森设计大奖 2023 James Dyson Award	中国赛区亚军 Runner-up (China)	MechCircuit: 冯书阅 张 超 姚嘉玉 Masulani Bokola 林伟嘉 马嘉依	姚 玲 王冠云
UXDA国际用户体验创新大赛 UXDA International User eXperience Innovation Competition	冠军 First Place	Shuttle glasses：王小东 戚煜格 刘国烨	罗仕鉴 陈 实
2023年国际大学生程序设计竞赛亚洲区域赛 International Collegiate Programming Contest Asia Regional Contest（ICPC）	亚军 First Runner-up	Prismatic Encore: . 唐嘉辰 黎伟诺 李昌栋（澳门赛区）	王 灿
		Plenty of Penalty: 吴与伦 徐锐扬 万 弘（合肥赛区）	
	金牌 Gold Medal	Prismatic Encore: 唐嘉辰 黎伟诺 李昌栋 （沈阳赛区，亚洲区决赛）	
		nameless story: 凌子恒 胡家齐 林响烨 （济南赛区、合肥赛区）	
		Solitary Dream: 彭 博 褚写庭 陈 逸 （西安赛区、济南赛区、亚洲区决赛）	
		Delay for Five Minutes： 严子轩 周轩熠 樊 睿 （西安赛区、南京赛区）	
		Stardust Reverie: 林 滨 李克成 谭思成 （南京赛区、合肥赛区）	
		Rd_rainydays： 叶佳昂 王培成 汪 翔 （南京赛区、合肥赛区）	
		Random Passing Legion: 吴 浩 施雨航 杨远航（沈阳赛区）	
		Vengeful Spirit: 张志心 楼沁霈 周 遥（沈阳赛区）	
		Boulevard Dust: 黄嘉尔 王楚淏 马熠阳（西安赛区）	
		S Explosion: 王造时 丁思韬 李谞远（西安赛区）	
	银牌 Silver Medal	19Shenyang14th, back once again： 陈彦博 王 熠 沈哲贝（沈阳赛区）	
		Vengeful Spirit: 张志心 楼沁霈 周 遥（济南赛区）	
		Plenty of Penalty: 吴与伦 徐锐扬 万 弘（亚洲区决赛）	

学科竞赛 Disciplinary Competition （续）

竞赛名称 Competition	奖项 Award	获奖人员、队名/作品 Winners List	指导教师 Advisor
2023中国大学生程序设计竞赛 China Collegiate Programming Contest（CCPC）	亚军 First Runner-up	nameless story： 凌子恒 胡家齐 林响烨（哈尔滨赛区）	王 灿
		Delay for Five Minutes： 严子轩 周轩熠 樊 睿（深圳赛区）	
	季军 Second Runner-up	Vengeful Spirit: 张志心 楼沁霈 周 遥（女生赛）	
		Plenty of Penalty: 吴与伦 徐锐扬 万 弘（秦皇岛赛区）	
	金奖 Gold Medal	Rd_rainydays： 叶佳昂 王培成 汪 翔（秦皇岛赛区）	
		Teamname： 陈君林 刘振宇 邹宇涵（秦皇岛赛区）	
		Stardust Reverie: 林 滨 李克成 谭思成（秦皇岛赛区）	
		Boulevard Dust: 黄嘉尔 王楚淏 马熠阳（哈尔滨赛区）	
	银奖 Silver Medal	S Explosion: 王造时 丁思韬 李谞远（哈尔滨赛区）	
		Dream On： 叶皓天 田宇灼 黄 钰（深圳赛区）	
2023中国高校计算机大赛 2023 China Collegiate Computing Contest(C4)	移动应用创新赛 二等奖 Second Place in Mobile Application Innovation Competition	眼语：方宇阳 滕朱瑜 蒋招衢	向 为 张克俊
		NeckDisco：张思洲 李啸龙 邹 卓	赵艺钧 姚 玲
		fitpal：王心宇 车 瑞 顾雨馨	冯 天 张 微
	智能交互创新赛 二等奖 Second Place in AIGC Innovation Competition	HypomimiaCoach： 徐荥璟 李正可 蔡雪岩 徐瑞特	林 博 罗 巍
2023年第十一届全国大学生光电设计竞赛 The 11th National University Students' Opt-Sci-Tech Competition	二等奖 Second Place	酒精浓度的非接触测量： 张曹琛 陈泓鑫 吴翔宇	林远芳
		酒精浓度的非接触测量： 翟家骏 刘钦卫 余 能	吴仍茂 林远芳
		安防镜头设计：袁子扬 潘 宁 薛子乔	吕玮阁 林远芳
2023年全国大学生电子设计竞赛 2023 National Undergraduate Electronic Design Contest	一等奖 First Place	信号调制方式识别与参数估计装置： 章佳斌 应旷野 沈嘉宇	张 昱 李惠忠
	二等奖 Second Place	电感电容测量装置： 宋子轩 许展凤 任禹谦	马洪庆 李惠忠

