

CONFERENCE PROGRAM

2022年第五届IEEE电子技术国际会议

2022 IEEE 5th International Conference on
ELECTRONICS TECHNOLOGY

May 13-16, 2022

Chengdu, China

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About IEEE ICET

2022 IEEE 5th International Conference on Electronics Technology (ICET) which is yearly held in Chengdu, China. It is organized by Sichuan Institute of Electronics, sponsored by IEEE, also with the support of University of Electronic Science and Technology of China, Sichuan University, Southwest Jiaotong University and Singapore Institute of Electronics. The purpose of the conference is to provide an international platform for information exchange for senior and young researchers in the electronic industries. This conference has a rich schedule, which includes tutorial, keynote speeches, invited speeches, online oral presentations, providing a relaxing and multicultural conference atmosphere for experts and scholars.

第五届 IEEE 电子技术国际会议将于 2022 年 5 月 13-16 日在中国成都（网络）召开。本次会议由四川省电子学会和 IEEE 联合主办，并获得电子科技大学、四川大学、西南交通大学，以及新加坡电子学会支持。ICET 每年在成都举办，会议旨在为学术研究界和电子工业界的资深研究者和青年研究者提供一个信息交流的国际平台。本次会议日程丰富，将包含专题讲座、大会报告、邀请报告、口头报告等形式，为广大专家学者提供一个轻松、多元化的会议氛围。

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| May 12 Thursday 5月12日 星期四 | May 13 Friday 5月13日 星期五 | May 14 Saturday 5月14日 星期六 | May 15 Sunday 5月15日 星期日 | May 16 Monday 5月16日 星期一 |
|---|---|---|-------------------------------|---------------------------------|
| Test for Session 1-15 & Best Student Paper Competitions 1-5 10:00-12:00 | Opening Remarks Keynote Speeches 9:30-12:00 | Session 1-4 9:30-12:00 | Session 11-14 9:30-12:00 | Session 23-25 9:30-12:00 |
| Break 12:00-14:00 | Break 12:00-14:00 | Break 12:00-13:30 | Break 12:00-13:30 | Break 12:00-13:30 |
| Test for Session 16-27 Keynote & Invited Speakers & Session Chairs 14:00-16:00 | Keynote & Invited Speeches 14:00-15:40 | Workshop & Session 5-7 13:30-15:30 | Session 15-18 13:30-15:30 | Session 26-27 13:30-15:30 |
| Tutorial 14:00-15:00 | Best Student Paper Competitions 1-5 16:00-18:30 | Workshop & Session 8-10 15:50-18:30 | Session 19-22 15:50-18:30 | Closing & Awards 16:00-16:30 |

2022 IEEE 5th International Conference on Electronics Technology will be held in Chengdu (virtual), China during May 13-16, 2022. IEEE ICET is an annual conference, and it brings a wide range of state-of-the-art research works from different aspects. It provides a forum for multidisciplinary discussion with the aim of combining the research ideas in various aspects of electronics technology. The primary objective of the meeting is to exchange research ideas, methodologies, techniques and applications for fosters their integration and future collaboration in various smart applications.

Under this special pandemic situation, IEEE ICET 2022 is held online this year. We totally have 1 tutorial, 1 workshop, 27 online parallel sessions, as well as 5 Best Student Paper Competition sessions.

This year, IEEE ICET 2022 is highlighted with 11 tracks:

Track 1: Antennas and Microwaves

Track 2: Electronics Materials and Devices

Track 3: Communication and Networks

Track 4: Power and Electrical Engineering

Track 5: Aerospace & Electronics Systems

Track 6: Electronics Applications

Track 7: Internet of Things

Track 8: Embedded System

Track 9: AI and Applications

Track 10: Control and Robotics

Track 11: Signal Processing

Four Keynote Speakers:

Prof. Zhihua Wang, Tsinghua University, China (IEEE Fellow)

Prof. Mohamad Sawan, Westlake University, China (IEEE Fellow, FCAE, FEIC)

Prof. Weida Hu, Shanghai Institute of Technical Physics, Chinese Academy of Science

Prof. Marjan Popov, Delft University of Technology, the Netherlands (IEEE Fellow)

And a number of Invited Speakers from different research fields. Special appreciation delivered by the conference for their great support. Apart from that, we'd like to extend our thanks to reviewers, for their great contributions on management of paper reviewing, to all of the sponsoring organizations for providing their generous support and to all of the conference participants for their contributions which are the foundation of this conference. We truly believe the participants will find the discussion fruitful and will enjoy the opportunity for setting up future collaborations.

