浙江大學信息學部
FACULTY OF INFORMATION TECHNOLOGY, ZHEJIANG UNIVERSITY

浙江大學 信息學部

AnnualReport 2019

FACULTY OF INFORMATION TECHNOLOGY
ZHEJIANG UNIVERSITY

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FIT

浙江大學 信息學部

Faculty of Information Technology Zhejiang University

Annual Report 2019 年報

学部概况

INTRODUCTION TO FIT

信息学部涵盖了光电科学与工程学院、信息与电子工程学院（含微电子学院）、控制科学与工程学院、计算机科学与技术学院（含网络空间安全学院）、软件学院、生物医学工程与仪器科学学院。学部共有15个本科专业，10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3个国家重点实验室，1个国家工程实验室，3个国家工程（技术）研究中心，共有23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 six colleges, namely College of Optical Science & Engineering (COSE), College of Information Science and Electronic Engineering (ISEE, including College of Microelectronics), 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 & Instrument Science (BME) and College of Software Technology (CST). Currently, FIT has 15 undergraduate programs and 10 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 3 State Key Laboratories, 1 National Engineering Laboratory, 3 National Engineering Research Centers, 23 research institutes, to devote to the innovation research on information science and technology.

主任：陈纯
Dean : Chen Chun

副主任：陈耀武
Vice-Dean : Chen Yaowu

副主任：陈积明
Vice-Dean : Chen Jiming

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学部机构

Organization

学术交流与合作专门委员会

- **主　任**　李尔平
- **副主任**　陈积明　陈红胜　任　奎
- **委　员**　刘　东　刘清君　许　超　巫英才　余官定　沙　威　张明暐　钱　骏　高云君　程　鹏

Academic Exchange and Cooperation Committee

- **Director** Li Erping
- **Vice Director** Chen Jiming Chen Hongsheng Ren Kui
- **Committee members**

Liu Dong Liu Qingjun Xu Chao Wu Yingcai
Yu Guanding Sha Wei Zhang Mingwei Qian Jun
Gao Yunjun Cheng Peng

学位评定委员会

- **主　任**　陈积明
- **副主任**　何钦铭
- **委　员**　王小松　刘清君　许正平　孙守迁　李春光　吴　飞　何钦铭　何湘宁　陈红胜　陈积明　陈祥献　邵之江　林兰芬　郑臻荣　赵道木　黄志尧　童利民

Academic Degrees Committee

- **Director** Chen Jiming **Vice Director** He Qinming
- **Committee members**

Wang Xiaosong Liu Qingjun Xu Zhengping
Sun Shouqian Li Chunguang Wu Fei
He Qinming He Xiangning Chen Hongsheng
Chen Jiming Chen Xiangxian Shao Zhijiang
Lin Lanfen Zheng Zhenrong Zhao Daomu
Huang Zhiyao Tong Limin

学术委员会

- **主　任**　陈　纯
- **副主任**　陈耀武　刘　旭
- **委　员**　卜佳俊　王文海　尹建伟　任　奎　庄越挺　刘向东　刘　旭　刘　承　孙优贤　孙凌云　李尔平　杨建义　余　锋　张　宏　张朝阳　陈　刚　陈伟球　陈　纯　陈积明　陈耀武　邵之江　赵民建　章献民　鲍虎军　熊　蓉　潘云鹤　戴道锌

Academic Committee

- **Director** Chen Chun **Vice Director** Chen Yaowu Liu Xu
- **Committee members**

Bu Jiajun Wang Wenhai Yin Jianwei Ren Kui
Zhuang Yueting Liu Xiangdong Liu Xu Liu Cheng
Sun Youxian Sun Lingyun Li Erping Yang Jianyi
Yu Feng Zhang Hong Zhang Zhaoyang Chen Gang
Chen Weiqiu Chen Chun Chen Jiming Chen Yaowu
Shao Zhijiang Zhao Minjian Zhang Xianmin Bao Hujun
Xiong Rong Pan Yunhe Dai Daoxin

学部学院 COLLEGE OF

师资队伍
Talent Team

学部教职员工738人，其中教学科研岗462人。有中国工程院院士5人，中国科学院院士1人，“万人计划”入选者18人，教育部长江学者14人，国家百千万人才工程人选9人，教育部高校教学名师1人，国家杰出青年基金获得者19人，优秀青年基金获得者14人，浙江省特级专家7人。国家自然科学基金创新群体2个，教育部创新团队2个。

2019年新增中国工程院院士1人，国家百千万人才工程人选者1人，浙江省有突出贡献中青年专家3人，国家杰出青年基金获得者1人，国家优秀青年基金获得者2人。10位教师晋升教授，10位教师晋升副教授。

FIT has 738 full-time faculty and staff members, including 462 faculty members. There are 5 members of Chinese Academy of Engineering and 1 member of Chinese Academy of Sciences, 18 talents of National High-level Talents Special Support Program, 14 professors of “Cheung Kong Scholar Program”, 9 professors of National Bai-Qian-Wan Talent Project, 1 outstanding teacher in universities of MOE, 19 National Distinguished Youth Science Foundation Fellows, 14 National Excellent Youth Science Foundation Fellows, 7 Zhejiang Province Outstanding Experts, 2 Innovative Research Groups of NSFC and 2 Innovative Research Teams of Ministry of Education.

In 2019, 1 professor was elected as Academician of Chinese Academy of Engineering. 1 professor was engaged in the National Bai-Qian-Wan Talent, 1 professor was selected in “Cheung Kong Scholars Program” (Youth Scholar), 3 professors were honored with Zhejiang Province Outstanding Achievement Youth Experts. 1 professor obtained National Science Fund for Distinguished Young Scholars, 2 professors obtained National Science Fund for Excellent Young Scholars, 10 teachers were promoted to full professors and 10 teachers were promoted to associate professors.

教学科研队伍职称结构
Professional Structure

2019年新增 Awarded in 2019

中国工程院院士
Academician of Chinese Academy of Engineering

吴汉明
Wu Hanming

国家百千万人才工程入选者
National Bai-Qian-Wan Talent

卜佳俊
Bu Jiajun

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

潘　纲
Pan Gang

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

时尧成
Shi Yaocheng

钟财军
Zhong Caijun

浙江省有突出贡献中青年专家
Zhejiang Province Outstanding Achievement Youth Experts

鲍虎军
Bao Hujun

陈积明
Chen Jiming

黄文君
Huang Wenjun

教授
Professors


汪凯巍
Wang Kaiwei


蔡云龙
Cai Yunlong


林时胜
Lin Shisheng


王　玮
Wang Wei


徐正国
Xu Zhengguo


柴春雷
Chai Chunlei


郑小林
Zheng Xiaolin


李石坚
Li Shijian

教授
Professors


黄正行
Huang Zhengxing


周　凡
Zhou Fan

副教授
Associate Professors


陈　冰
Chen Bing

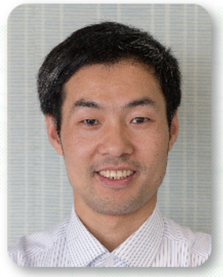

佘　玄
She Xuan


曹　臻
Cao Zhen


Julian Samuel Goodwin Evans

副教授
Associate Professors


王　越
Wang Yue


陈建海
Chen Jianhai


邹　宁
Zou Ning


刘雪松
Liu Xuesong


郑　婧
Zheng Jing


万　浩
Wan Hao

引进教师 New Faculty Members

常　瑞 Chang Rui	邓瑞龙 Deng Ruilong	高　飞 Gao Fei	何水兵 He Shuibing	况　琨 Kuang Kun	李　旻 Li Min	梁　波 Liang Bo	刘　峰 Liu Feng	刘　健 Liu Jian
孟文超 Meng Wenchao	邵天甲 Shao Tianjia	申文博 Shen Wenbo	孙铭阳 Sun Mingyang	谭德志 Tan Dezhi	谭志超 Tan Zhichao	唐晓宇 Tang Xiaoyu	田良飞 Tian Liangfei	田　雨 Tian Yu
王　旻 Wang Min	王　攀 Wang Pan	王则可 Wang Zeke	吴汉明 Wu Hanming	吴　磊 Wu Lei	谢意维 Xie Yiwei	徐金明 Xu Jinming	许贝贝 Xu Beibei	叶慧慧 Ye Huihui
尹勋钊 Yin Xunzhao	于云龙 Yu Yunlong	俞　滨 Yu Bin	张秉晟 Zhang Bingsheng	张东祥 Zhang Dongxiang	张　鹿 Zhang Lu	赵保丹 Zhao Baodan		

科学研究
Scientific Research

2019年度学部到校科研经费逾11亿，比上一年度增长48%，其中，国家自然科学基金获批78项，合计经费逾7043万元，包括杰青1项，优青2项，重点重大项目11项（含联合基金、国际合作）。在研三重项目共42项，其中千万级10项。发表论文SCI收录约730篇，其中高水平论文占50%。获国家授权发明专利近300项。获国家技术发明奖二等奖1项，高等学校自然科学一等奖1项。

In 2019, the total research funding of FIT reached over 1100 million RMB. 78 grants with the amount up to 70.43 million RMB were approved by the National Natural Science Foundation of China (NSFC), including 1 project for distinguished young scholars, 2 projects for excellent young scholars. Meanwhile, there were 10 new projects supported with over ten million each, 730 papers were indexed by SCI and 300 national patents have been approved this year. 1 project was awarded the 2nd Prize of National Technology Invention Award, 1 project was awarded the 1st prize of the Natural Science Award of MOE.

国家研究基地 National Research Bases

- 国家研究基地 National Research Bases
  - 国家重点（工程）实验室 State Key (Engineering) labs
    - 计算机辅助设计与图形学国家重点实验室 State Key Laboratory of CAD&CG
    - 现代光学仪器国家重点实验室 State Key Laboratory of Modern Optical Instrumentation
    - 工业控制技术国家重点实验室 State Key Laboratory of Industrial Control Technology
    - 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
  - 国家工程研究中心 National Engineering Research Centers
    - 国家光学仪器工程技术研究中心 National Engineering Resarch 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 Research Centre for Train Intelligent

研究所 Institutes

学 院 College of	研究所名称 Institute	所 长 Director
光电科学与工程学院 Optical Science & Engineering	光学工程研究所 Inst. of Optical Engineering	白 剑 Prof. Bai Jian
	光学成像与检测技术研究所 Inst. of Optical Imaging and Detection Technology	徐之海 Prof. Xu Zhihai
	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
	激光生物医学研究所 Inst. of Laser Biomedicine	丁志华 Prof. Ding Zhihua
	光及电磁波研究中心 Center for Optical & Electromagnetic Research	何赛灵 Prof. He Sailing
	微纳光子学研究所 Inst. of Microphotonics and Nanophotonics	邱建荣 Prof. Qiu Jianrong
信息与电子工程学院 Information Science and Electronic Engineering 微电子学院 Microelectronics	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
	微纳电子研究所 Inst. of Microelectronics and Nanoelectronics	程志渊 Prof. Cheng Zhiyuan
	超大规模集成电路设计研究所 Inst. of VLSI Design	张 明 Prof. Zhang Ming
	微电子集成系统研究所 Inst. of Integrated Microelectronic Systems (IMS)	储 涛 Prof. Chu Tao
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
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	何钦铭 Prof. He Qinming
	现代工业设计研究所 Inst. of Modern Industrial Design	孙守迁 Prof. Sun Shouqian
生物医学工程与仪器科学学院 Biomedical Engineering & Instrument Science	生物医学工程研究所 Inst. of Biomedical Engineering	夏 灵 Prof. Xia Ling
	数字技术及仪器研究所 Inst. of Digital Technology & Instrument	陈耀武 Prof. Chen Yaowu
	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