学科竞赛 Disciplinary Competition （续）

竞赛名称 Competition	奖项 Award	获奖人员、队名/作品 Winners List	指导教师 Advisor
第八届全国大学生生物医学工程创新设计竞赛 The 8th National Biomedical Engineering Innovation Design Competition for College Students	一等奖 First Place	如影"髓"形——基于深度学习的降采样磁共振髓鞘水成像方法： 梅 乐 王可欣 施予皓	吴 丹
		用于卒中治疗的蝶腭神经节刺激系统： 沈子豪 钟 睿 林钊坦	李宇波
	二等奖 Second Place	基于柔性电子的自驱动婴儿可穿戴传感系统： 叶为红 汪雨甜 吴珉阳	刘清君
		基于柔性电子的自驱动皮肤多模态传感检测系统： 徐理昂 吴 灏 施亦哲	
		无线无源柔性贴皮式传感贴片： 金 萌 方飞越 陈 涛	
		用于健康监测的柔性可穿戴皮肤贴片： 张致远 余馨琳 章哲宇	
		基于MRI图像三维重建的头盆不称检测系统： 康致宁 卢峰杰 李力扬	罗 琼
		基于深度学习的康复训练动作评价系统： 吴珉阳 汪雨甜 叶为红	周 泓
		不抖翁——基于自适应滤波的新型帕金森患者专用防抖勺： 张卓南 曹之扬 赵静怡	胡松钰
HACK@DAC 2023硬件CTF竞赛 HACK@DAC 2023 Hardware CTF Competition	第一名 First Place	Sycuricon战队： 徐金焱 刘诣元 赵小迪	周亚金
第十五届 CODEGATE CTF 国际赛事 The 15th CODEGATE International Hacking Competition	亚洲第一，全球第二 Champion (Asia) First Runner-up (Global)	AAA 战队： 韩 数 颜尔汛 黄炯睿 康锦辉 陆嘉晨 马 麟 胡又文 李英琦 叶耀阳 谢天晰	常 瑞
第十六届全国大学生信息安全竞赛（作品赛） The 16th National College Student Information Security Competition（Works Competition）	一等奖 First Place	GraphMapper：宋佳铮 贾子钊 吴一航 （"最具创新创业价值奖"）	任 奎
		紫色小分队：雷俊驰 吴伦锋 王家宝	秦 湛
第六届"强网杯"全国网络安全挑战赛人工智能专项赛 The 6th "Qiangwang Cup" National Cybersecurity Challenge Artificial Intelligence Special Competition	一等奖 First Place	ZZZero战队： 李 亮 赵子鸣 宋卓学 李兆轩 卢昊洋 （"恶意流量智能识别"赛道）	张 帆

海外交流
International Exchange and Cooperation

　　学部2023年教师出访参加学术会议、合作交流共438人次，约接待144人次国外学者来访进行学术交流，主办国际会议8次。学部各学院（系）与国外著名大学继续加强学生联合培养，推进教师科研合作，进一步提升了科研与教学水平。

In 2023, about 438 persons visited abroad for academic exchange and cooperation. About 144 world-renowned scholars were invited to visit FIT. Meanwhile, we successfully hosted about 8 international conferences. The colleges of FIT continue to strengthen the international exchange and cooperation in order to enhance the level of teaching and scientific research.