Conference Chairs

Prof. Yuan Lin, University of Electronic Science and Technology of China

Prof. Shiwen Yang, University of Electronic Science and Technology of China

Honorary Chair 荣誉主席

Longjiang Deng, University of Electronic Science and Technology of China, China | Academician of Chinese Academy of Engineering, China
邓龙江, 中国工程院院士, 电子科技大学

Advisory Chairs 顾问主席

Vladimir Terzija, Skolkovo Institute of Science and Technology (Skoltech), Russia | IEEE Fellow

Xinzhou Dong, Tsinghua University, China | IEEE Fellow, IET Fellow

董新洲, 清华大学, IEEE 会士、IET 会士、中国电机工程学会会士, "全国创新争先奖"获得者

Conference Chairs 大会主席

Yuan Lin, University of Electronic Science and Technology of China, China

林媛, 电子科技大学

Shiwen Yang, University of Electronic Science and Technology of China, China | IEEE Fellow

杨仕文, 电子科技大学, IEEE 会士

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黄卡玛, 四川大学, 四川省电子学会副理事长

Yuhua Cheng, Peking University, China | IEEE Fellow

程玉华, 北京大学, IEEE 会士

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胡维昊, 电子科技大学

Hui Li, University of Electronic Science and Technology of China, China

李辉, 电子科技大学

Haiying Dong, Lanzhou Jiaotong University, China

董海鹰, 兰州交通大学

Junran Zhang, Sichuan University, China

张俊然, 四川大学

Local Organizing Chair 本地组织主席

Tao Xiang, Secretary-General of Sichuan Institute of Electronics, China

向涛, 四川省电子学会秘书长

Local Organizing Committee 本地组织委员会

Kaikai Xu, University of Electronic Science and Technology of China, China

徐开凯, 电子科技大学

Xihua Zou, Southwest Jiaotong University, China

邹喜华, 西南交通大学

Technical Program Committee 审稿委员会

Arezki Benfdila, Mouloud Mammeri University, Algeria

Baokui Sun, C-EPRI Electric Power Engineering Corporation, State Grid Electric Power Research Institute Beijing, China

Binbin Xiang, Xinjiang Astronomical Observatory, China

Bo Qiu, Hebei University of Technology, China

Changli Li, Hohai University, China

Dake Tian, Shenyang Jianzhu University, China

Eng-Hock Lim, Universiti Tunku Abdul Rahman, Malaysia

Eugene Ren, Electric Connector Technology Co Ltd, USA

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Guofeng Jiang, Air Force Engineering University, China

Haigang Feng, Tsinghua Shenzhen International Graduate School, China

Hailong Jiao, Peking University Shenzhen Graduate School, China

Hao Wu, Beijing Jiaotong University, China

HE Jun, National University of Defense Technology, China

Hu Song, Nanjing Marine Radar Institute, China

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Jie Liu, Beijing University of Technology, China

Juan Guo, University of North Georgia, USA

Jun Wu, National University of Defense Technology, China

Junjie Hu, North China Electric Power University, China

Kai Wang, Southern University of Science and Technology, China

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Qing Shen, Beijing Institute of Technology, China

Rustam Asnawi, Yogyakarta State University, Indonesia

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Sheng-Kuan Wang, Ming Chi University of Technology, China

Sherif Welsen, University of Nottingham Ningbo, China

Shiwen Lei, University of Electronic Science and Technology of China, China

Victor R.L. Shen, National Taipei University, China

Wang Yang, Xinjiang University, China

Weipeng Cao, Shenzhen University, China
Wen-Sheng Zhao, Hangzhou Dianzi University, China
Xiang Li, Guilin University of Electronic Technology, China
Xiaoyu Lan, Shenyang Aerospace University, China
Xing Wu, East China Normal University, China
Xinpeng Xing, Tsinghua Shenzhen International Graduate School, China
Yan Li, China Electric Power Research Institute, China
Yan Lin, China Information Consulting & Designing Institute CO., LTD. China
Yongbo Liao, University of Electronic Science and Technology of China
Yu Hongyu, Southern University of Science and Technology, China
Yuan Zhang, Beijing Institution of Graphic Communication, China
Zhengchun Peng, Shenzhen University, China
Zhikuan Cai, Nanjing University of Posts and Telecommunications, China
Zhiwei Li, National University of Defence Technology, China
Zhongjie Guo, Xi'an University of Technology, China