科研亮点 Research Highlights

1. 学部青年创新奖 | Youth Innovation Awards

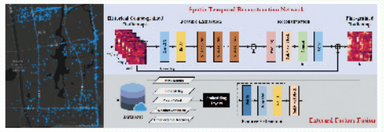
贺诗波 研究员
控制学院

研究方向： 智能物联网

简介： 主要从事智能物联网方面的研究工作，提出了多维度复杂物联系统关键状态信息辨识方法，揭示了多尺度感知对象下网络化感知问题之间的相互转化规律，构建了融合感知质量要求和应用特性的可扩展分布式协同感知机制。主持国家自然基金联合重点项目、科技部科技创新2030重大项目课题等，部分理论成果获2019年教育部自然科学一等奖，相关技术在重大基础设施安全监测等领域应用。

Artificial Intelligence of Things (AIoT)

The researcher has proposed a framework to efficiently identify the critical system status information in multi-dimensional complex systems, revealed the intrinsic relationship of network sensing problems for different spatial dimensions of sensing targets, and designed the scalable distributed intelligent sensing mechanism. He won the 1st prize of the Natural Science Award of MOE, because of his theoretical contribution to AIoT, and the research results have been applied to major infrastructure safety monitoring and other areas. His research has been supported by NSFC-Zhejiang joint major project, and sci& tech innovation 2030 program of MoST.



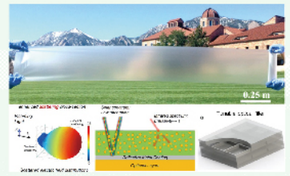
马耀光 研究员
光电学院

研究方向： 纳米光子学及其应用

简介： 主要从事超材料、超表面等微纳光子学器件的研究工作。研究介观尺度光与物质相互作用，以及微/纳米技术在光子学、电子学、及能量输运系统中的应用。设计了随机结构的超材料光学薄膜，实现了接近零能耗的辐射制冷效应，揭示了光学超材料结构对红外辐射率的增强机制，首次实现了具有可大规模卷轴式（R2R）生产的辐射制冷薄膜。并提出了辐射制冷的动态调控新方法，为这一技术的实用化提供了更加新颖的应用方向。代表性工作被Nature, Science, Nature Photonics 等学术期刊与The Forbes, Economists等百余家新闻媒体报道。

Nanophotonics and Its Applications

The researcher focuses on the development of metamaterials and metasurface related devices in the field of nanophotonics. His research interests are in the fundamentals of nanoscale light-matter interactions and the advanced applications of micro/nanotechnologies in photonic, electronic, and energy systems. His notable contributions include laying out the innovative metamaterial structural designs for the hybrid random metamaterials for radiative cooling, developing novel scalable Nano-manufactured method for 300-mm-wide metamaterial thin film, and realizing the first experimental demonstration of the scalable-manufactured highly efficient radiative cooling technology. His research work and accomplishments have been reported and highlighted by various media channels.



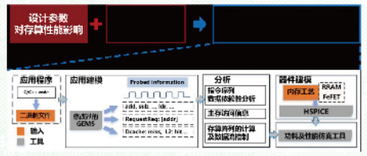
卓 成 研究员
信电学院

研究方向： 集成电路设计与设计自动化

简介： 主要从事集成电路设计及设计自动化的研究工作，在高能效计算、深度学习算法与架构、以及设计自动化等方面取得了一系列创新性成果，通过低功耗芯片电源优化/管理，高能效电路优化及架构设计等技术有效提高了高能效芯片/系统计算效率及可靠性。近三年发表论文40余篇，包括CCF推荐A类论文10篇，作为项目负责人承担了国家重点研发计划（中日合作）等多个课题。日本大阪大学客座教授，IEEE异构集成路线图工作组成员，以及IEEE Trans. on CAD等多个国际期刊编委编委等。

VLSI Design and Design Automation

The researcher focuses on VLSI design and design automation, spanning from energy efficient computing, deep learning algorithm and architecture, to design automation algorithms. His most recent work includes low power chip power optimization/management, energy efficient data migration and storage circuit/ architecture, which has led to improved performance, enhanced reliability, and reduced power for energy efficient computing chip and system.



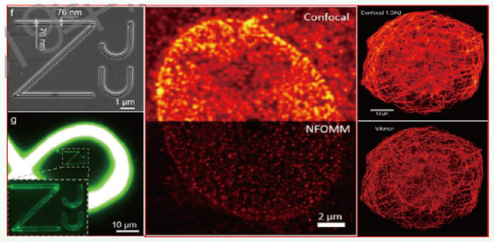
2. 重大重点项目及进展 | New Important Projects and Significant Progress

❶ 超分辨光学微纳显微成像技术

光电学院刘旭教授领衔的该项目获2019年国家技术发明二等奖。项目攻克了标记和无标记均兼容的普适性超分辨显微难题以及超分辨成像中视场与分辨率无法兼容的难题，提出了移频的超分辨新方法，发明了虚拟移频技术与宽场表面波移频新技术，成功研制了系列超分辨光学显微成像仪器。该项目与我国最大的显微镜企业合作，打破了我国高端显微镜基本空白的现状，建成了我国自主高端显微镜体系，产品销往全国各地和美国、荷兰、印度、南非、日本、新加坡等地区，近年来形成了2.23亿的产值。获授权发明专利55项，其中PCT专利1项，发表SCI论文107篇。

Micro-/Nanoscale Super-Resolution Imaging

The project directed by Prof. Liu Xu won the 2nd Prize of National Technology Invention Award in 2019. This project could obtain label and label free super-resolution imaging simultaneously. It also enables a large field of view and high-resolution super-resolution imaging in a convenient method. To achieve this, this project creatively proposed the spatial-frequency shift method. Based on this principle, virtual k-space spatial-frequency shift and wide-field surface wave spatial-frequency shift techniques have been invented, and a series of super-resolution instruments have been successfully developed. In cooperation with China's largest microscope company, this project has been the breakthrough of China's high-end microscopes and established our high-end microscope system. The products of this project have been sold in China and exported to other countries, such as the USA, Netherlands, India, South Africa, Japan, and Singapore. The project has created 223 million RMB benefits in recent years.

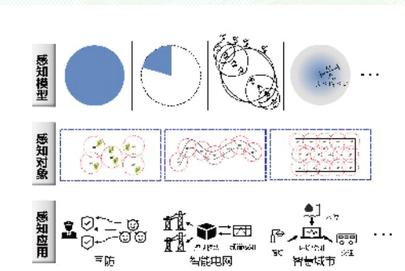


❷ 多维智能感知的基础理论与方法

控制学院陈积明教授负责的该项目获2019年高等学校自然科学奖一等奖。项目围绕感知需求的多样化及环境的复杂动态性，从感知模型、感知对象、感知应用三个维度，在多模态感知的统一表达、多尺度感知的内在关联、分布式自主智能的感知机制等三方面取得了新突破，解决了感知模型的可表达性、感知对象的可转化性、感知应用的可扩展性等难题，形成了多维度智能感知理论与方法。

Multi-dimensional Smart Sensing: Theory and Method

The project directed by Prof. Chen Jiming won the 1st prize of the Natural Science Award of MOE in 2019. In order to tackle the challenges caused by the diverse sensing requirements and complicate sensing environments, the project focused on the dimensions of the sensing models, the sensing targets, and the application scenarios. Funded by the NSFC, this project has made breakthroughs in three aspects: the unified formulation of network coverage problems under different sensing models, the intrinsic relationship among network coverage problems for different spatial dimensions of sensing targets, and the scalable distributed mechanism of autonomous intelligent sensing. The project therefore provides a new perspective of understanding the theory and method of multi-dimensional intelligent sensing.



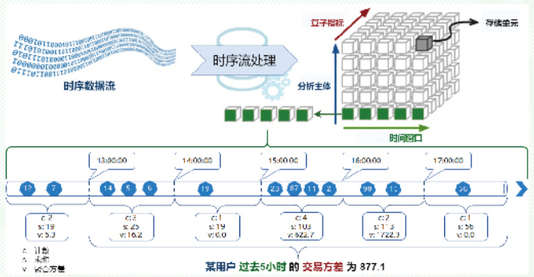
多维度智能感知的基础理论与方法

❸ 流式大数据实时智能处理技术及平台应用

计算机学院陈刚教授和陈纯院士负责的该项目获2019年中国电子学会科技进步奖特等奖。项目攻克了时序大数据的实时处理、面向全域时序数据的知识挖掘、时序数据驱动的“实时+智能”决策等三大层层递进的技术难题，成功研制了技术平台。成果在金融、网络安全、国防军工等行业的国家计算机网络与信息安全管理中心、银联商务等400多家单位得到广泛应用；为网易数百款互联网产品提供流式大数据实时智能分析支撑，为10亿多互联网用户和10多万家企业用户提供服务，近三年新增销售额28.63亿元。共授权发明专利25项，登记软件著作权11项，发表高水平学术论文42篇。

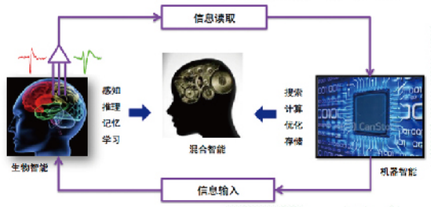
Streaming Big Data Real-Time Intelligent Processing Technology and Platform Application

The project directed by Academician Chen Chun and Prof. Chen Gang won the Grand Prize of Sci &Tech Progress Award of China Institute of Electronics in 2019. This project conquered three key difficult problems, including real-time processing of time sequence big data, global time sequence data oriented knowledge mining, and time sequence data driven real-time intelligence decision making. The products of this project have been widely applied in more than 400 enterprises and institutions, such as UnionPay Business, Industrial Bank, CNCERT and etc, and provide streaming big data real-time intelligence analysis supporting for hundreds of internet products such as e-commerce, online entertainment, education and e-mail under NetEase group. The products of this project served more than 1 billion internet users and more than 100,000 enterprise users as a cloud service, which sales of 2.86 billion yuan in recent three years.



④ 脑机混合智能

由计算机学院潘纲教授负责的该项目获批2019年国家杰青基金资助。潘纲教授主要从事于人机融合智能计算的理论与方法研究。本项目拟重点研究神经信息的多脑区多尺度协同解码、脑在回路的脑机互学习、神经光电声刺激的感知–行为调控增强、脑在回路的混合增强智能系统原型等，致力于建立脑机混合智能的理论与技术体系。

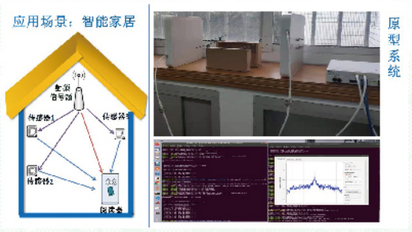


Brain-Machine Intelligence

The project, directed by Prof. Pan Gang, is supported by NSFC for Distinguished Young Scholars in 2019.Prof. Pan's group has been doing lots of work on automatic user sensing, human-oriented pervasive service, neural modeling and decoding, and cyborg intelligence. This project will focus on neural decoding across cortical areas, brain-in-loop learning, multimodal neural modulation, and brain-in-loop cyborg intelligent prototypes. The object is to establish basic principles and technical systems of brain-machine intelligence.