序号 No.	会议名称 Conference	时间 Date
1	亚欧硅光技术研讨会 Asia-Europe Silicon Photonics Symposium	7月7日-9日 Jul 7-9
2	2023年国际应用计算电磁学会议 2023 International Applied Computational Electromagnetics Symposium (ACES)	8月15日-18日 Aug 15-18
3	脑机接口技术与标准国际研讨会 International Symposium on Brain-Computer Interfaces and its Standards	9月3日-7日 Sept 3-7
4	第15届国际无线通信与信号处理大会 15th International Conference on Wireless Communications and Signal Processing (WCSP)	11月2日-4日 Nov 2-4
5	颜色视觉科学与图像论坛 Colour and Vision Science and Imaging Forum	12月4日-6日 Dec 4-6
6	2023"一带一路"与"金砖五国"先进光子学研讨会 2023 Belt-Road & BRICS Forum for Advanced Photonics	12月14日-15日 Dec 14-15
7	2023科技设计国际会议 2023 International Conference on Technology and Design	12月16日-17日 Dec 16-17
8	2023网络空间安全西湖论坛 West Lake International Forum on Cybersecurity 2023	12月29日-30日 Dec 29-30

2023要闻

News 2023

Jan.2023

1月10日，信息学部举行了首届光谷成果转化奖评审会，共有三位科学家获得2022年度奖。

On Jan.10th, the first Optics Valley Achievement Transformation Award Review Meeting was held and three scientists won the 2022 Annual Award in FIT.

1月13日，光电学院童利民教授入选首批"新基石研究员"。

On Jan.13th, Prof. Tong Limin from COSE was selected as the first batch of "New Cornerstone Researchers".

Feb.2023

2月16日，计算机学院设计学王冠云团队与国际跨学科团队联合设计的一种可以自发钻土的"种子载体E-seed"，登上国际顶刊《NATURE》封面。

On Feb. 16th, the group of Researcher Wang Guanyun from CCST with the international interdisciplinary team designed a "seed carrier E-seed" that can spontaneously drill into the soil, which was published on the cover of the top international journal "NATURE".

2月20日，中国科协2023"科创中国"年度会议上控制学院陈积明教授荣获第二十五届"中国科协求是杰出青年成果转化奖"。

On Feb. 20th, Prof. Chen Jiming from CSE won the 25th "China Association for Science and Technology Outstanding Youth Achievement Transformation Award" at the 2023 "Science and Technology China" Annual Conference.

Mar.2023

3月16日，信息学部召开长聘教职评聘制度宣讲会，校人力资源处解读政策。

On Mar. 16th, a lecture on the tenure-track evaluation system was held, and the Human Resources Office of ZJU explained the policy.

3月17日，光电学院邱建荣教授团队成果"发现飞秒激光诱导复杂体系微纳结构新机制"成功入选2022年度"中国科学十大进展"。

On Mar. 17th, the achievement named Discovery of a New Mechanism of Micro-Nano Structure of Femtosecond Laser-Induced Complex Systems led by prof. Qiu Jianrong, vice-dean of FIT from COSE, was successfully selected as one of the "Top Ten Advances in Chinese Science" in 2022.
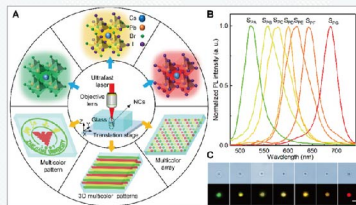
3月30日，控制学院苏宏业教授牵头完成的3项国际标准荣获2022中国标准创新贡献奖一等奖。

On Mar. 30th, three international standards finished by Prof. Su Hongye from CSE won the first prize of the 2022 China Standard Innovation Contribution Award.

Apr.2023

4月24日，信息学部副主任李尔平带队赴西安交通大学、西安电子科技大学调研交流合作。

On Apr. 24th, Prof. Li Erping, vice-dean of FIT, led a team to visit Xi'an Jiaotong University and Xidian University for exchange and cooperation.
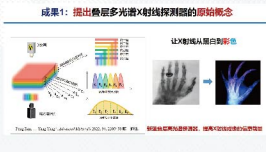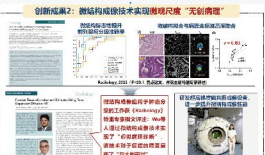
4月26日，光电学院邱建荣教授荣获"浙江大学2022年度突出学术贡献奖"、控制学院高飞团队荣获"浙江大学2022年度十大学术进展"。本年度10月11日，信息学部另有2项进展荣获首届"浙江大学青年学者2022年度十大学术进展项目"，负责人分别是生仪学院吴丹和光电学院杨旸。

On Apr. 26th, Prof. Qiu Jianrong, vice-dean of FIT from COSE, won the " 2022 Outstanding Academic Contribution Award of ZJU", and the team of Gao Fei from CSE won the "2022 Top Ten Academic Advances of ZJU ". In addition, two other achievements of FIT were awarded the first "2022 Top Ten Academic Progress Projects of Young Scholars of ZJU", which are led separately by Wu Dan from BME and Yang Yang from COSE on Oct. 11th.