Day 1: May 12, THU. 5月12日, 星期四
Test Sessions | 线上测试

| Time | Event | Room |
|-------------|---|---|
| 10:00-12:00 | Test for Session 1-4 | https://us02web.zoom.us/j/85441401537 |
| | Test for Session 5-8 | https://us02web.zoom.us/j/89136654725 |
| | Test for Session 9-12 | https://us02web.zoom.us/j/82575271771 |
| | Test For Session 13-15 & Best Student Paper Competition 1 | https://us02web.zoom.us/j/84367058482 |
| | Test For Best Student Paper Competition 2-5 | https://us02web.zoom.us/j/83122879266 |
| 12:00-14:00 | Break | |
| 14:00-16:00 | Test for Session 16-19 | https://us02web.zoom.us/j/84367058482 |
| | Test for Session 20-23 | https://us02web.zoom.us/j/89136654725 |
| | Test for Session 24-27 | https://us02web.zoom.us/j/82575271771 |
| | Test for Keynote & Invited Speakers & Session Chairs | https://us02web.zoom.us/j/85441401537 |

Tutorial | 专题讲座

| Time | Event | Room |
|-------------|--|---|
| 14:00-15:00 | <i>Architecture of 3D Graphics Hardware</i> Prof. Tao Li, Xi'an University of Posts & Telecommunications, China | https://us02web.zoom.us/j/83122879266 |

Day 2: May 13, FRI. 5月13日, 星期五

| Opening Ceremony, Keynote & Invited Speeches & Best Student Paper Competition 大会开幕式、主旨特邀报告、优秀学生论文竞赛 Zoom Meeting ID: 854 4140 1537, https://us02web.zoom.us/j/85441401537 | | |
|---|--|---|
| Time | Event | Host |
| 9:25-9:40 | Opening Remarks | Prof. Jiang Wu, University of Electronic Science and Technology of China |
| | Longjiang Deng, University of Electronic Science and Technology of China, China Academician of Chinese Academy of Engineering, China 邓龙江, 中国工程院院士, 电子科技大学 | |
| | Tao Xiang, Secretary-General of Sichuan Institute of Electronics 向涛, 四川省电子学会秘书长 | |
| | Yuan Lin, University of Electronic Science and Technology of China 林媛, 电子科技大学, 材料与能源学院院长 | |
| 9:40-10:20 | Keynote Speech 1 <i>Briefly on the Development of Integrated Circuit and Technology and Industries</i> Prof. Zhihua Wang, Tsinghua University, China (FIEEE, FCIE, FCIC) | |
| 10:20-11:00 | Keynote Speech 2 <i>Closed-Loop Neuromodulation Systems for the Treatment of Neurodegenerative Disorders</i> Prof. Mohamad Sawan, Westlake University, China (FIEEE, FCAE, FEIC) | |
| 11:00-11:20 | Break | |
| 11:20-12:00 | Keynote Speech 3 <i>Novel Infrared Hotodetectors and Their Smart Chips</i> Prof. Weida Hu, Shanghai Institute of Technical Physics, China Academy of Sciences | |
| 12:00-14:00 | Break | |
| 14:00-15:40 | Keynote & Invited Speech on Power System and Grid Connection Technology | |