⑤ 多天线协同传输理论与方法

由信电学院钟财军教授负责的该项目获批2019年基金委国家优秀青年基金资助。他长期从事多天线协同通信理论与方法研究，在多天线协同通信系统容量理论、多天线协同传输方法与自适应机制和多天线信息与能量协同传输方法三个方面取得了一系列创新性研究成果。未来拟开展工作着眼于大规模接入体制，重点解决基于大规模天线的非正交接入系统的容量理论、传输方法和信号检测技术。

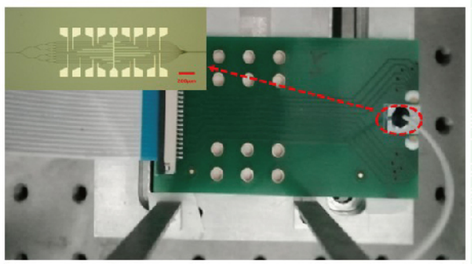


Multi-antenna Cooperative Transmission: Theory and Techniques

The project is supported by NSFC for Excellent Young Scholars in 2019. The research interest of Prof. Zhong Caijun is mainly in the area of multi-antenna cooperative communications, and he has made significant contributions in understanding the capacity of multi-antenna cooperative communication systems, designing efficient adaptive multi-antenna cooperative transmission mechanism, as well as multi-antenna simultaneous wireless information and power transmission methods. In the future, the project aims to tackle the key issues in massive access systems, with particular focus on the fundamental capacity limits, transmission methods and signal detection techniques of massive MIMO non-orthogonal multiple access systems.

⑥ 硅基光子集成

由光电学院时尧成教授负责的该项目获批2019年基金委国家优秀青年基金资助。他长期从事硅基光子集成器件及其应用的研究，先后研制出超小型偏振分束器件、波分复用器、高性能微腔以及硅基高速多通道片上集成芯片，为发展硅基光波导光子集成提供了新思路和新方法。未来拟研究面向多维复用片上光互连的动态可重构功能芯片，探索新结构与新机理，实现多维复用动态路由、上下路光插分复用等功能芯片。



Silicon-Based Photonic Integration

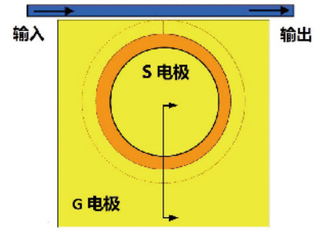
The project is supported by NSFC for Excellent Young Scholars in 2019. Prof. Shi Yaocheng has been engaged in silicon waveguides based integrated devices and their applications. He has developed ultra-compact polarization beam splitters, wavelength division multiplexers, and mode multiplexers. In the future, the project will focus on exploring new structures and mechanisms enabling dynamic reconfigurable functions for multi-dimensional multiplexed on-chip optical interconnects. Functional chips such as multi-dimensional multiplexing dynamic router, reconfigurable mode add-drop multiplexer will be developed.

⑦ 超快响应和超低能耗的硅基片上模场调控及器件研究

由光电学院戴道锌教授负责的该项目获批2019年基金委重大研究计划资助。项目聚焦于硅基片上模场调控，从新光波导结构、新光功能材料、新光器件结构等三方面着手，研究片上光–物质相互作用及其增强机制，探索其调控速度及能耗物理极限，发展新一代超快响应和超低能耗的硅基片上模场调控技术及器件，以满足未来超大容量和超低能耗光信息传输与处理发展需求。

Silicon-Based on-Chip Guided-Mode Manipulation Devices with Ultrafast Responses and Ultra-Low Power

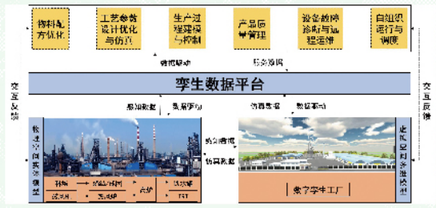
The project, led by Prof. Dai Daoxin, is supported by the NSFC Major Research Program in 2019. This project is for on-chip manipulation of guided-modes in silicon nanophotonic waveguides and devices. It is desired to break the physical limit of the response speed and the energy efficiency for on-chip mode manipulation by introducing novel optical waveguides, novel optical materials as well as novel photonic devices. It will play a very important role for the realization of next-generation ultra-high capacity optical transmission and processing systems.



⑧ 基于混合增强智能的大型高炉故障诊断与自愈控制基础理论与关键技术

由控制学院杨春节教授负责的该项目获批2019年基金委重点项目资助。项目未来拟重点研究人机协同的学习与决策机制、人机协同决策结果置信度评价方法、非平稳工况下异常炉况智能检测、非平衡样本下异常炉况智能分类、复杂运行环境下异常炉况智能溯源与自愈控制理论和方法。

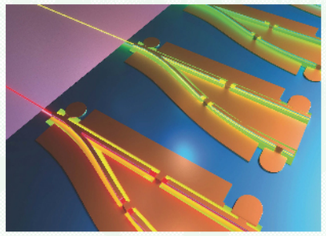
Basic Theory and Key Technologies for Fault Diagnosis and Self-Healing Control of Large Blast Furnace Based on Hybrid-Augmented Intelligence



The project, led by Prof. Yang Chunjie, is supported by key program of NSFC in 2019. It will focus on the study of the learning and decision-making mechanism of human-machine collaboration, the reliability evaluation method of human-machine collaborative decision results, the intelligent detection of abnormal furnace conditions under non-stationary conditions, the intelligent classification of abnormal furnace conditions under unbalanced samples and the intelligent traceability and self-healing control theory of abnormal furnace conditions under complex operation environment.

⑨ 单模宽调谐中红外锑化物带间级联激光器研究

由光电学院何建军教授负责的该项目获批2019年基金委重点国际合作项目资助，同时获得美国NSF的国际合作项目资助。可调谐中红外激光器在环境监测、气体传感、激光雷达、红外对抗等领域有广阔的应用前景。本项目采用合作者杨瑞青教授发明的带间级联量子阱材料和何建军教授发明的V型腔结构开发高单模选择性的可调谐中红外激光器，不需要光栅制作等复杂工艺，克服目前锑化物材料体系结构设计、器件工艺等方面的难题，在大范围可调谐中红外半导体激光器的关键技术上取得突破。



Single Mode Widely Tunable Mid-Infrared Antimonide-Based Interband Cascade Lasers

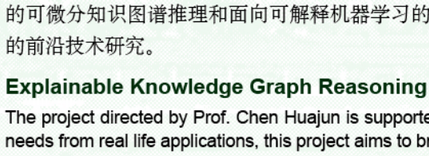
The project, led by Prof. He Jianjun, is jointly supported by Major International Collaboration Project of NSFC and by NSF of USA in 2019, Mid-infrared laser has a wide range of applications in environmental monitoring, gas sensing, laser radar, and so on. Using the interband cascaded quantum-well material invented by Prof. Yang Ruiqing, the collaborator from Oklahoma University, and the V-coupled cavity laser structure invented by Prof. He Jian-Jun of ZJU, the project will develop tunable mid-infrared laser with high single-mode selectivity, without requiring complex grating fabrication process. It aims to overcome the challenges in device design and fabrication technologies of the antimonide material system, to break through the bottleneck in the key technologies for realizing widely tunable mid-infrared semiconductor lasers.

⑩ 双向脑机接口的互适应理论与关键技术研究

由计算机学院潘纲教授负责的该项目获2019年联合基金重点项目支持。目前的脑机接口技术存在普适性、自适应性以及融合性不足等问题，本项目重点研究双向脑机接口的互适应理论与技术。主要内容包括：脑机双向互适应计算模型、自适应动态神经解码技术、面向互适应的外部信息输入与多模态反馈和脑在回路的脑机互适应学习方法。在此基础上，两个原型验证系统，加速实现兼具人类智能体和机器智能体优势的新型智能形态。

Co-Adaptive Models and Techniques for Brain-Machine Interfaces

Brain-machine interfaces (BMI) have great potential in applications in military and medical fields. However, it still lacks universality and adaptive ability, which is a serious problem in practical applications. This project focuses on co-adaptive theories and methods for BMIs. Its content mainly includes computational model for bi-directional BMIs, dynamic adaptive decoding, multi-modal feedback, and brain-in-the-loop co-adaptive learning methods. The prototype systems of non-invasive rehabilitation and invasive motor control will also be built for evaluation. This project will further accelerate the realization of a new intelligent system that integrates the advantages of human intelligence and machine intelligence. The project led by Prof. Pan Gang is supported by Key Program of NSFC Joint Fund in 2019.



⑪ 面向APT网络攻击链的智能检测与溯源方法及关键技术研究

由计算机学院纪守领研究员负责的该项目获2019年联合基金重点项目支持。该项目针对APT网络攻击的持续、隐蔽、多样和动态的特点，研究面向APT网络攻击链的智能检测与溯源理论和技术体系，从内在机理、数据特征、攻击载体、演化模型、原型系统等五个方面对APT网络攻击进行全方位、多层次的理论和技术研究。成果有望为APT网络攻击智能检测与溯源提供高效实用的理论与技术支撑。

Methodologies and Key Technologies of Intelligent Detection and Tracing of APT Attacks

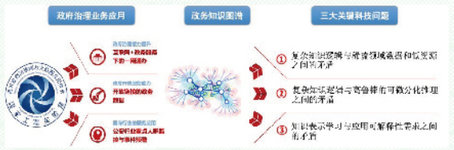
The project is led by Researcher Ji Shouling and supported by Key Program of NSFC Joint Fund in 2019. Considering the persistent, stealthy, diverse and dynamic characteristics of APT attacks, this project studies the theory and key techniques for intelligent detection and tracing of APT attacks. A comprehensive and multi-layered theory and technique study against APT attacks will be conducted from five aspects, including internal mechanism, data characterization, attack vectors, evolution models, and prototype systems. The research is expected to shed light on new theories and technologies of APT detection, analysis and tracing.

⑫ 面向复杂推理的可解释知识图谱技术及在政府治理中的应用研究

由计算机学院陈华钧教授负责的该项目获2019年联合基金重点项目支持。该项目旨在突破复杂推理与可解释知识图谱技术等人工智能瓶颈科技问题，重点研究面向稀疏领域的高精度知识图谱构建方法、面向复杂知识逻辑的可微分知识图谱推理和面向可解释机器学习的知识图谱技术等一系列创新技术，并开展面向政府治理领域应用的前沿技术研究。

Explainable Knowledge Graph Reasoning and Applications in e-Government

The project directed by Prof. Chen Huajun is supported by Key Program of NSFC Joint Fund in 2019. Focusing on the urgent needs from real life applications, this project aims to break through bottleneck technologies in artificial intelligence and carry out basic research for specific domains. This project proposes a serial of novel techniques including few-shot knowledge graph extraction under low resources, axiom or rule injection for differential knowledge graph reasoning with complex logic, knowledge-based transfer learning explanation and interpretable knowledge graph reasoning, and the applications in two real life scenarios including government governance and public security.

