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EDUCATION

- **09/2014 – 06/2020 Ph.D.** in Electronic and Computer Engineering,
The Hong Kong University of Science and Technology (HKUST), Hong Kong
Supervisor: Prof. Hoi Sing KWOK & Prof. Man WONG
- **09/2010 – 06/2014 B.Sc.** in Opto-Information Science and Technology (with Honors),
Huazhong University of Science and Technology (HUST), Wuhan, China

RESEARCH INTERESTS

Back-end-of-line (BEOL) compatible (e.g., amorphous oxide semiconductor) electronics and related processing technologies **for monolithic 3D integration, alternative computing, and information displays**. All are committed to advancing **integrated circuits for artificial intelligence**.

AWARDS & HONORS

1. **Best Theme Poster Award**, *the 1st Annual Review of the Center for Heterogeneous Integration of Micro Electronic Systems (CHIMES, one of the SRC/DARPA JUMP 2.0 centers)*, 2023
2. **Member**, *SID Display Future Star Committee*, 2023
3. **Distinguished Paper Award**, *Society for Information Display's Display Week*, 2021
4. **Young Leader Award**, *SID China*, 2021
5. **Best Paper Award**, *Young Leaders in Displays (HK) and Postgraduate Workshop*, 2021
6. Student Travel Grant, *Society for Information Display's Display Week*, 2019
7. **Academic Award for PhD Students**, *School of Engineering, HKUST*, 2019
8. **Best Poster Presentation Award**, *Postgraduate Workshop on Display Research*, 2018
9. Student Travel Grant, *Society for Information Display's Display Week*, 2018
10. **Distinguished Poster Award**, *International Display Manufacturing Conference*, 2017
11. **Best Oral Presentation Award**, *Postgraduate Workshop on Display Research*, 2016
12. **PG Workshop Distinguished Paper Award**, *International Display Manufacturing Conference*, 2015
13. Full postgraduate scholarship, *HKUST*, 2014-2020
14. Outstanding Graduate, *HUST*, 2014
15. Merit Student, *HUST*, 2013
16. Undergraduate Scientific and Technological Innovation Activist, *HUST*, 2012

RESEARCH EXPERIENCE

- **09/2022 – present School of Electrical and Computer Engineering, Georgia Institute of Technology (GaTech), Atlanta, USA**
Supervisor: Prof. Suman DATTA
Position: Postdoctoral Fellow
- 1. **Amorphous oxide semiconductor (AOS) power transistors for on-chip voltage conversion**
 - a) Invented BEOL-compatible AOS power transistors for 12-volt operation.
 - b) Monolithically co-integrated depletion- and enhancement-mode AOS power transistors.
 - c) Developed dual-gate AOS power transistors with boosted performance and enhanced reliability.