| | | | | | | |
|-------------|---|---|---|---|---|---|
| 14:00-14:40 | <div>Keynote Speech 4</div> <div><i>MPPT-based Islanding Detection Method for Grid-Connected PV Microgrids</i></div> <div>Prof. Marjan Popov, Delft University of Technology, the Netherlands (FIEEE)</div> | | | | | <div>Host:</div> <div>Prof. Vladimir Terzija, Skolkovo Institute of Science and Technology (Skoltech), Russia (FIEEE)</div> |
| 14:40-15:00 | <div>Invited Speech 1</div> <div><i>Development and Applications of Open Simulation Toolkit for Electrical Power Systems</i></div> <div>Prof. Changgang Li, Shandong University, China</div> | | | | | |
| 15:00-15:20 | <div>Invited Speech 2</div> <div><i>Application of Terahertz Technology in Delamination Defect Inspection for Vehicle High Voltage Cable Terminals</i></div> <div>Prof. Shuaibing Li, Lanzhou Jiaotong University, China</div> | | | | | |
| 15:20-15:40 | <div>Invited Speech 3</div> <div><i>Investigation of Distribution System Real-Time Voltage Control with Fast PV Power Fluctuations and Imperfect Communication)</i></div> <div>Prof. Licheng Wang, Zhejiang University of Technology, China</div> | | | | | |
| | | | | | | |
| 15:40-16:00 | Break | | | | | |
| 16:00-18:30 | Best Student Paper Competition 1 | Best Student Paper Competition 2 | Best Student Paper Competition 3 | Best Student Paper Competition 4 | Best Student Paper Competition 5 | |
| | https://us02web.zoom.us/j/85441401537 | https://us02web.zoom.us/j/89136654725 | https://us02web.zoom.us/j/82575271771 | https://us02web.zoom.us/j/84367058482 | https://us02web.zoom.us/j/83122879266 | |

Day 3: May 14, SAT. 5月14日, 星期六

| Invited Speeches & Oral Presentations 特邀报告 & 线上分会报告 | | | | |
|--|---|---|---|---|
| Time | Event | | | |
| Room | https://us02web.zoom.us/j/85441401537 | https://us02web.zoom.us/j/89136654725 | https://us02web.zoom.us/j/82575271771 | https://us02web.zoom.us/j/84367058482 |
| 9:30-12:00 | Session 1 | Session 2 | Session 3 | Session 4 |
| 12:00-13:30 | Break | | | |
| 13:30-15:40 | Workshop | Session 5 | Session 6 | Session 7 |
| 15:40-16:00 | Break | | | |
| 16:00-18:30 | Workshop | Session 8 | Session 9 | Session 10 |

Day 4: May 15, SUN. 5月15日, 星期日

| Invited Speeches & Oral Presentations 特邀报告 & 线上分会报告 | | | | |
|--|---|---|---|---|
| Time | Event | | | |
| Room | https://us02web.zoom.us/j/85441401537 | https://us02web.zoom.us/j/89136654725 | https://us02web.zoom.us/j/82575271771 | https://us02web.zoom.us/j/84367058482 |
| 9:30-12:00 | Session 11 | Session 12 | Session 13 | Session 14 |
| 12:00-13:30 | Break | | | |
| 13:30-15:40 | Session 15 | Session 16 | Session 17 | Session 18 |
| 15:40-16:00 | Break | | | |
| 16:00-18:30 | Session 19 | Session 20 | Session 21 | Session 22 |

Day 5: May 16, MON. 5月16日, 星期一

| Invited Speeches & Oral Presentations 特邀报告 & 线上分会报告 | | | | |
|--|---|---|---|---|
| Time | Event | | | |
| Room | https://us02web.zoom.us/j/84367058482 | https://us02web.zoom.us/j/89136654725 | https://us02web.zoom.us/j/82575271771 | https://us02web.zoom.us/j/85441401537 |
| 9:30-12:00 | Session 23 | Session 24 | Session 25 | |
| 12:00-13:30 | Break | | | |
| 13:30-15:40 | Session 26 | Session 27 | | |
| 15:40-16:00 | Break | | | |
| 16:00-16:30 | | | | Closing & Award |

Platform | 线上会议平台



ZOOM, Download link:

- ♦ <https://zoom.us/download>
- ♦ <https://zoom.com.cn/download> (for Chinese authors)

Meeting Rooms | 线上会议房间号

Room 1: Meeting ID-854 4140 1537, <https://us02web.zoom.us/j/85441401537>

Room 2: Meeting ID-891 3665 4725, <https://us02web.zoom.us/j/89136654725>

Room 3: Meeting ID-825 7527 1771, <https://us02web.zoom.us/j/82575271771>

Room 4: Meeting ID-843 6705 8482, <https://us02web.zoom.us/j/84367058482>

Room 5: Meeting ID-831 2287 9266, <https://us02web.zoom.us/j/83122879266>

Online Meeting Needs | 线上会议需求

- ♦ A computer with internet connection and camera
- ♦ Headphone/earphone
- ♦ A quiet place
- ♦ Stable internet connection
- ♦ Proper lighting and background

Test Your Presentation | 线上报告测试

Date: May 12, 2022

Prior to the formal meeting, online presenters shall join the test room to ensure everything is on the right track. Please check the test time on page 8.