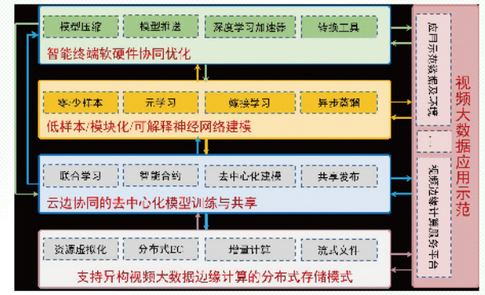


⑬ 云边协同的智能视频大数据边缘计算

由计算机学院肖俊教授负责的该项目获2019年联合基金重点项目支持。项目力争突破支持异构视频大数据边缘计算的分布式存储模式、支持云边协同的去中心化模型训练与共享、面向边缘计算的低样本学习及可解释、模块化神经网络建模和智能终端软硬件协同优化等理论技术难点，构建面向广域视频网的低延时、低负荷、低能耗和高效率的新型视频大数据边缘计算原型系统并进行应用示范。

Cloud-Edge Computing for Intelligent Video Analysis

The project directed by Prof. Xiao Jun is supported by Key Program of NSFC Joint Fund in 2019. The research project will break through theoretical and technical difficulties such as the distributed storage schemes that support heterogeneous video big data edge computing, decentralized model training and sharing with cloud edge collaboration, few-shot learning for edge computing, interpretable and modular neural network modeling for edge computing, and cooperative optimization of software and hardware for intelligent terminals. The project will build and demonstrate a novel video big data edge computing protosystem for wide area video network with low delay, low load, low energy consumption and high efficiency.

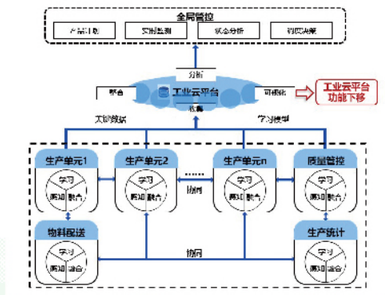


⑭ 面向网络化智能制造的分布式自主学习理论与方法

由控制学院贺诗波研究员负责的该项目获2019年联合基金重点项目支持。该项目重点探索网络化智能感知的新方法，构建高效的制造数据时空配准及融合技术，形成基于数据融合的多环节协同自主学习理论体系，将为智能制造提供关键数据和技术支撑，有望提升工厂运行效率、生产精度以及生产环境监测水平。

Distributed Autonomous Learning for Networked Intelligent Manufacturing

The project directed by Prof. He Shibo is supported by Key Program of NSFC Joint Fund in 2019. To be specific, it will focus on exploring new methods for networked sensing, establishing efficient spatial-temporal registration and data fusion for manufacturing data, and forming a multi-step collaborative and autonomous learning system. This project will not only offer key data and technical support for the global intelligent decision-making, but also improve the overall operation efficiency, production accuracy and production monitoring level.

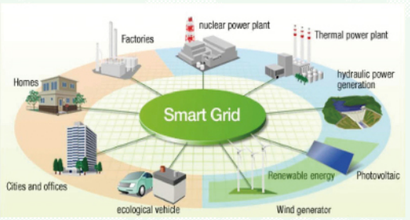


⑮ 电网恶意网络攻击识别及主动防御策略关键技术研究

由控制学院吴争光研究员负责的该项目获2019年基金委联合基金重点项目支持。项目研究工作主要包括：1）实现恶意网络攻击行为建模；2）建立电网工控及管理信息量测恶意攻击的辨识方法，并研究基于模糊–信息推理的恶意网络攻击溯源方法；3）基于博弈论理论，构建电网工控系统主动防御体系。4）实现网络攻击辨识、溯源和主动防御策略的技术验证。

Key Technologies of Power Grid on Malicious Cyber-Attack Identification and Active Defense Strategy

The project is supported by Key Program of NSFC Joint Fund in 2019. The system of information and industrial control has been considered as an effective platform for power system safety analysis and control. Promoting its ability against cyber-attack via the technologies of attack identification and active defense has significant meanings to ensure the safety, stability and efficient operation of power grid. The project will focus on the key technical problems of power grid industrial control and management information system in malicious cyber-attack identified, and active defense system established.



16 无线无源微纳传感器前沿技术

该项目由微电子学院董树荣教授主持，获2019年国家重点研发计划支持，主要开展应用于智能制造的关键传感器新技术研发。项目面对制造中高温、高旋、高压等极端环境，开展基于表面波SAW和LC的无线无源多参数监测传感新技术研发，为智能制造的生产质量控制、设备健康监控、新设备设计实验验证等提供有力的技术支持手段。

Manufacturing Foundation and Key Components

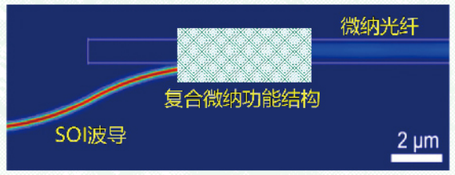
The project, presided over by Prof. Dong Shurong, is supported by the National Key Research and Development Program of China. It focused on development of key sensor new technology in intelligent manufacturing. Aimed on sensing under extreme environments, such as high temperature, high rotation, high pressure, the project will develop new wireless passive multi parameter sensing technology based on SAW and LC, and provide powerful technical support means for production quality control, equipment health monitoring, new equipment experimental verification in intelligent manufacturing.

17 复合微纳体系光子器件及集成

由光电学院童利民教授负责的该项目获批2019年国家重点研发计划资助。该项目拟构建新型复合微纳体系及超高时空分辨系统，发现及利用光子、电子、准粒子相互作用新机制，在微纳尺度上实现光场多维调控，发展超小、超快、低能耗、可集成微纳光子器件及片上光互连技术，实现全光集成芯片功能演示，推动未来信息领域核心芯片与器件的发展。

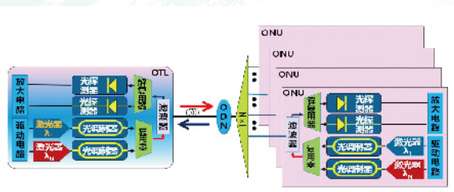
Hybrid Micro-/Nanoscale Systems for Photonic Devices and Integration

The project, led by Prof. Tong Limin, is supported by the National Key Research and Development Program of China. The project plans to build a hybrid micro-/nanoscale systems and ultrahigh space-time resolution microscopy system, discover and utilize the novel effects of photon, electron and quasi-particle interaction, realize multi-dimensional manipulation of light field on micro-/nanoscale, develop ultra-small, ultra-fast, low energy consumption photonic devices and on-chip interconnection technology, demonstrate all-optical functionalities on a single chip, and develop the key devices for future on-chip information technology.



18 光接入用100G PON核心硅基光电子器件

由光电学院戴道锌教授负责的该项目获批2019年国家重点研发计划支持。该项目瞄准大数据时代25/50/100G超宽带接入网这一重大需求，着重研究100G PON 核心硅基光电子器件，并研制收发一体化硅基光集成芯片及其密集封装高速光电模块与工程样品，为下一代 PON 接入网奠定核心器件基础。本项目研制的器件及模块关键技术也可扩展至长距离光纤通信及超短光互联网络，具有广阔的应用前景。

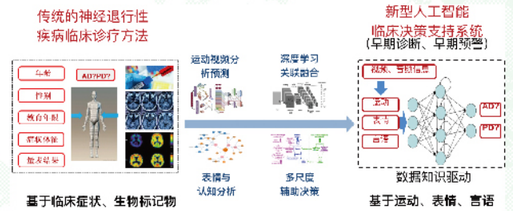


Silicon Photonics for 100G PON

The project led by Prof. Dai Daoxin is supported by National Major Research and Development Program in 2019. Aiming at the increasing demands of 25/50/100G PON, this project mainly focuses on silicon photonics for 100G PON, including passive and active devices as well as the transceiver chips. This will play a very important role for the realization of next-generation PONs. The key technologies developed in this project can also be extended to the applications of long-distance optical fiber communications and short-distance optical interconnects.

19 新型人工智能算法及其神经退行性疾病应用研究

由生仪学院周泓教授负责的该项目获2019年国家重点研发计划项目资助。项目重点探讨阿尔茨海默病（AD）、帕金森病（PD）患者的运动、微表情变化与脑功能的关系与神经机制，并基于机器视觉和深度神经网络研发突破人体姿态估计和步态异常监测关键技术，最终建立常见神经退行性疾病的早期诊断辅助系统，并进行大型综合医院场景下的医学诊断信息系统嵌入与应用验证，为神经系统慢病的防治提供理论依据和智能诊断系统。



A Novel Artificial Intelligence Approach to Diagnose Neural Degenerative Diseases

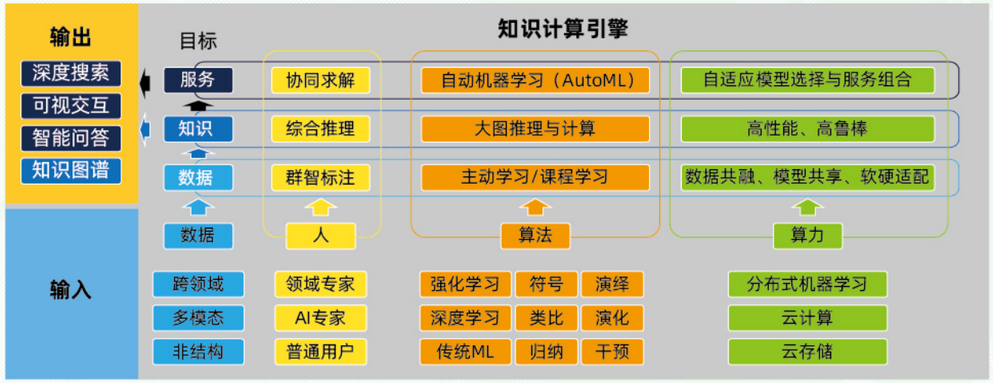
The research led by Prof. Zhou Hong is supported by the National Key R & D Program of China. The project will develop novel deep-learning algorithms to diagnose Alzheimer's disease and Parkinson's disease based on the posture, gait, and facial expressions, and integrate these algorithms into an embedded system that will be tested in multiple major hospitals. The final product of the project will contribute to intelligent prevention and diagnosis of neural degenerative diseases.

20 可泛化的领域知识学习与计算引擎

由计算机学院庄越挺教授负责的该项目获2019年科技创新2030新一代人工智能重大项目支持。围绕永不停息的自主归纳和学习机制，以及知识服务能力的迁移泛化两个核心科学问题，确立“从跨领域知识自动归纳与迁移，到可泛化的知识演化与协同推理，再到永不停息的自主知识学习与计算服务”的研究思路，设置自动化知识发现与图谱构建、知识图谱演化及协同推理、可泛化的领域知识计算引擎框架与平台等重点任务，同时在安防风控和工程科技两个知识密集型领域进行验证。

Generalization of Domain Knowledge Learning and Computing Engine

The project, led by prof. Zhuang Yueting, is supported by the National Key Research and Development Project 2030 for AI. The project mainly focuses on two core scientific problems: never-ending active induction and learning mechanism, and transfer of knowledge service capabilities. According to them, the research approach can be decomposed into three steps: 1) cross-domain automatic knowledge induction and transfer; 2) generalizable knowledge evolution and collaborative reasoning; 3) active knowledge learning and computing services. Specifically, it consists of multiple key tasks, such as automatic knowledge discovery and graph construction, knowledge graph evolution and collaborative reasoning, and generalizable domain knowledge computing engine framework and platform. Meanwhile, it demonstrates their effectiveness in two knowledge-intensive domains: security risk control and engineering technology.