- d) Fabricated high-breakdown-voltage superlattice MIM capacitors based on laminate fluorites.
 - e) Demonstrated on-chip switched-capacitor DC-DC converters for 12V-to-6V step-down conversion for heterogeneous 3D integrated transformer accelerators.
- 2. AOS access and ferroelectric transistors for Computing in-Memory (CiM) Hardware**
- a) Improved reliability of AOS transistors with a dual-gate structure for memory access.
 - b) Explored ALD technique as mobility-reliability boosters for AOS transistors.
 - c) Developed asymmetric dual-gate AOS ferroelectric field-effect transistors (FeFETs) with improved area efficiency and suppressed read/write disturbance in CiM bit cells.
- **09/2021 – 08/2022 School of Materials Engineering, Purdue University, West Lafayette, USA**
Supervisor: Prof. Shriram RAMANATHAN
Position: Postdoctoral Researcher
- 1. Homotypic Mott neuromorphic electronics enabled by selective-area doping technique**
- a) Reported the first two-terminal VO₂-based artificial synapses.
 - b) Implemented selective-area extremely heavy H doping in VO₂-based neural memories for building homotypic spiking neural IC hardware.
- 2. Hydrogenated Mott bits for energy-efficient probabilistic computing**
- a) Developed sub-nm scale mapping technique of hydrogen dopant distribution in VO₂.
 - b) Demonstrated partially hydrogenated VO₂-based probabilistic bit (p-bit) generators.
- **07/2020 – 08/2021 State Key Laboratory of Advanced Displays and Optoelectronics Technologies (SKL of ADT), HKUST, Hong Kong**
Supervisor: Prof. Hoi Sing KWOK & Prof. Ching Wan TANG
Position: Postdoctoral Research Associate (in HK Research Talent Hub)
- 1. Research on AOS thin-film transistors (TFTs)**
- a) Developed cost-effective fluorination in-packaging (FiP) technique for AOS TFT reliability enhancement at a low thermal processing budget.
 - b) Implemented low-voltage (≤ 1 V) ICs with all-oxide TFTs for wearable electronics.
- 2. Silicon nitride shadow masking for ultra-high-resolution OLED displays**
- a) Develop micron-thin self-tensioned (5000 ppi) corrugated silicon nitride masks (SiNMs).
 - b) Demonstrated 3000-ppi 3-inch full-color OLED pixel patterns using the SiNMs.
- **09/2014 – 06/2020 SKL of ADT, HKUST, Hong Kong**
Supervisor: Prof. Hoi Sing KWOK & Prof. Man WONG
Position: Ph.D. Candidate
- 1. Hybrid-phase indium-tin-zinc oxide (hp-InSnZnO) TFT technology**
- a) Designed hp-InSnZnO channels by co-design of element composition and crystal morphology.
 - b) Developed hybrid PECVD-SiO₂ stacks as gate insulators with enhanced dielectric quality.
 - c) Reported gate electrode's gas permeability as an effective knob for threshold voltage modulation.
 - d) Fabricated high-performance hp-InSnZnO TFTs with diverse (self-aligned, vertical, etc.) structures.
 - e) Extracted compact models of the hp-InSnZnO TFTs.
 - f) Prototyped a 2.2-inch 861ppi AMOLED panel with the hp-InSnZnO TFTs.
 - g) Implemented digital and analog ICs applicable to sensor interfaces.
- 2. Bridged-grain (BG) poly-Si TFTs using laser interference lithography (LIL)**
- a) Built a LIL system for submicron BG strips patterning.
 - b) Improved electrical characteristics of poly-Si TFTs by using LIL-defined BG structure.
- 3. Large-area few-layered MoS₂ film deposition via magnetron sputtering**
- a) Sputtered high-quality few-layer MoS₂ films on 4-inch Si wafers.
 - b) Characterized the few-layer MoS₂ films using spectroscopic and microscopy technologies.

c) Fabricated the few-layer MoS₂ transistors.

4. Development of new-generation micro-LED displays

- a) Investigated selective mass transfer and miniaturization techniques for micro-LED pixels.
- b) Assembled micro-LED pixels on active-matrix backplanes with AOS TFTs.

▪ 05/2011 – 06/2014 Wuhan National Laboratory for Optoelectronics (WNLO), HUST, China

Mentor: Prof. Jun ZHOU & Prof. Zhonglin WANG

Position: Undergraduate Research Assistant

- 1. Fabricated self-cleaning flexible infrared sensors with carbon nanoparticles.
- 2. Developed three-dimensional ZnO porous films for self-cleaning ultraviolet detectors.
- 3. Demonstrated broadband photodetectors based on ZnO nanowire array and PbS quantum dots.

PROFESSIONAL ACTIVITIES

▪ Participated Funding Programs

- 1. 01/2023 – 12/2027, “Amorphous Oxide Semiconductor for Integrated Power Delivery & Conversion”, CHIMES-T2-3136.007, USD 1,200,000, funded by SRC/DARPA Joint University Microelectronics Program (JUMP) 2.0 Program.
- 2. 03/2022 – 02/2024, “Research on Thin Film Encapsulation Technology for Flexible OLED Devices”, GHP/006/20GD, HKD 1,096,250.00, funded by The Innovation and Technology Commission (ITC).
- 3. 11/2020 – 10/2022, “Flexible Metal-oxide Backplane Technology for RGB-Color Conversion OLED Displays”, GHP/013/19SZ, HKD995,999.47, funded by The Hong Kong Government.
- 4. 11/2019 – 4/2022, “Flexible photodetector array with integrated electronics based on metal-oxide”, SZSTI20EG15, HKD 1,924,371.93, funded by Shenzhen Sci & Tech Innovation Committee (SZSTI).
- 5. 09/2019 – 08/2021, “EMMO-Structure Metal-Oxide Thin-Film Transistor for the Next-Generation AMOLED Display”, GHP/007/18GD, HKD 1,276,700.00, funded by The Innovation and Technology Commission (ITC).
- 6. 04/2019 – 03/2020, “Study on InSnZnO Thin Film Transistors and its Active-Matrix Array for High Resolution AMOLED Displays”, GZSTI17EG02, HKD 283,254.02, funded by Guangzhou Municipal Sci. & Tech. Bureau.
- 7. 06/2017 – 05/2019, “Applications of Novel Metal-Oxide Thin-Film Transistor to Flat Panel Displays and Internet of Things (IoT)”, IGN16EG17, HKD 200,000, funded by the Hong Kong University of Science and Technology.
- 8. 07/2013 – 01/2049, “State Key Laboratory on Advanced Displays and Optoelectronics Technologies (HKUST)”, ITC-PSKL12EG02, HKD 98,750,000.00, funded by The Innovation and Technology Commission (ITC).
- 9. 01/2012 – 12/2016, “Challenges in Organic Photo-Voltaic and Light-Emitting Diodes – A Concerted Multi-Disciplinary and Multi-Institutional Effort”, T23-713/11-1, HKD 5,000,000, funded by The Hong Kong Government.
- 10. Other projects supported by DoE EFRC program, ARO Neuro Fund, Samsung Electronics, EMD Electronics, etc.