5月12日为线上作者报告测试日，测试的主要目的是保证作者能够正常进入会议室并熟悉做报告的流程和方法。为保证一切进行顺利，请准时参加，

Presentation Time | 报告时长

A maximum of 15 minutes in total, including Q&A. Please make sure your presentation is well timed.

Backup Video | 备份视频

A video has been required to upload as a backup to avoid any technical problems on the presentation date. If you need to play the video, please contact the staff in meeting room.

如果您在会议期间因为网络或电脑等技术问题无法正常报告，可以要求工作人员代替您播放备份视频。报告期间作者务必保持在线，并解答与会人员的提问。



TUTORIAL

Architecture of 3D Graphics Hardware

Prof. Tao Li, Xi'an University of Posts & Telecommunications, China

14:00-15:00, May 12, Thursday, 5月12日, 星期四

Room 5: Meeting ID-831 2287 9266,

<https://us02web.zoom.us/j/83122879266>

Abstract:

A 3D graphics pipeline has a few of rendering stages, each of which performs different functions. This tutorial discusses classical forward rendering hardware pipelines as well as hardware ray-tracing techniques. The following contents are covered here.

Classical graphics rendering is based on surface representation of primitives. Objects are mostly formed using surfaces, which in turn are composed of triangular primitives, and lines which are connected with line segments. Graphics primitives are specified by their defining vertices.

A classical rendering pipeline must assemble vertices into graphical primitives. Hence, a primitive assembly stage is needed to establish the relations between vertices and primitives. Vertices of the primitives then go through model-view transformation and are shaded according to rendering equations. This is known as vertex shading. They then go through projection transformation to enter the clip space. Primitives are clipped and (backface) culled in this space. The remaining primitives are transformed into window coordinate space and then are rasterized into fragments. The fragments may go through another shading process to add textures and so on. Shaded fragments are fed to the ROP stage to perform various pixel level processing. The results are stored in the framebuffer to be displayed on screen. Hardware acceleration for 3D rendering will be discussed in detail.

Ray-tracing (RT) is another approach to 3D rendering. If the classical pipeline can be viewed as forward rendering, that is, from models to screen pixels, RT can be viewed as backward rendering, that is, from screen pixels to models. Recursive RT requires highly complex computation and drives demand for computation power. For real-time RT, bounding volume hierarchy (BVH) and deep learning super-resolution (DLSS) are two approaches to harness the complexity of ray-tracing. These issues and related hardware acceleration techniques will also be addressed in this tutorial.

Bio:

LI Tao is a professor of Electrical Engineering at Xi'an University of Posts and Telecom. He was a graduate student at the Institute of Computing Technology, Chinese Academy of Science. He earned his Ph.D in computer science from the University of Utah. He taught at several Universities in Australia, Canada and United States. He was tenured faculty at Monash University in Melbourne, Australia, tenured faculty at Concordia University in Montreal, Canada. In addition to his academic experience, he also has comprehensive industrial experience, serving various posts at Bell-Labs research, Motorola, and other companies. He has started or involved in a couple of successful start-ups among a number of such companies. LI Tao has been working in the fields of neural networks and machine learning, computer graphics and chip design, as well as telecom equipment.

KEYNOTE SPEECH 1

Briefly on the Development of Integrated Circuit and Technology and Industries

Prof. Zhihua Wang, Tsinghua University, China
(FIEEE, FCIE, FCIC)



9:40-10:20, May 13, Friday, 5月13日, 星期五

Room 1: Meeting ID-854 4140 1537,

<https://us02web.zoom.us/j/85441401537>

Abstract:

Transistors and integrated circuits are the greatest inventions in the history of science and technology. So far, integrated circuit technology has been developed for more than 70 years. Today, integrated circuits had become the foundation of the industries, the core of the industrial technologies, the guarantee of information and production securities, and the effective carrier of intellectual property. Integrated circuits are now closely related to the development of the society and daily life of human being. In this report, the history of the development of the integrated circuit industries have been reviewed, the current status of the industries has been studied, and future expectations has been looked forward. Regarding the development of the domestic integrated circuit industry, this report analyzes the challenges and opportunities, difficulties and the direction of efforts. For the talent shortage problem that is generally concerned in the integrated circuit industry has been detailed and accurate analyzed, and the ideas for solving the problem have been proposed.

