

# Scientific Program

## Afternoon, July 16, 2017

**14:00–18:00** Registration (Lobby, International Conference Center of NJU)

**18:00–20:00** Reception

## Morning, July 17, 2017 Session K (Sanjiang Hall, 三江厅)

Chair: Kaiyou Wang (China)

**8:30–8:50** Opening

**8:50–9:30** T.-P. Ma (Yale University, USA)  
Unipolar CMOS Logic: A Transforming Technology for Current and Emerging Transistor Materials

**9:30–10:10** Ru Huang (Peking University, China)  
Emerging Steep Slope Devices for Ultra-Low-Power Applications

**10:10–10:20** Conference photo

**10:20–11:40** Coffee Break

**11:00–11:40** H.-S. Philip Wong (Stanford University, USA)  
The N3XT 1,000x of Computing Energy Efficiency

**11:40–12:20** Jiangfeng Du (University of Science and Technology of China, China)  
Quantum control of spins in solids and its applications

**12:20–13:30** Lunch

## Afternoon, July 17, 2017 Session 1 (Zhongda Hall, 中大厅)

Chairs: Yang Chai (Hong Kong) / Junichi Murota (Japan)

**13:30–14:00** Junichi Murota (Tohoku University, Japan )  
Atomically Controlled Processing for In-Situ Doping in CVD Si and Ge Epitaxial Growth

**14:00–14:30** Deren Yang (Zhejiang University, China)  
Defects in Cast Quasi-single Crystalline Silicon

**14:30–15:00** Seiichi Miyazaki (Nagoya University, Japan)  
Fabrication of Multiple Stack Si/Ge Quantum Dots for Light/Electron Emission Devices

**15:00–15:20** Jimmy Wang (Nanjing University, China)  
High performance transparent in-plane silicon nanowire Fin-TFTs via a robust nano-droplet-scanning crystallization dynamics

**15:20–15:40** Liming Wang (Fudan University, China)  
Carrier effects on ferromagnetism of Mn-doped Ge Quantum dots

**15:40–16:00** Coffee Break

**16:00–16:30** Yaoyi Li (Shanghai Jiao Tong University, China)  
Topological superconductor and Majorana zero mode

**16:30–17:00** Yang Chai (The Hong Kong Polytechnic University)

Extraordinarily Strong Interlayer Interaction and High-Electron-Mobility in 2D Layered PtX<sub>2</sub>  
**17:00–17:20** Yuanhui Sun (Jilin University, China)  
InSe: a two-dimensional material with strong inter-layer coupling

**17:20–17:40** Yi Zhang (Nanjing University, China)  
Electronic Structures of Novel Quantum Materials: Growth and ARPES Characterizations of Epitaxial Thin Films

**18:10–20:00** Banquet

**Afternoon, July 17, 2017 Session 2 (Yixing Hall, 以行厅)**

Chairs: Olivier Bonnaud (France) / Durga Misra (USA)

**13:30–14:00** Durga Misra (New Jersey Institute of Technology, USA)  
Solving the Interface Problem in Ge/High-k Gate Stacks

**14:00–14:30** Qiliang Li (George Mason University, USA )  
Graphene Gas Sensors for Chemical Discrimination

**14:30–15:00** Tianling Ren (Tsinghua University, China)  
Novel fabrication method and wearable device applications of graphene

**15:00–15:20** Xiaodong Tong (Chinese Academy of Engineering Physics, China)  
The Optimization of Drain Delay in Short-Chanel GaN HEMT

**15:20–15:40** Peng Cui (Shandong University, China)  
Study of Polarization Coulomb Field Scattering Influence on Improved Linearity in AlGaIn/GaN Heterostructure Field-Effect Transistors

**15:40–16:00** Coffee Break

**16:00–16:30** Olivier Bonnaud (University of Rennes 1, France)  
Challenge of the semiconductor technologies through innovative education

**16:30–17:00** Xiaoyang Zeng (Fudan University, China)  
High-Performance and Low-Power SoC Design for Information Security

**17:00–17:20** Pingan Hu (Harbin Institute of Technology, China)  
High performance electronics and optoelectronics based on two dimensional layered films

**17:20–17:40** Fengqi Song (Nanjing University, China)  
Experimental observations of the quantum Hall effect and universal conductance fluctuations in topological insulator devices