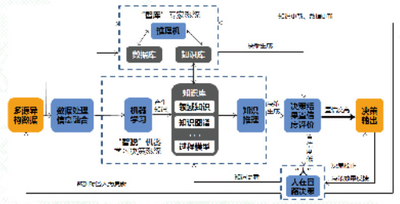


21 基于工业互联网平台的流程行业生产线数字孪生系统

本项目在研究流程工业数据高效可靠传输、多源异构数据多时空尺度建模、数字孪生系统安全机制等关键技术基础上，构建孪生数据平台，建立数字孪生模型，建成包括物料配方优化、工艺参数设计优化与仿真、生产过程建模与控制、设备故障诊断与远程运维、产品质量管理、生产自组织运行与调度优化六大解决方案的流程行业生产线数字孪生系统。通过平台的应用示范、对外培训服务、市场宣传等推广方案，完成相应的技术应用指标。该千万级项目负责人是控制学院杨春节教授。

Digital Twin System of Process Industry Production Line Based on Industrial Internet Platform

Based on the research of key technologies such as efficient and reliable transmission of data, multi-source heterogeneous data fusion, multi-temporal and spatial scale modeling, and digital twin system security mechanism, the project will construct the twin data platform and the digital twin model. The digital twin system provides six solutions including material formula optimization, process parameter design and optimization, production process modeling and control, equipment fault diagnosis and remote maintenance, product quality management, production self-organizing operation and scheduling optimization. Through the application and demonstration of the platform, external training services, market publicity and other promotion programs, the project will complete the corresponding technical application indicators. The project is directed by Prof. Yang Chunjie.



22 非完全信息条件下的博弈决策

由计算机学院张国川教授负责的该项目获2019年科技创新2030新一代人工智能重大项目支持。本项目将融合计算博弈、优化控制和新型机器学习方法，分别从博弈决策的三个不同的角度，即博弈者、分析者和设计者，建立复杂环境下数据驱动的不完全信息博弈理论及方法论，突破动态博弈的人工智能基础模型和动力学机制，发展人机对抗和经济活动中的智能博弈算法和软件系统。

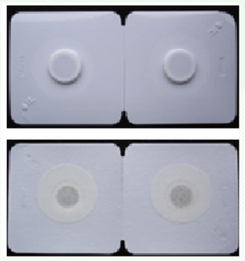
Game Theory and Decision Methodology with Incomplete Information

The project, led by Prof. Zhang Guochuan, is supported by the National Key Research and Development Project 2030 for AI. The project is going to figure out the meeting points of algorithmic game theory, optimization methodology and novel machine learning techniques. By taking three different roles, respectively, in game systems, i.e., players, analyzers and mechanism designers, it aims to establish a fundamental framework of data-driven game theory with incomplete information, break through the barriers in AI models and mechanisms of dynamic games, and develop AI game methods and software platforms in man-machine confrontation and economics.

23 基于脐融透皮给药关键技术的中药新药辛荑贴片研究

由生仪学院田景奎教授负责的该项目获批2019年国家科技重大专项资助。本项目在临床疗效确认的基础上，经过生物大数据筛选分析，确定符合现代药理学的有效组分，分别提取细辛和吴茱萸的有效部位，研制成治疗复发性口腔溃疡的脐用组分中药新药。脐部给药使用过程中不与口腔患处接触，通过脐中穴透皮吸收发挥作用，避免用药刺激溃疡处引起疼痛及被唾液冲刷，使用过程中无痛苦，克服了现在临床制剂的不足。

Research on New TCM Drug “Xinyu Patch” Based on Navel Transdermal Delivery System



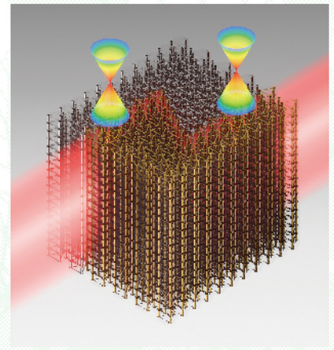
This project, directed by Prof. Tian Jingkui, was supported by National Sci & Tech Major Program in 2019. With confirmation of clinical efficacy, this project determined the effective components conforming to modern pharmacology through screening and analysis of biological Big Data. Effective parts within asarum and evodiarudocardia were extracted and developed into a new Chinese-patent medicine, for treatment of recurrent oral ulceration with direct application through umbilical cord. Administration through umbilical cord avoids contact with the affected part in mouth. Functioning through transdermal absorption in the middle of the umbilicus largely reduces pain from oral administration or low efficiency from saliva scouring, which eliminates suffering during treatment and overcomes the shortage of current clinical preparations.

3. 年度代表性论文 Recommended Papers

1 Realization of a Three-Dimensional Photonic Topological Insulator

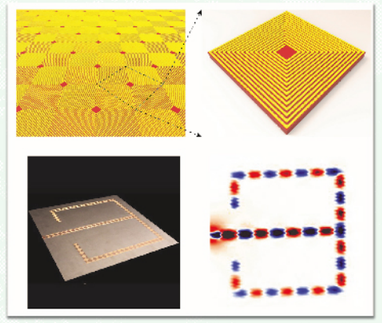
作者: Yihao Yang, Zhen Gao, Hongsheng Chen; 等
来源: NATURE 卷：565 页：622-626 出版年：JAN 2019

We experimentally demonstrate a 3D photonic topological insulator with an extremely wide 3D topological bandgap based on split-ring resonators. By using direct field measurements, we map out both the gapped bulk band structure and the Dirac-like dispersion of the photonic surface states, and design a novel waveguide propagating robustly along a non-planar surface. Our work extends the family of 3D topological insulators from fermions to bosons, realizes the first 3D topological photonics bandgap, and paves the way for applications in topological photonic cavities, circuits and lasers in 3D geometries.



2 Type-I Hyperbolic Metasurfaces for Highly-Squeezed Designer Polaritons with Negative Group Velocity

作者: Yihao Yang, Pengfei Qin, Hongsheng Chen; 等
来源: NATURE COMMUNICATION 卷：10 文章号：2002 出版年：MAY 2019

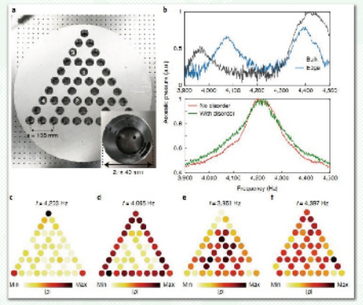


We propose a concept of type-I hyperbolic metasurface with anisotropic magnetic responses, consisting of a single-layer coil array and characterized by a negative/positive out-of-plane/in-plane permeability. By directly imaging near-field distributions, we experimentally observe a cone-like dispersion in reciprocal space with a remarkably high effective refractive index and achieve an entire integrated polariton circuit. Our work may serve as an alternative platform in polaritonics and may find many potential applications in electromagnetic wave sensors, wireless energy transfer and so on.

3 Acoustic Higher-order Topological Insulator on a Kagome Lattice

作者: Haoran Xue, Yahui Yang, Fei Gao;等
来源: NATURE MATERIALS 卷：18 页：108-112 出版年：FEB 2019

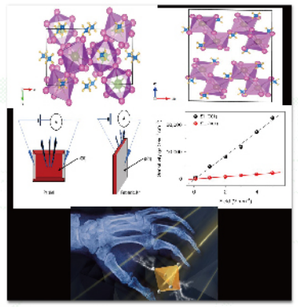
Two-dimensional higher-order topological insulators (TI) exhibit topologically protected zero-dimensional corner states instead of one-dimensional gapless edge states. We experimentally realize a second-order TI in an acoustic kagome metamaterial with zero quadrupole polarization, unlike previous realizations. We show experimentally that topological states exist at acute angled corners of the kagome lattice, but not at obtuse-angled corners. The topological states may have useful applications in biomedical microfluidic devices and high-precision acoustic sensors.



4 Highly sensitive X-ray Detector Made of Layered Perovskite-Like (NH4)(3)Bi2I9 Single Crystal with Anisotropic Response

作者: Renzhong Zhuang, Xueji Wang, Yang (Michael) Yang; 等

来源: NATURE PHOTONICS 卷：13 期：9 页：602–608 出版年：SEP 2019



The effective detection of X-ray radiation with low threshold is essential to many medical and industrial applications. In this work, we show that low dimensional perovskite-like (NH4)3Bi2I9 device provides unique anisotropic X-ray detecting performance with different crystal directions, effective suppression of ion migration and a low detection limit of 55 nGyair s−1. These results will motivate new strategies to achieve a high-performance X-ray detector by utilizing 2D layered perovskite or perovskite-like materials, without requiring toxic elements.

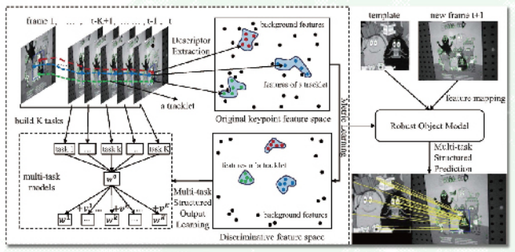
5 Multi-Task Structure-aware Context Modeling for Robust Keypoint-based Object Tracking

作者: Xi Li, Liming Zhao, Wei Ji; 等

来源: IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE

卷：41 期：4 页：915-927 出版年：APR 2019

We propose a robust keypoint tracker based on spatio-temporal multi-task structured output optimization driven by discriminative metric learning. Consequently, temporal model coherence is characterized by multi-task structured keypoint model learning over several adjacent frames; spatial model consistency is modeled by solving a geometric verification based structured learning problem; discriminative feature construction is enabled by metric learning to ensure the intra-class compactness and inter-class separability. We jointly optimize the above three modules in a spatio-temporal multi-task learning scheme.



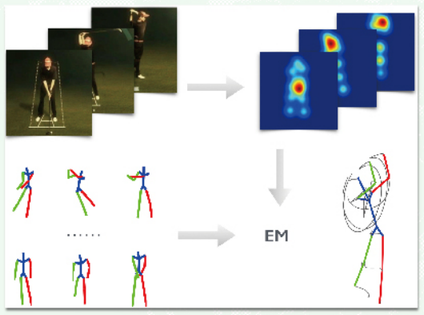
6 MonoCap: Monocular Human Motion Capture using a CNN Coupled with a Geometric Prior

作者: Xiaowei Zhou, Menglong Zhu, Georgios Pavlakos; 等

来源: IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE

卷：41 期：4 页：901-914 出版年：APR 2019

We address the challenging problem of recovering 3D human motion from a monocular video. Deep learning approaches have shown remarkable abilities to learn 2D appearance features. The missing piece is how to integrate 2D, 3D, and temporal information to recover 3D geometry and account for the uncertainties arising from the discriminative model. We introduce a novel approach that treats 2D joint locations as latent variables and unknown 3D poses as a sparse representation, which are solved simultaneously via an Expectation-Maximization algorithm. The extensive evaluation shows the state-of-the-art performance and generalization ability of the proposed method.