Bio:

Zhihua Wang (FIEEE, FCIE, FCIC) received the B.S., M.S., and Ph.D. degrees in Electronic Engineering in 1983, 1985 and 1990, respectively, from Tsinghua University, Beijing, China, where he has served as full professor and Deputy Director of the Institute of Microelectronics since 1997 and 2000. He was a visiting scholar at CMU (1992-1993) and KU Leuven (1993-1994), and was a visiting professor at HKUST (2014.9-2015.3). His current research mainly focuses on CMOS RFIC and biomedical applications, involving RFID, PLL, low-power wireless transceivers, and smart clinic equipment combined with leading edge RFIC and digital image processing techniques. He has co-authored 13 books/chapters, over 225 (569) papers in international journals (conferences), over 251 (29) papers in Chinese journals (conferences) and holds 130 Chinese and 10 US patents.

Prof. Wang has served as the chairman of IEEE SSCS Beijing Chapter (1999-2009), an AdCom Member of the IEEE SSCS (2016-2019), a technology program committee member of the IEEE ISSCC (2005-2011), a steering committee member of the IEEE A-SSCC (2005-), the technical program chair for A-SSCC 2013, a guest editor for IEEE JSSC Special Issues (2006.12, 2009.12 and 2014.11), IEEE SSCS Distinguished Lecturer(2018-2019), IEEE CASS Distinguished Lecturer(2020-2021), Associate Editors in Chief, IEEE Open Journal of Circuits and Systems (2019-), associate editor of IEEE Trans on CAS-I, II and IEEE Trans on BioCAS, and other administrative/expert committee positions in China's national science and technology projects.



KEYNOTE SPEECH 2

Closed-Loop Neuromodulation Systems for the Treatment of Neurodegenerative Disorders

Prof. Mohamad Sawan, Westlake University, China
(FIEEE, FCAE, FEIC)

10:20-11:00, May 13, Friday, 5月13日, 星期五

Room 1: Meeting ID-854 4140 1537,

<https://us02web.zoom.us/j/85441401537>

Abstract:

Brain-Machine Interfaces intended for efficient diagnosis and treatment of neurodegenerative diseases are becoming major research targets to mimic brain regular operation. Consequently, hardware-based neuromorphic implementations learning techniques are the heart parts of emerging control units to be embedded in proposed Neuromodulation Systems. Neurodegenerative diseases require the introduction of custom smart medical devices intended for the diagnosis, treatment, and prediction of health conditions. This talk covers signal processing and custom integrated circuits and subsequent use to implement wearable and implantable bioelectronic closed-loop systems for brain interfaces. These methods deal with multidimensional design challenges such as efficient power management, low-power and high-data rate wireless communication methods, small volume devices, reliable wearable, and implantable systems. In these neuromodulation and stimulation applications, priority could be given to non-invasive approaches, however for some healthcare dysfunctions, wearable systems can not apply, implantable devices should be used. Also, optoelectronic methods are becoming the winning approaches to build proposed advanced closed-loop systems for both non-invasive nanoimaging, and transcranial stimulation. Case studies include several applications such as epilepsy, vision, addictions, etc. Also, cells monitoring, and manipulations are consistent options for efficient neural diseases studies.