**17:40–18:00** Cong Ye (Hubei University, China)  
Application of Transition metal oxide thin films in RRAM devices

**18:10–20:00** Banquet

**Afternoon, July 17, 2017 Session 3 (Jiexing Hall, 洁行厅)**

Chairs: Kevin J Chen (Hong Kong) / Hao Zeng (USA)

**13:30–14:00** Jianbin Xu (The Chinese University of Hong Kong, China )  
High Performance Graphene-Based Optoelectronic Devices: from Photodetectors to Modulators

**14:00–14:30** Hao Zeng (University of Buffalo, USA)

	Tunable valley splitting in TMDCs by exchange field
<b>14:30–15:00</b>	Zhipei Sun (Aalto University, Finland) Nonlinear photonics with two-dimensional layered materials and their applications
<b>15:00–15:20</b>	Zhongming Wei (Institute of Semiconductors, Chinese Academy of Sciences, China) 2D semiconductors and (opto)electronics based on MoS <sub>2</sub>
<b>15:20–15:40</b>	Xing Sheng (Tsinghua University, China) Implantable Optoelectronic Devices for Deep-Brain Neural Signal Sensing
<b>15:40–16:00</b>	Coffee Break
<b>16:00–16:30</b>	Kevin J Chen (Hong Kong University of Science and Technology, China) GaN-on-Si Power Devices and IC Technology
<b>16:30–17:00</b>	Ming Qiao (University of Electronic Science and Technology of China) Status and Trends of Superjunction Power Semiconductor Devices
<b>17:00–17:20</b>	Shiyong Zhang (Microsystem and Terahertz Research Center, China Academy of Engineering Physics, China) Ka-band power amplifier design using 100nm GaNSi technology
<b>17:20–17:40</b>	Weizong Xu (Nanjing University, China) Low Gate Leakage and High Stability MIS-HEMTs with High-k Y <sub>2</sub> O <sub>3</sub> Gate Dielectric
<b>18:10–20:00</b>	Banquet

## Morning, July 18, 2017 Session 1 (Zhongda Hall, 中大厅)

Chairs: Bo Shen (China) / Amalia Patane (UK)

8:00–8:30	Amalia Patane (University of Nottingham, UK) Novel two-dimensional van der Waals crystals and heterostructures
8:30–9:00	Hongtao Yuan (Stanford University, USA) Electric Control of Spin-Coupled Valleytronics in Layered Metal Dichalcogenides
9:00–9:20	Tianru Wu (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China) Towards the Controllable Synthesis of Graphene, h-BN and Graphene-h-BN Heterostructures
9:20–9:40	Haomin Wang (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China) Multidimensional Hetero-integration of Graphene and h-BN towards Nano-electronics
9:40–10:00	Coffee Break
10:00–10:30	Bo Shen (Peking University, China) Epitaxial growth of GaN-based heterostructures on Si substrates using a large lattice-mismatch induced stress control technology
10:30–11:00	Hongxing Wang (Xi'an Jiaotong University, China) Fabrication of microlens arrays for non-planar ultraviolet detector
11:00–11:20	Dong Pan (Institute of Semiconductors, Chinese Academy of Sciences) Near full-composition-range high-quality GaAs <sub>1-x</sub> Sb <sub>x</sub> nanowires grown by molecular-beam epitaxy
11:20–11:40	Ren-Kui Zheng (Shanghai Institute of Ceramics, Chinese Academy of Sciences) Reversible and nonvolatile manipulation of the topological surface states of Cr-doped Bi <sub>2</sub> Se <sub>3</sub> via ferroelectric polarization switching of Pb(Mg <sub>1/3</sub> Nb <sub>2/3</sub> )O <sub>3</sub> -PbTiO <sub>3</sub> single crystals
11:40–13:30	Lunch

## Morning, July 18, 2017 Session 2 (Yixing Hall, 以行厅)

Chairs: Xue Feng (China) / K. Tsukagoshi (Japan)

8:00–8:30	K. Tsukagoshi (National Institute for Materials Science, Japan) Silicon Induced Metal Oxide Thin Film Transistors
8:30–9:00	Yong-Young Noh (Dongguk University, Korea) Development of Printed Large Area Organic Transistors and Integrated Circuits
9:00–9:20	Fukai Shan (Qingdao University, China) Solution-processed ternary p-type CuCrO <sub>2</sub> semiconductors and their applications in thin-film transistors
9:20–9:40	Xiaoci Liang (Sun Yat-Sen University, China) Performance Adjustments of Solution Combustion-Processed In-Zn-O TFTs through Defect Engineering