May.2023

5月10日全天，浙江大学召开加快建设世界优秀学科调研会，聚焦学科前沿方向和国家战略急需等问题开展研讨。校长杜江峰院士全程参加了上午信息领域组专场研讨会。

On May 10, ZJU held a research meeting on accelerating the construction of world-class disciplines, focusing on the frontier direction of disciplines and the urgent needs of national strategies. ZJU President Du Jiangfeng attended the special seminar of FIT group in the morning.

Jun.2023

6月9日，信息学部FIT论坛第17期-信息学部学科前沿发展高端论坛成功召开，中国工程院潘云鹤院士、郑南宁院士、张平院士等7位信息领域资深专家出席论坛作报告，主任陈纯院士致开幕词。

On Jun. 9th, the 17th FIT Forum on the Frontier Development of Disciplines was successfully held, and seven senior experts in the field of information technology, including Academician Pan Yunhe, Academician Zheng Nanning, and Academician Zhang Ping of the Chinese Academy of Engineering, attended the forum to make reports. Academician Chen Chun, the dean of FIT, delivered an opening speech.

由青年学者主办的信息学部FIT论坛举行了三次：
5月5日，FIT论坛第16期：漏洞智能化挖掘方法研讨会
7月18日，FIT论坛第18期：网络空间前沿论坛
10月28日，FIT论坛第20期：光学超分辨显微成像学术论坛

The FIT Forum, which was hosted by young scholars, was held in May, July and October, respectively, and was as follows: On May 5th, the 16th FIT Forum on Intelligent Vulnerability Mining Methods; On Jul. 18th, the 18th FIT Forum on Frontiers of Cyberspace; On Oct. 28th, the 20th FIT Forum on Optical Super-resolution Microscopy.

Aug.2023

8月21日，国务院以"加快发展数字经济，促进数字技术与实体经济深度融合"为主题，进行第三次专题学习。国务院总理李强主持专题学习，浙大信息学部主任、中国工程院院士陈纯作了讲解。

On Aug. 21st, the State Council held the third thematic study with the theme of "Accelerating the Development of the Digital Economy and Promoting the Deep Integration of Digital Technology and the Real Economy". Premier Li Qiang presided over the thematic study and Academician Chen Chun, the dean of FIT, was invited to interpret the theme.

Sep.2023

9月上旬，信息学部李尔平副主任访问UIUC工学部，探讨人才培养交叉融合新举措。

In early September, prof. Li Erping, vice-dean of FIT, visited the Faculty of Engineering of UIUC to discuss new measures for the cross-integration of talent training.

Oct.2023

10月11日，信息学部副主任邱建荣教授召集的信息学部FIT论坛第19期，在忙碌的科研中求解积极的人生策略，为青年学者启发思考。

On Oct. 11th, Prof. Qiu Jianrong, vice-dean of FIT, convened the 19th FIT Forum to find positive life strategies in the busy scientific research and inspire young teachers to think.

10月20日，浙江大学联合主办的2023年中国电磁兼容及电磁环境效应技术及产业创新大会在杭成功举办，信息学部副主任、新加坡工程院李尔平院士做大会主旨报告。

On Oct. 20th, the 2023 China Electromagnetic Compatibility and Electromagnetic Environmental Effect Technology and Industrial Innovation Conference co-sponsored by ZJU was successfully held in Hangzhou, Academician Li Erping from the Singapore Academy of Engineering, vice-dean of FIT, delivered a keynote speech on the conference.

Nov.2023

11月3日，信息学部举办百人计划研究员长聘教职申请经验分享会，长聘教职优秀代表吴丹教授和信息学部副主任李尔平教授进行了经验分享和精心指导。

On Nov. 3rd, an experience sharing meeting on the application for long-term teaching positions for the Hundred Talents Program was held by FIT, Prof. Wu Dan, an outstanding representative of long-term teaching positions, and Prof. Li Erping, vice-dean of FIT, were invited to share their experiences and provide careful guidance.