Bio:

Mohamad Sawan is Chair Professor in Westlake University, Hangzhou, China, and Emeritus Professor in Polytechnique Montreal, Canada. He is founder and director of the Center of Excellence in Biomedical Research on Advanced Integrated-on-chips Neurotechnologies (CenBRAIN Neurotech) in Westlake University, Hangzhou, China. He received the Ph.D. degree from University of Sherbrooke, Canada. Dr. Sawan research activities are bridging micro/nano electronics with biomedical engineering to introduce smart medical devices dedicated to improving the quality of human life. He was Editor-in-Chief of the IEEE Transactions on Biomedical Circuits and Systems (2016-2019). He is founder of the Polystim Neurotech Laboratory. He hosted the 2016 IEEE International Symposium on Circuits and Systems, and the 2020 IEEE International Medicine, Biology and Engineering Conference (EMBC). He was a Canada Research Chair in Smart Medical Devices (2001-2015), and was leading the Microsystems Strategic Alliance of Quebec, Canada (1999-2018). Dr. Sawan published more than 1000 peer reviewed papers and many books and patents. He received the Zhejiang Westlake Friendship Award, the Qianjiang Friendship Ambassador Award, the Shanghai International Collaboration Award, the Queen Elizabeth II Golden Jubilee Medal. Dr. Sawan is Fellow of the IEEE, Fellow of the Canadian Academy of Engineering, and "Officer" of the National Order of Quebec.



KEYNOTE SPEECH 3

Novel Infrared Photodetectors and Their Smart Chips

Prof. Weida Hu, Shanghai Institute of Technical Physics, Chinese Academy of Sciences

11:20-12:00, May 13, Friday, 5月13日, 星期五

Room 1: Meeting ID-854 4140 1537,

<https://us02web.zoom.us/j/85441401537>

Abstract:

Infrared photodetectors based on traditional thin-film semiconductors such as InGaAs, InSb, HgCdTe, and QWIP as well as novel type-II superlattice exhibit highly sensitive detection capability. However, these devices always need to work at low temperature, resulting in an additional large and expensive cooling system. Recently, two dimensional (2D) materials and nanowires (quasi-1D) have attracted tremendous attention owing to their bandgap tunability and potential optoelectronic applications. Nevertheless, as a photoconductive detector, the signal-to-noise ratio could be very low without the suppression of dark current. Meanwhile, the performance of 1D/2D photodetectors including phototransistors, photoconductors with photogating, and photodiodes, is strongly affected by surface states resulting in the restricted electron-hole separation efficiency and low speed, and intrinsic ultrathin absorption thickness for 1D/2D photodetectors suffers the low quantum efficiency.

Here we report the progress on novel uncooled infrared photodetectors and their smart chips based on 1D/2D materials manipulated by localized fields. We fully exploit the detection ability of 1D/2D materials by introducing localized-field, including ferroelectric field, vertical heterojunction field, p-n junction photovoltaic field and so forth. With a strong induced localized-field, high performance infrared photodetectors based on InAs nanowires, Graphene, TMDs, Pd (Pt) Se, Black phosphorus, Black arsenic-phosphorus etc. may lead to a disruptive revolution in prospective low dimensional electronic/optoelectronic devices. Our study opens a new avenue for the controllable fabrication of built-in localized-field in 1D/2D devices, which is a prominent challenge in low dimensional material researches.

Bio:

Weida Hu is currently a full professor (Principal investigator) on fabrication and characterization of infrared photodetectors/photodiodes/phototransistors and their smart chips in Shanghai Institute of Technology Physics, Chinese Academy of Sciences. He has authored or co-authored more than 150 technical journal papers in Science, Nature Nanotechnology, Nature Electronics etc with the total citations of 13800 and h-index of 64. He received the National Science Fund for Distinguished Young Scholars in 2017, China Youth Science and Technology Award in 2019, National Science Fund for Excellent Young Scholars in 2013, and National Program for Support of Top-notch Young Professionals in 2015. He is selected as the IEEE Senior Member and Royal Society-Newton Advanced Fellowship in 2017. He is also serving as the Committee Member and Distinguished Lecturer of IEEE Nanotechnology Council, the Associate Editor of Infrared Physics & Technology, the Executive Editor of Optical and Quantum Electronics, the Program Committee of the International Conference on Numerical Simulation of Optoelectronic Devices.