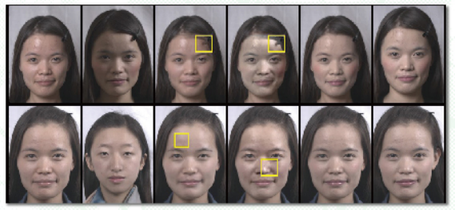
7 Physically-Based Simulation of Cosmetics via Intrinsic Image Decomposition with Facial Priors

作者: Chen Li, Kun Zhou, Hsiang-Tao Wu; 等

来源: IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE

卷：41 期：6 页:1455-1469 出版年：JUN 2019

We present a physically-based approach for simulating makeup in face images. The key idea is to decompose the face image into intrinsic image layers which are each differently affected by cosmetics, and then manipulate each layer according to corresponding models of reflectance. Realistic results are generated in a manner that preserves the personal appearance features and lighting conditions of the target face while not requiring detailed geometric and reflectance measurements.

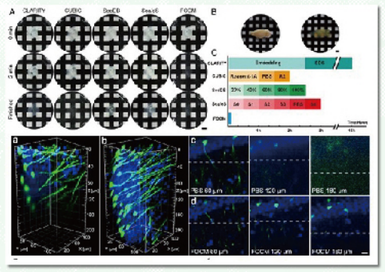


8 Ultrafast Optical Clearing Method for Three-dimensional Imaging with Cellular Resolution

作者: Xinpei Zhu; Limeng Huang; Ke Si; 等

来源: PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA

卷: 116 期: 23 页: 11480-11489 出版年: JUN 2019



Optical clearing is a versatile approach to improve imaging quality and depth of optical microscopy by reducing scattered light. However, conventional optical clearing methods are restricted in the efficiency-first applications due to unsatisfied time consumption, irreversible tissue deformation, and fluorescence quenching. Here, we developed an ultrafast optical clearing method (FOCM) to overcome these limitations. FOCM can rapidly clarify 300-μmthick brain slices within 2 min, which can be widely used in biological optical imaging.

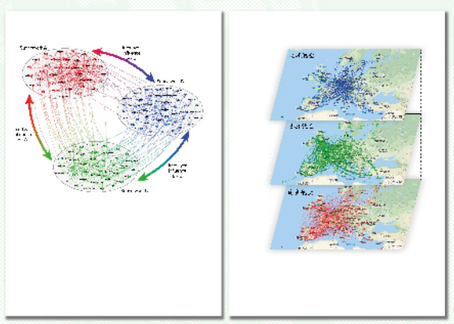
9 A Tensor-Based Framework for Studying Eigenvector Multicentrality in Multilayer Networks

作者: Mincheng Wu, Shibo He, Yongtao Zhang; 等

来源: PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA

卷：116 期：31 页：15407-15413 出版年：JUL2019

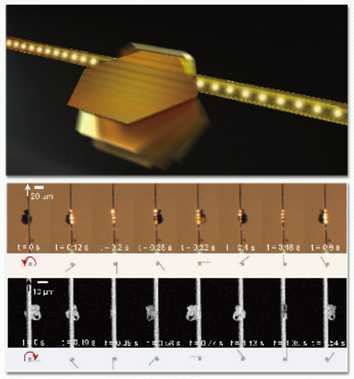
We propose a tensor-based framework to study eigenvector multicentrality, which enables the quantification of the impact of interlayer influence on multicentrality, providing a systematic way to describe how multicentrality propagates across different layers. This framework can leverage prior knowledge about the interplay among layers to better characterize multicentrality for varying scenarios. Two interesting cases are presented to illustrate how to model multilayer influence by choosing appropriate functions of interlayer influence and design algorithms to calculate eigenvector multicentrality.



10 Nanoscale Lamb Wave-Driven Motors in Nonliquid Environments

作者: Jinsheng Lu, Qiang Li, Cheng-Wei Qiu; 等
来源: SCIENCE ADVANCES
卷 : 5 期 : 3 页 : eaau8271 出版年 : MAR 2019

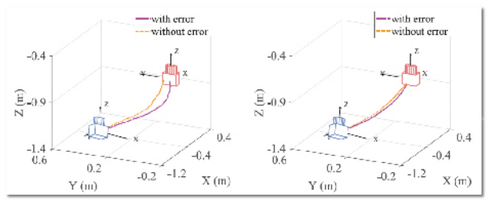
We report rotary locomotion of a micrometer-sized metal plate with ~30 nm thickness, revolving around a microfiber in air and vacuum. This optical motor is powered by pulsed light guided into the fiber as a coordinated consequence of optically excited Lamb wave on the plate and favorable configuration of plate-fiber geometry. The motor, actuated by designed light pulses, crawls stepwise with subnanometer locomotion resolution. Furthermore, we can control the rotation velocity and step resolution by varying the repetition rate and pulse power, respectively. It unfolds unprecedented application potential for integrated micro-opto-electromechanical systems, outer-space all-optical precision mechanics and controls, and laser scanning for miniature lidar systems.



11 Trifocal Tensor-Based 6-Dof Visual Servoing

作者: Kaixiang Zhang, François Chaumette, Jian Chen
来源: INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH
卷 : 38 期 : 10-11 页 : 1208-1228 出版年 : SEP 2019

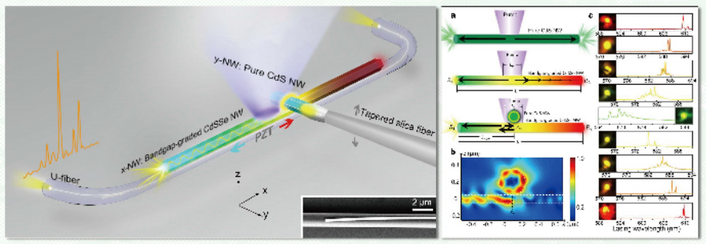
This paper proposes a trifocal tensor-based approach for six-degree-of-freedom visual servoing. The trifocal tensor model among the current, desired, and reference views is constructed to describe the geometric relationship of the system. Instead of resorting to explicit estimation of the camera pose, a set of visual features with satisfactory decoupling properties are constructed from the tensor elements. A visual controller is developed to regulate the camera to a desired pose, and an adaptive update law is used to compensate for the unknown distance scale factor.



12 Fiber-Integrated Reversibly Wavelength-Tunable Nanowire Laser Based on Nanocavity Mode Coupling

作者: Ming-hua Zhuge, Yaoguang Ma, Qing Yang; 等
来源: ACS NANO 卷 : 13 期 : 9 页 : 9965-9972 出版年 : SEP 2019

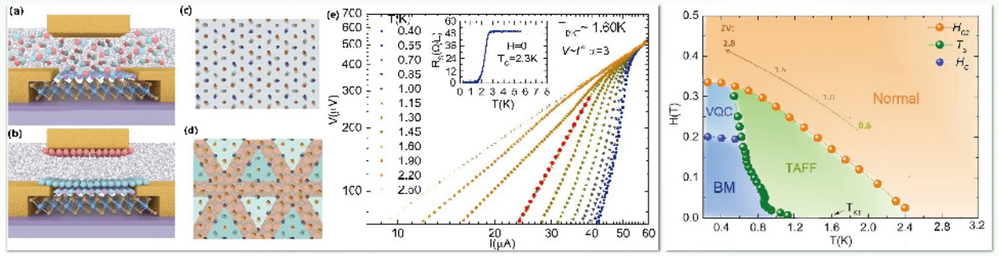
We propose an FP-WGM nanocavity-coupled method to achieve fiber-integrated wide-wavelength reversibly tunable lasers on single bandgap-graded CdSSe NWs. Due to a longer photon lifetime in WGM, Q-factor of an FP-WGM coupling cavity is higher compared to an FP cavity. Consequently, this wavelength-tuning nanolaser covered a 42-nm wide spectrum with high stability and reproducibility; also, a 1.13-nm tuning spectral resolution was realized.



13 Anomalous Quantum Metal in a 2D Crystalline Superconductor with Electronic Phase Nonuniformity

作者: Linjun Li, Chuan Chen, Kenji Watanabe; 等
来源: NANO LETTERS 卷 : 19 期 : 6 页 : 4126-4133 出版年 : JUN 2019

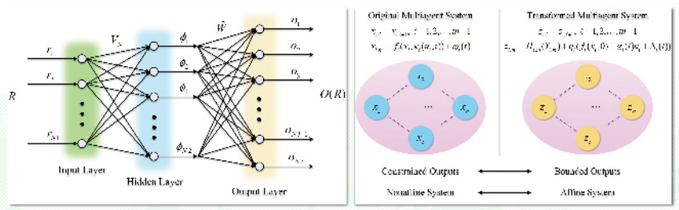
We report the observation of a superconducting to quantum metal transition in 2D ion-gel-gated 1T-TiSe2 (Li et al., 2016) driven by a magnetic field. A field-induced crossover between Bose quantum metal and vortex quantum creeping with an increasing field is observed. From our findings, gate-tunable 1T-TiSe2 emerges as a privileged platform to scrutinize, in a controlled way, the role of coexisting fluctuating orders and, ultimately, to obtain a deeper understanding of the fate of superconductivity in strictly two-dimensional crystals near zero temperature.



14 Output-Constrained Control of Nonaffine Multiagent Systems with Partially Unknown Control Directions

作者: Bo Fan, Qinmin Yang, Sarangapani Jagannathan; 等
来源: IEEE TRANSACTIONS ON AUTOMATIC CONTROL 卷 : 64 期 : 9 页 : 3936-3942 出版年 : SEPT 2019

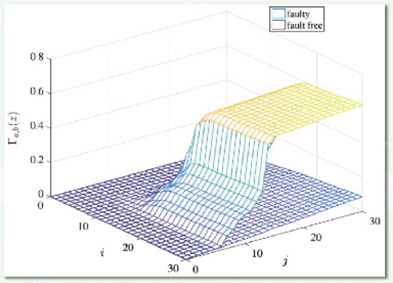
An output-constrained consensus controller is presented for unknown nonaffine multiagent systems with partially unknown control directions. An error transformation technique is established to generate an equivalent system. Stabilization and consensus of the transformed states ensure both the satisfaction of the constraints and the consensus of the original states. The asymptotic consensus result is theoretically proved, along with all the closed-loop signals being bounded.



15 Dissipativity Based Fault Detection for 2D Markov Jump Systems with Asynchronous Modes

作者: Ying Shen, Zheng-Guang Wu, Peng Shi; 等
来源: AUTOMATICA 卷 : 106 页 : 8-17 出版年 : AUG 2019

This paper studies fault detection for two-dimensional Markov jump systems in Roesser model. A fault detection filter is designed to produce a residual signal, whose mode transitions are asynchronous with and dependent on the plant's mode through some conditional probabilities. Moreover, both the transition probabilities and conditional probabilities are partially accessible. Under such a framework, sufficient conditions are developed to ensure the asymptotic mean square stability and dissipativity of the overall fault detection system. The parameters in the fault detection filter can be obtained by solving an optimization problem.