11月17日、20日，"信息+X"中心联合"工学+X"中心举办两场多学科交叉人才培养学术交流会。

On Nov. 17th and 20th, tthe "Information+X" Center cooperating with the "Engineering+X" Center held two academic exchanges seminar on multidisciplinary interdisciplinary talent training.

11月21日，"信息+X"中心2022级交叉培养博士研究生学习科研进展报告会暨2023级新生政策说明会在玉泉校区组织召开。

On Nov. 21st, the "Information+X" Center organized a sharing seminar on the learning and research progress of 2022 doctoral students in the cross training program and a policy briefing for the 2023 postgraduate students at the Yuquan Campus.

Dec.2023

12月26日，信息学部组织举办2023年个推青年创新奖评选交流会，共有12位青年学者参与角逐3个奖励名额，个推CTO叶新江参与了评审。

On Dec. 26th, FIT organized the 2023 Youth Innovation Award Selection Meeting, in which a total of 12 young scholars participated in the competition for 3 awards sponsored by "Getui", and Ye Xinjiang, CTO of "Getui", attended the review meeting.

12月27日，信电学院杨宗银研究员因研发世界最小光谱仪荣获2023达摩院青橙学者奖。

On Dec. 27th, researcher Yang Zongyin from COSE won the 2023 DAMO Academy Young Scholar Award for his research and development of the world's smallest spectrometer.

12月29日，信息学部2023年光谷成果转化奖评审会顺利举行，首届光谷成果转化奖获奖者参与了评审。

On Dec. 29th, the 2023 Optics Valley Achievement Transformation Award Review Meeting of FIT was successfully held, and the winners of the first Optics Valley Achievement Transformation Award participated in the review.

12月29日，浙江大学集成电路学院成立，撤销微纳电子学院。

On Dec. 29th, College of Integrated Circuits at Zhejiang University was established and College of Micro-Nano Electronics was disbanded.

the IEEE Marconi Paper Award
the IEEE Communications Society Katherine Johnson Young Author Best Paper Award

信电学院杨照辉
Yang Zhaohui from ISEE

第三届全国创新争先奖状
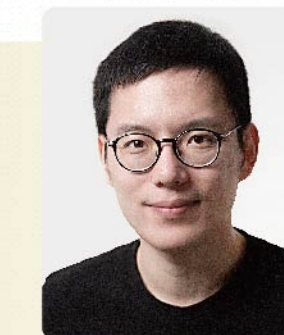the 3rd National Innovation Competition

控制学院王文海教授
Prof. Wang Wenhai from CSE

小米青年学者
Xiaomi Young Scholar

计算机学院王冠云研究员
Researcher Wang Guanyun from CCST

集成电路学院赵博长聘教授
Prof. Zhao Bo from CIC

IEEE Motohisa Kanda Award
（这是该奖项首次授予中国内地学者）
the IEEE Motohisa Kanda Award
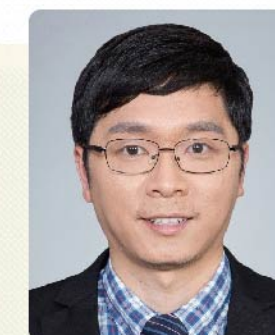(the first scholar awarded from Chinese mainland)

信电学院李达
Li Da from ISEE

2023年"CCF杰出教育奖"
the 2023 CCF Outstanding Education Award.

计算机学院何钦铭教授
Prof. He Qinming from CCST

IEEE Fred W. Ellersick Prize Paper Award

信电学院黄崇文
Huang Chongwen from ISEE

教育部青年科学奖（科学技术）
the Youth Science Award (Sci & Tech) by the MOE

控制学院长聘教授贺诗波
Tenured Prof. He Shibo from CSE

第27届中国青年五四奖章
the 27th China Youth May Fourth Medal.

生仪学院吴丹长聘教授
Tenured Prof. Wu Dan from BME

宝钢优秀教师奖
Bao Gang Excellent Teacher Award

光电学院郑臻荣教授
Prof Zheng Zhenrong from COSE