KEYNOTE SPEECH 4

MPPT-based Islanding Detection Method for Grid-Connected PV Microgrids

Prof. Marjan Popov, Delft University of Technology, the Netherlands (FIEEE)



14:00-14:40, May 13, Friday, 5月13日, 星期五

Room 1: Meeting ID-854 4140 1537,

<https://us02web.zoom.us/j/85441401537>

Abstract:

In this presentation, a novel islanding detection method for grid-connected photovoltaic systems (GCPVSs) through a disturbance injection. When an absolute deviation of the output voltage exceeds a threshold, the applied disturbance shifts the system operating point from its maximum power point (MPP) condition. This leads to a sharp active power output reduction and consequently, a significant voltage drop in an islanded mode beyond the standard voltage limit. The proposed algorithm is defined in a way that the distributed generator (DG) can be restored to MPP after islanding classification. It is thereby effective in a microgrid in which the power injection at maximum level to cater to the critical loads and maintain the stability of the isolated area are pursued. An intentional time delay has also been considered to avoid nuisance tripping in short-circuit faults, which do not require tripping. The assessment of the proposed technique is demonstrated for a sample network containing two GCPVSs in a real-time platform including physical relays in hardware-in-the-loop (HiL). The provided results under extensive islanding scenarios defined in islanding standards endorse timely and accurate detection with the negligible non-detection zone (NDZ) as well as no false tripping in non-islanding disturbances. The comparative analysis of the presented scheme with a few recent IDMs for GCPVS highlights its overall superiorities, including very small NDZ, fast detection, thresholds self-standing determination, no adverse effect on power quality, and simple and inexpensive integration.

Bio:

Marjan Popov (M95'-SM03'-F22') received the Dipl.-Ing. degree in electrical power engineering from the University of Saints Cyril and Methodius of Skopje, Republic of Macedonia, in 1993, and the Ph.D. degree in electrical power engineering from the Delft University of Technology, Delft, The Netherlands, in 2002. He is a Chevening Alumnus and in 1997, he was an Academic Visitor with the University of Liverpool, Liverpool, U.K., working in the Arc Research Group on modeling SF6 circuit breakers. His major research interests include future power systems, large-scale power system transients, intelligent protection for future power systems, and wide-area monitoring and protection. He is a member of CIGRE and actively participated in WG C4.502 and WG A2/C4.39. In 2010, he was the recipient of the prestigious Dutch Hidde Nijland Prize for extraordinary research achievements. He is the recipient of the IEEE PES Prize Paper Award and IEEE Switchgear Committee Award for 2011. He is an Associate Editor for the Elsevier's International Journal of Electric Power and Energy Systems. Prof. Popov has given many invited lectures for the industry and academia among those, at Tsinghua and Xi'an Jiaotong University.

| Invited Speech 1 | Invited Speech 2 | Invited Speech 3 | Invited Speech 4 | Invited Speech 5 |
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| Changgang Li Shandong University | Shuaibing Li Lanzhou Jiaotong University | Licheng Wang Zhejiang University of Technology | Yi Zhang University of Electronic Science and Technology of China | Zhuoqing Yang Shanghai Jiao Tong University |
| Invited Speech 6 | Invited Speech 7 | Invited Speech 8 | Invited Speech 9 | Invited Speech 10 |
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| Faheng Zang Shanghai Jiao Tong University | Jinshui Miao Shanghai Institute of Technical Physics, CAS | Li Nannan China Academy of Engineering Physics | Wen Huang University of Electronic Science and Technology of China | Xiaohang Wang South China University of Technology |
| Invited Speech 11 | Invited Speech 12 | Invited Speech 13 | Invited Speech 14 | Invited Speech 15 |
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| Xing Wu East China Normal University | Hua Fan University of Electronic Science and Technology of China | Yuan Yang Xi'an University of Technology | Wen-Sheng Zhao Hangzhou Dianzi University | Yuehang Xu University of Electronic Science and Technology of China |

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| Invited Speech 16 | Invited Speech 17 | Invited Speech 18 | Invited Speech 19 | Invited Speech 20 |
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| Donglin Wang Zhengzhou University of Light Industry | Junyu Lai University of Electronic Science and Technology of China | Weiwei Shi Shenzhen University | Hongbo Liu University of Electronic Science and Technology of China | Jingjing Li University of Electronic Science and Technology of China |
| Invited Speech 21 | Invited Speech 22 | Invited Speech 23 | Invited Speech 24 | Invited Speech 25 |
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| Tian Xiang Suzhou Thorsianway Co., Ltd | Conghao Zhou University of Waterloo | Wen Wu Peng Cheng Laboratory | Peng Chen Southeast University | Xuan Li East China Jiaotong University |
| Invited Speech 26 | | | | |
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| Yu Yao East China Jiaotong University | | | | |