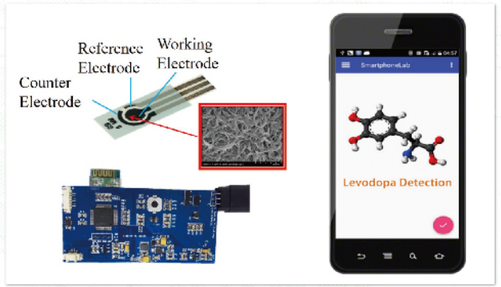


16 Smartphone-Based Differential Pulse Amperometry System for Real-Time Monitoring of Levodopa with Carbon Nanotubes and Gold Nanoparticles Modified Screen-Printing Electrodes

作者: Daizong Ji, NingXu, Qingjun Liu; 等

来源: BIOSENSORS & BIOELECTRONICS 卷：129页：216-223出版年：MAR 2019

We reported a smartphone-based electrochemical detection system for rapid monitoring of levodopa, in which the dosage needs to be controlled for improving symptom control in Parkinson's disease. The system involved single-wall carbon nanotubes and gold nanoparticles modified sensor, a hand-held electrochemical detector, and a smartphone with designed application. Smartphone was connected to the detector, giving command to the detector, calculating data, and plotting graph in real-time. The system showed linear and specific response for levodopa and provide the possibility to solve clinical demand for levodopa detection.

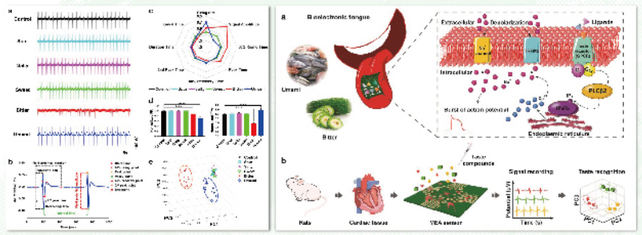


17 A Novel Bionic in Vitro Bioelectronic Tongue Based on Cardiomyocytes and Microelectrode Array for Bitter and Umami Detection

作者: Xinwei Wei, Chunlian Qin, Ping Wang; 等

来源: BIOSENSORS AND BIOELECTRONICS 卷：145 文献号: UNSP 111673 出版年：Dec 2019

We first introduced a bionic in vitro cell-based BioET utilizing rat cardiomyocytes as a primary taste sensing element and microelectrode arrays (MEAs) as a secondary transducer for bitter and umami detection. The results indicate that the BioET responds to bitter and umami compounds specifically among five basic tastants. In addition, using principal component analysis (PCA), different bitter substances could be discriminated, which suggesting its promising applications in taste detection and pharmaceutical study.

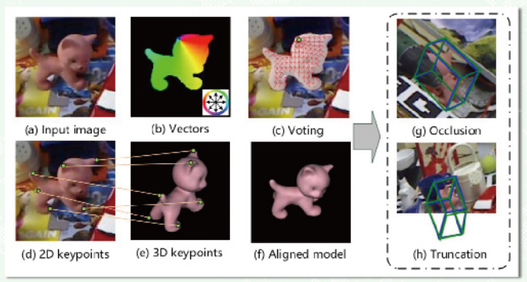


18 PVNet: Pixel-Wise Voting Network for 6d of Pose Estimation

作者: Sida Peng, Yuan Liu, Qixing Huang, Xiaowei Zhou, Hujun Bao

来源: CVPR 2019，LONG BEACH, CA，USA 出版年：JUN 2019

This paper proposes a novel approach to 6DoF object pose estimation from a single RGB image under severe occlusion or truncation. Unlike previous methods that regress keypoint locations, we introduce a Pixel-wise Voting Network (PVNet) to regress pixel-wise vectors pointing to the keypoints and use these vectors to vote for keypoint locations. This creates a flexible representation for localizing occluded or truncated keypoints. Another advantage is that it provides uncertainties of keypoint locations that can be further leveraged by the PnP solver for more robust pose estimation.



人才培养

Education

学部共有15个本科专业，10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。在校生（包含本科生和研究生）8496人，在国内外各类学科竞赛中成绩优异，本科生深造率超60%。本年度光电信息科学与工程、电子科学与技术、自动化、计算机科学与技术、软件工程、生物医学工程等6个专业入选国家级一流本科专业建设点名单。

There are totally 15 undergraduate programs, 10 doctorate programs of primary discipline, 22 doctorate programs of secondary discipline. About 8496 full-time undergraduate and graduate students enrolled in the faculty. They have made outstanding achievements in various international and domestic disciplinary competitions. More than 60% undergraduate students can continue their studies at home or aboard. In 2019, 6 undergraduate programs were selected in the country's construction plan list of first-class undergraduate programs.

本科专业 UG Programs

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
	数字媒体技术** Digital Media 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 & Instrument Science	生物医学工程 Biomedical Engineering
	测控技术与仪器** Measurement and Control Technology and Instrument**

*仅在竺可桢学院招生
*Enrolling in Chu Kochen Honors College

** 2019年取消招生
**Cancelled in 2019

学科 Disciplines

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

设计学 Design
设计艺术学 Art of Design

学生（人） Students

学生 Students \ 学院 College		光电科学与工程学院 COSE	信息与电子工程学院 ISEE	控制科学与工程学院 CSE	计算机科学与技术学院 CCST	软件学院 CST	生物医学工程与仪器科学学院 BME	合计 Total
在校生 Enrollments	博士生 Doctor	271	302	235	531	/	222	1561
	硕士生（全日制） Master	382	724	438	1005	480	286	3315
	本科生（16级、17级、18级） Undergraduate	372	956	543	1382	/	367	3620
招生数 Freshmen	博士生 Doctor	65	82	66	153	/	45	411
	硕士生（全日制） Master	129	229	132	310	232	92	1124
	本科生（19级） Sophomore	108	310	156	470	/	102	1146
毕业生 Graduates	博士生 Doctor	50	40	38	55	/	44	227
	硕士生（全日制） Master	85	160	114	277	238	91	965
	本科生 Undergraduate	99	275	134	401	/	140	1049
本科生深造与对外交流 Further Study and International Exchange of Undergraduate	毕业生* Graduate*	96	266	122	346	/	125	955
	出国（境）深造率 Ratio of Further Studies Aboard	29.9%	19.55%	18.85%	37.39%	/	12.8%	26.08%
	国内读研率 Ratio of Further Studies at Home	35.6%	46.62%	54.92%	24.93%	/	37.6%	37.53%
	对外交流人次 International Exchange	90	247	204	312	/	122	975

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

国际学科竞赛 International Disciplinary Competitions

竞赛名称 Competition	奖 项 Award	获奖人员（及作品） Winners List	指导教师 Advisor
2019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）	亚洲赛区亚军（2队次） First Runner-up in Asia Regional Contest	Runespoor：李彦奎 张清棋 吕耀维	王 灿 Wang Can
	亚洲赛区金牌（19队次） Gold Medal in Asia Regional Contest	Legilimens：陈靖邦 叶梓成 刘明锐	
		Runespoor：李彦奎 张清棋 吕耀维	
		Wheatfield with Crows: 邓浩然 陈昱文 林思仪	
		Peccadet: 孙典圣 李昌栋 卢旻昊	
		Expelliarmus: 章可循 杨沛霖 余奥洋	
		Extraterrestrial: 周屹赫 赵广泽 陈彦博	
		AutoClose: 黄海烽 田文杰 林逢源	
		Immortal Shield: 刘一辰 彭博 张 鑫	
		Immortal Shield: 刘一辰 陈诗翰 张 鑫	
	亚洲赛区银牌（4队次） Silver Medal in Asia Regional Contest	AutoClose: 黄海烽 田文杰 林逢源	
		Daybreak: 孙志博 周义涵 顾哲涵	
		Expelliarmus: 章可循 杨沛霖 余奥洋	
		Acyclic_SD: 付冰洋 王宣煊 张龙姣	
2019世界机器人大赛 The 23th Robot World Cup (RoboCup 2019)	小型组冠军 Small Size League First Place	ZJUNlict: 黄哲远 温力成 胡 朋 郭达顺 方献泽 沈紫嫣 陈凌云 贾慎涵 王云凯 陈泽希	熊 蓉 周春琳 Xiong Rong Zhou Chunlin
	小仿人组第二名 Kid-Size Humanoid League Second Place	ZJUDancer: 樊 武 陈昕欣 靖 鑫 周晟皓 江家骏 王 懂 彭昱翔 李诚辉 林焕彬 王广利	
2019 红点设计概念大奖 Red Dot Award: Design Concept 2019	红点奖 Red Dot	15° Rice Cooker: 周芷怡 钱王俊 郑涵佳 高瞻晟	徐雯洁 Xu Wenjie
2019 DJI RoboMaster 人工智能挑战赛 2019 DJI RoboMaster AI challenge	亚军 First Prize - Second Place	ZMART/RM：熊 坤 王立子 丁梓铭 王子豪 纪佳林 王钱浩 贾若凯 郭佳昕 Federico Bassetto	许 超 Xu Chao
2019世界机器人帆船锦标赛 2019 World Robotics Sailing Championship（WRSC）	冠军 Champion	ZMART/Sailing：王钱浩 朱江超 林成翰 金怡宁 王 者 林楚昂 郑文浩 潘黎铖 朱文欣 翰志超 曾宝成 李 想	许 超 Xu Chao

国内学科竞赛 Civil Disciplinary Competitions

竞赛名称 Competition	奖 项 Award	获奖人员（及作品） Winners List	指导教师 Advisor
2019 中国大学生程序设计竞赛 China Collegiate Programming Contest（CCPC）	冠军（1队次） Champion	Wheatfield with Crows: 邓浩然 陈昱文 林思仪	王 灿 Wang Can
	季军（1队次） Second Runner Up	Runespoor：李彦奎 张清棋 吕耀维	
	金牌（5队次） Gold Medal	Legilimens：陈靖邦 叶梓成 刘明锐	
		Runespoor：李彦奎 张清棋 吕耀维	
		Wheatfield with Crows: 邓浩然 陈昱文 林思仪	
		Expelliarmus: 章可循 杨沛霖 余奥洋	
	银牌（2队次） Silver Medal	Wheatfield with Crows: 邓浩然 陈昱文 林思仪	
		Acyclic_SD: 付冰洋 王宣煊 张龙姣	
2019 RoboCup 机器人世界杯中国赛 Robocup China Open	亚军 2nd Place	ZJUNlict：黄哲远 温力成 方献泽 郭达顺 胡 朋 沈紫嫣 李政希 陈凌云 何 滨 陈翰文 张浩东 贾慎涵 王云凯 朱江超 姜朝峰	熊 蓉 周春琳 Xiong Rong Zhou Chunlin
		ZJUDancer：樊 武 姚铖焘 彭昱翔 叶泽文 丁王杰 周晟皓 陈昕欣 裴育斌 张恒楷 靖 鑫 王 懂 李诚辉 贾 昊 林焕彬 江家骏 章雨宸 王广利	
长三角创意设计联展 - 2019长三角创意设计【智汇大奖】 2019 Yangtze River Delta Creative Design Exhibition-WISDOM Award	金奖 Gold Award	Cool Kit 模块化教育机器人: 阳 月	孙凌云 王冠云 Sun Lingyun Wang Guanyun
第七届全国大学生光电设计竞赛 The 7th National University Students' Opt-Sci-Tech Competition	一等奖 1st Place	基于激光三角法测距的3D扫描仪：陈炳焜、许子旭、高鑫瑞	汪凯巍 白剑等 Wang Kaiwei Bai Jian, etc
		全景环带光学系统：谢舜宇、胡寅鹏、李辰睿、冯逸鹤、王之丰	
		下一代立体视觉传感器：白 延、石 锦、孙 鹏、王文娟、李华兵	
2019全国大学生电子设计竞赛 2019 National Undergraduate Electronic Design Contest	一等奖 1st Place	简易电路特性测试仪：庞婧璇 张紫璨 叶文文	周绮敏 史笑兴 Zhou Yimin Shi Xiaoxin
		纸张计数显示装置：刘猛豪	