<b>9:40–10:00</b>	Coffee Break
<b>10:00–10:30</b>	Xue Feng (Tsinghua University, China) Epidermal Inorganic Optoelectronics for blood oxygen measurement
<b>10:30–11:00</b>	Qing Chen (Peking University, China) The structure-dependent properties of InAs nanowires and their devices
<b>11:00–11:20</b>	Xiangyang Shi (Chinese Academy of Engineering Physics) Advanced $\text{In}_{0.8}\text{Ga}_{0.2}\text{As}$ /AlAs Resonant Tunneling Diode with High Peak Current Density for Terahertz Radiation
<b>11:20–11:40</b>	Hailong Wang (Institute of Semiconductors, Chinese Academy of Sciences) Complete demagnetization of (Ga,Mn)As films via electric field
<b>11:40–13:30</b>	Lunch

### **Morning, July 18, 2017 Session 3 (Jiexing Hall, 洁行厅)**

Chairs: Shijie Xu (Hong Kong) / Buwen Cheng (China)

<b>8:00–8:30</b>	Buwen Cheng (Institute of Semiconductors, CAS, China) Si-based heterostructure photodetectors for long-wavelength applications
<b>8:30–9:00</b>	Ning Dai (Shanghai Institute of Technical Physics, CAS, China) Fabrication of Flexible Bismuth Telluride Films and Investigation on Their Photoelectric Properties
<b>9:00–9:20</b>	Yulian Cao (Institute of Semiconductors, Chinese Academy of Sciences) Mid-infrared InAs-based interband cascade lasers
<b>9:20–9:40</b>	Young Huang (Oxford Instruments)
<b>9:40–10:00</b>	Coffee Break
<b>10:00–10:30</b>	Shijie Xu (The University of Hong Kong, China) The self-absorption effect in excitonic luminescence of ZnO
<b>10:30–11:00</b>	Hai Lu (Nanjing University, China) High performance UV photodetectors based on wide bandgap semiconductors
<b>11:00–11:20</b>	Han Wu (Nanjing University, China) Cathodoluminescence spectra of monolayer phosphorene on different substrates
<b>11:20–11:40</b>	Yongheng Huo (University of Science and Technology of China, China) Spontaneous brightening of dark excitons in GaAs/AlGaAs quantum dots near a cleaved facet
<b>11:40–13:30</b>	Lunch

### **Afternoon, July 18, 2017 Session 1 (Zhongda Hall, 中大厅)**

Chairs: Weifeng Sun (China) / E. A. Fitzgerald (USA)

<b>13:30–14:00</b>	Rong Zhang (Shandong University, China) Manipulable and hybridized, ultralow-threshold lasing in a plasmonic laser using elliptical InGaN/GaN nanorods
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<b>14:00–14:30</b>	Eugene A. Fitzgerald (MIT, USA ) Silicon Integrated Circuit Innovation Defined by New Materials
<b>14:30–14:50</b>	Jiacai Nie (Beijing Normal University, China) Possible Unconventional Pairing Mechanism at Superconducting LaAlO <sub>3</sub> /SrTiO <sub>3</sub> Interface
<b>14:50–15:10</b>	Yunbin He (Hubei University, China) SnO <sub>2</sub> epitaxial films with varying thickness on c-sapphire: structure evolution and optical band gap modulation
<b>15:10–15:30</b>	Coffee Break
<b>15:30–16:00</b>	Tangsheng Chen (Nanjing Electronic Devices Institute, China) Development of High Voltage SiC MOSFET
<b>16:00–16:30</b>	Weifeng Sun (Southeast University, China) Technical Challenge of Power Integrated Devices and New Structures in Monolithic Power ICs
<b>16:30–16:50</b>	Rong WANG (Institute of Electronic Engineering, China Academy of Engineering Physics, China) First-principles study on the role of fluorine impurities in the performance of enhancement-mode AlGaIn/GaN HEMTs
<b>16:50–17:10</b>	Jun-Wei Luo (National Center for Nanoscience and Technology, China) Photocorrosion-limited maximum efficiency of solar photoelectrochemical water splitting
<b>17:10–17:30</b>	Zonghai Hu (Beijing University of Posts and Telecommunications, China) Pristine graphene as a catalyst
<b>17:30–19:30</b>	<b>Poster Session</b>
<b>18:00–20:00</b>	Buffet dinner