国内学科竞赛 Civil Disciplinary Competitions

竞赛名称 Competition	奖 项 Award	获奖人员（及作品） Winners List	指导教师 Advisor
2019全国研究生电子设计竞赛 2019 National Graduate Electronics Design Contest	二等奖 2nd Place	无传感LED显示交互技术：谢慕寒 包成雷 金昀程 杨瑞琪 杨 岸	金心宇 Jin Xinyu
2019年全国大学生信息安全竞赛 2019 National College Students Information Security Contest	一等奖 1st Place	基于RISC-V使用标签隔离的可信执行环境：徐金焱 段宇萱 林逸竹	周亚金 Zhou Yajin
	二等奖 2nd Place	面向PQC的电磁旁路采集与分析平台：蔡佳仪 李良永 李秉恒 潘靖宇	张 帆 Zhang Fan
		面向物联网设备的硬件流量采集与分析系统：张晨辉 陈 松 孙博昭 俞炯弛	
	三等奖 3rd place	新型交互式富媒体Web验证码：倪梵云 张凯博 陈露怡 刘 偲	张 昱 Zhang Yu
全国大学生智能机电系统创新设计大赛 National Innovation Design Competition of Intelligent Mechatronical Systems for College Students	一等奖 1st Place	基于弹性表面的跳跃四足机器人的设计与控制：王博省 方晨昊 万梓威 李陈浩文	周春琳 Zhou Chunlin
	二等奖 2nd Place	多智能体协作对抗系统—小型足球机器人：黄哲远 方献泽 郭达顺 张浩东 李政希 陈泽希	熊 蓉 Xiong Rong
	三等奖 3rd place	面向装配作业的机器人演示编程项目：周忠祥 华伟彤 李威杰 陈祥驰 自主移动感知单元：傅博	熊 蓉 王 越 Xiong Rong Wang Yue

专项奖 Special Awards

奖 项 Award	获奖学生 Winners	学 院 College of
2018-2019学年浙江大学竺可桢奖学金 Chu Kochen Scholarship	阮杨峻 Ruan Yangjun	信息与电子工程学院 Information Science and Electronic Engineering
	任宇凡 Ren Yufan	计算机科学与技术学院 Computer Science and Technology
	刘文杰 Liu Wenjie	光电科学与工程学院 Optical Science and Engineering

海外交流

International Exchange and Cooperation

学部2019年教师出访参加学术会议、合作交流共634人次，约接待361人次国外学者来访进行学术交流，主办国际会议11次以上，接待圣路易斯华盛顿大学、谢菲尔德大学等来访。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，进一步提升了学部的科研与教学水平。

In 2019, 634 persons visited abroad for academic exchange and cooperation. About 361 world-renowned scholars were invited to visit FIT. Meanwhile, we successfully hosted about 11 international conferences and welcomed the delegations from Washington University, Sheffield University, etc. The colleges of FIT continue to strengthen the international exchange and cooperation in order to enhance the level of teaching and scientific research.

主办国际会议 Host International Conferences

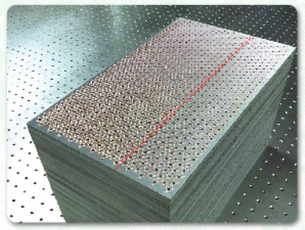
序号 No.	会议名称 Conference	时间 Date
1	第二十六届电气电子工程师协会软件分析、演化与再工程国际会议 The 26th IEEE International Conference on Software Analysis, Evolution and Reengineering	2月24日-27日 Feb 24-27
2	2019科技设计国际会议暨中国创新设计大会紫金港峰会 International Conference on Technology and Design Chinese Congress on Innovation Design Zijingang Summit	4月25日-26日 Apr 25-26
3	第6届大气光散射和遥测技术国际学术会议 The 6th International Symposium on Atmospheric Light Scattering and Remote Sensing（ISALSaRS）	6月17日-21日 Jun 17-21
4	第25届嵌入式及实时计算系统及应用国际会议 IEEE International Conference on Embedded and Real-Time Computing Systems and Applications	8月18日-21日 Aug 18-21
5	第8届非易失内存系统及应用研讨会 IEEE Non-Volatile Memory Systems and Applications Symposium	8月19日-21日 Aug 19-21
6	第四届西湖国际光电子论坛 Photonics Asia 2019 West-Lake Photonics Symposium	10月20日 Oct 20
7	第12届国际集成电路电磁兼容研讨会 The 12th International Workshop on the Electromagnetic Compatibility of Integrated Circuits	10月21日-23日 Oct 21-23
8	2019 IEEE可靠与安全计算国际会议 IEEE Conference on Dependable and Secure Computing	11月18日-20日 Nov 18-20
9	2019全球自动化五校联盟青年论坛 Global Automation and Control Early Career Workshop	11 月 28 日-29 日 Nov 28-29
10	“一带一路”和“金砖五国”先进光子学研讨会 "Belt-Road" & "BRICS" Forum for Advanced Photonics	12月11日-12日 Dec 11-12

2019要闻

News 2019

1月7日，第四届信息学部青年创新奖评选会在邵科馆如期举行。

On Jan 7th, the 4th FIT Youth Innovation Award Selection was held at Yuquan Campus.



1月10日，信电学院陈红胜教授课题组在《NATURE》上发表研究成果。

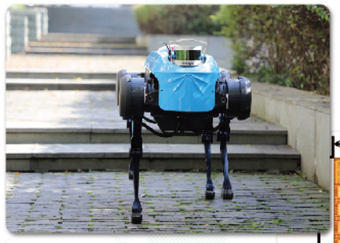
On Jan 10th, the research by Chen Hongsheng's group was published in *Nature*.

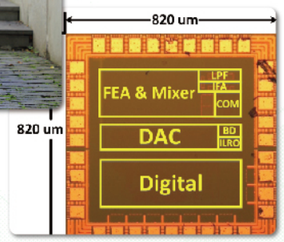
3月22日，信息学部在紫金港校区召开了2019年工作会议。

On Mar 22nd, FIT held its 2019 annual conference on Zijingang Campus.

4月24日，信息学部召开百人计划中期评估会。

On Apr 24th, FIT held the mid-term assessment conference on "Hundred Talents Program of ZJU."



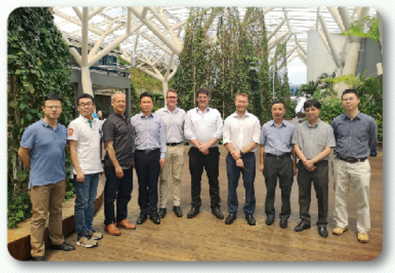


4月24日，信息学部2项学术研究成果入选浙江大学2018年度十大学术进展。

On Apr 24th, two academic research achievements of FIT were selected as the 2018 Top-10 Academic Progress of ZJU.

5月31日，信息学部首期FIT论坛：技术创新与产研协同会议在玉泉校区邵科馆隆重召开。

On May 31st, the 1st FIT Forum: Technical Innovation and Industry-Research Collaboration Conference was held on Yuquan Campus.



7月4日至5日，信息学部副主任陈积明教授应邀赴南洋理工大学参加Global Research Network for Automation and Control会议，并就学生交流、教师互访达成谅解备忘录。

From Jul 4th to 5th, Prof. Chen Jiming, Vice Dean of FIT, was invited to attend the Global Research Network for Automation and Control Conference at NTU. Memorandum of Understanding on student and teacher exchanges was signed jointly by several universities.

8月19至21日，FIT论坛（第2期）：2019 IEEE RTCSA和2019 IEEE NVMSA会议同时在杭州顺利召开。

During Aug 19th - 21st, the 2nd FIT Forum, covering both IEEE RTCSA 2019 and IEEE NVMSA 2019, was held successfully in Hangzhou.

9月11日，浙江大学工业信息物理融合系统（简称iCPS）省部共建协同创新中心获批（教技厅函〔2019〕71号）。

On Sep 11th, ZJU Collaborative Innovation Center for industrial Cyber-Physical (iCPS) was approved by MOE.

教 育 部 办 公 厅

教技厅函〔2019〕71号

教育部办公厅关于认定2019年度省部共建协同创新中心的通知

各省、自治区、直辖市教育厅（教委），新疆生产建设兵团教育局，有关部门（单位）教育司（局），部属有关高等学校、部省合建有关高等学校：

按照省部共建协同创新中心工作的总体部署，在各地培育推荐基础上，经专家评审、统筹考虑，教育部决定认定省部共建协同创新中心共64个（见附件），有关事项通知如下：

10月24日，信息学部主任陈纯院士在中央政治局学习会上专题解读区块链技术发展。

On Oct 24th, Academician Chen Chun, Dean of FIT, presented the development of blockchain technology at the Political Bureau of the CPC Central Committee.

11月16日，FIT论坛（第3期）：第三届“微电子+X”会议在玉泉校区邵科馆举办。

On Nov 16th, the 3rd FIT Forum, also named the 3rd “microelectronics + X” conference, was held on Yuquan Campus.

11月29日，浙江大学推进工信学科发展大会在紫金港校区剧场召开。

On Nov 29th, ZJU Engineering & Information Technology Development Conference was held on Zijingang Campus.

12月18日，浙江大学工信学科跨校区联动举办国际合作主题研讨会。

On Dec 18th, FIT, cooperated with FE (Faculty of Engineering) and ZJUI (ZJU-UIUC Institute), held an international cooperation seminar to promote engineering and information technology.

12月25日，信息学部陈积明副主任接棒任第四届浙江大学青年教授联谊会会长。

On Dec 25th, Prof. Chen Jiming, Vice Dean of FIT, was nominated as the President of the 4th Young Professors Association of ZJU.

12月30日，校友企业捐赠支持的首届信息学部2019年“个推”青年创新奖评选会启动。

On Dec 30th, 2019 “GeTui” Youth Innovation Awards of FIT was first supported by alumni enterprises.

光电学院刘旭教授成功当选2019年SPIE会士，并荣获全国模范教师

Prof. Liu Xu from COSE was elected 2019 SPTE Fellow and awarded the National Model Teacher

鲍虎军
Prof. Bao Hujun
唐立新优秀学者奖
Tang LixinExcellent Scholars Award

吴飞
Prof. Wu Fei
宝钢优秀教师奖
Bao Gang Excellent Teacher Award

吴仍茂
Researcher Wu Rengmao
阿里达摩院青橙奖
Green Orange Award of Alibaba DAMO Academy

狄大卫
Dr. Di David
《麻省理工科技评论》全球“35岁以下科技创新35人”
MIT Technology Review Innovators Under 35

第十五届光华龙腾奖
The 15th Guanghua LongtengAward

潘云鹤
Academician
Pan Yunhe
中国设计贡献金质奖章
Gold Medal for Design Contribution

孙守迁
Prof. Sun Shouqian
中国设计贡献金质奖章
Gold Medal for Design Contribution

孙凌云
Prof. Sun Lingyun
中国设计业十大杰出青年
Top 10 Outstanding Young Designers