### Afternoon, July 18, 2017 Session 2 (Yixing Hall, 以行厅)

Chairs: Jingbi You (China) / Helmut Baumgart (USA)

<b>13:30–14:00</b>	Helmut Baumgart (Old Dominion University, USA) Improving Conversion Efficiency of Thermoelectric Materials with Novel Phonon Engineering Approaches
<b>14:00–14:30</b>	Guozhen Shen (Institute of Semiconductors, CAS, China) Flexible Microsupercapacitors and Their Applications in Integrated Sensing Systems
<b>14:30–15:00</b>	Xiaodan Zhang (Nankai University, China) Key Issues in High Efficient Perovskite/Silicon-Heterojunction Two-Terminal Tandem Solar Cells
<b>15:00–15:20</b>	Lijun Zhang (Jilin University, China) Design of Inorganic Pb-free Halide Double-perovskite Semiconductors for Solar Cells via Cation-transmutation
<b>15:20–15:40</b>	Coffee Break
<b>15:40–16:10</b>	Jingbi You (Institute of Semiconductors, CAS, China) Efficient and Stable of Perovskite Solar Cells

<b>16:10–16:40</b>	Hongwei Han (Wuhan University, China) Stable Fully Printable perovskite solar cells based on triple mesoscopic layers
<b>16:40–17:10</b>	Yabing Qi (Okinawa Institute of Science and Technology, Japan) A Surface Science Approach to Perovskite Material and Solar Cell Research
<b>17:10–17:30</b>	Dongwen Yang (Jilin University, China) Functionality-Directed Screening of Pb-Free Hybrid Organic–Inorganic Perovskites with Desired Intrinsic Photovoltaic Functionalities
<b>17:30–19:30</b>	<b>Poster Session</b>
<b>18:00–20:00</b>	Buffet dinner

### Afternoon, July 18, 2017 Session 3 (Jiexing Hall, 洁行厅)

Chairs: Jie Yao (USA) / Fei Ding (Germany)

<b>13:30–14:00</b>	Fengqi Liu (Institute of Semiconductors, CAS, China) Quantum Cascade Lasers: From Mid-infrared to THz
<b>14:00–14:30</b>	Fei Ding (Leibniz University Hannover, Germany) Towards an ideal entangled photon source
<b>14:30–14:50</b>	Huiying Huang (Johannes Kepler University, Austria) Electrical-driven-GaAs/AlGaAs-QD-device with electroluminescence energy tunable around $^{87}\text{Rb}$ D2 line
<b>14:50–15:10</b>	Jun Zhang (Institute of Semiconductors, CAS, China) Laser cooling and quantum control of semiconductor phonons
<b>15:10–15:30</b>	Coffee Break
<b>15:30–16:00</b>	Jie Yao (UC Berkeley, USA) Tunable Optical Responses near the 2D limit
<b>16:00–16:20</b>	Chong-Xin Shan (Zhengzhou University, China) Chemical Vapor Deposited Diamond for Solar-blind Photodetectors
<b>16:20–16:40</b>	Shusheng Pan (Institute of Solid State Physics, Chinese Academy of Sciences, China) High Detectivity UV Photodetector Based on Intermediate Band $\text{Bi}_x\text{Sn}_{1-x}\text{O}_2$
<b>16:40–17:00</b>	Huijun Tian (Beijing University of Technology, China) Hybrid GaN-graphene ultraviolet photodetectors
<b>17:30–19:30</b>	<b>Poster Session</b>
<b>18:00–20:00</b>	Buffet dinner

**Morning, July 19, 2017 Session K (Sanjiang Hall, 三江厅)**

Chair: Xinran Wang (China)

**8:00–8:45** Akira Toriumi (University of Tokyo, Japan)  
Materials fundamentals for germanium CMOS

**8:45–9:30** Wei Huang (Nanjing Tech University, China )  
Recent Advances in Organic Optoelectronics

**9:30–9:50** Coffee Break

**9:50–10:35** Ming Liu (Institute of Microelectronics, CAS, China)  
Developing Status and Trend for Nonvolatile Memory

**10:35–11:20** Yue Kuo (Texas A&M University, USA)  
Semiconductor Technology – Nano, Giga, and Beyond

**11:20–12:00** Closing Remark

**12:00–13:30** Lunch

**Afternoon, July 19, 2017**

**13:30–18:00** Tour (Nanjing Museum)

**18:00–20:00** Buffet dinner