▪ Invited Talks

- 1. “BEOL-Compatible On-Chip DC-DC Converter” at *2024 IEEE International Interconnect Technology Conference (IITC)*, San Jose, USA, 06/2024.
- 2. “Amorphous Oxide Semiconductors for Monolithic 3D Integrated Circuits”, on *2024 IEEE Symposium on VLSI Technology & Circuits*, Honolulu, USA, 06/2024.
- 3. “Fluorinated Metal Oxide Thin-Film Transistors with Low Process Thermal Budgets” at *2023 International Conference on Display Technology*, Nanjing, China, 03/2023.
- 4. “Hybrid-Phase Metal Oxide Thin-Film Transistor Technology” at *Young Leader Conference of ICDT*

2021, Beijing, China, 06/2021.

5. "Hybrid-Phase Metal Oxide Thin-Film Transistors and their Applications" at *Shanghai University League's Forum for International Young Scholars*, Shanghai, China, 05/2020.

▪ **Organized Conferences/Workshops**

1. TPC, *2024 National Nanotechnology Coordinated Infrastructure (NNCI) Etch Symposium*, Atlanta, USA, 2024.
2. Program committee member, *Cross-Strait Postgraduate Workshop on Display Research*, Guangzhou, China, 2016
3. Student helper, *16th International Conference on Ferroelectric Liquid Crystals*, Hong Kong, 2016
4. Student helper, *6th International Photonics and Optoelectronics Meeting*, Wuhan, China, 2013

▪ **Professional Affiliations**

1. Member, *Institute of Electrical and Electronics Engineers (IEEE)*
2. Member, *Society for Information Display (SID)*

▪ **Reviewer**

IEEE Electron Device Letters, IEEE Transactions on Electron Devices, Applied Physics Letters, Journal of the Society for Information Display, Scientific Reports, Thin Solid Films, Physical Review Applied, etc.

▪ **Editorial Board**

Rare Metals

▪ **Teaching Assistant**

1. Fundamentals of Photovoltaic and Renewable Energy (ELEC 4530), HKUST, 02/2018-06/2018
2. Digital Circuits and Systems (ELEC 2200), HKUST, 09/2015-06/2016
3. Synthesis and Characterization of Optoelectronic Materials, HUST, 09/2013-01/2014

PUBLICATIONS (citation: 880+, H-index: 16 according to [Google Scholar](https://scholar.google.com/citations?user=...))

▪ **Representative Publications**

1. **Deng, Sunbin**; Yu, Haoming; Park, Tae Joon; Islam, A. N. M. Nafiul; Manna, Sukrit; Pofelski, Alexandre; Wang, Qi; Zhu, Yimei; Sankaranarayanan, Subramanian K. R. S.; Sengupta, Abhronil; Ramanathan, Shriram. "Selective area doping for Mott neuromorphic electronics", *Science Advances*, 9.11 (2023): eade4838.
2. **Deng, Sunbin**; Kwak, Jungyoung; Lee, Junmo; Aabrar, Khandker Akif; Kim, Tae-Hyeon; Choe, Gihun; Kirtania, Sharadindu Gopal; Zhang, Chengyang; Li, Wantong; Phadke, Omkar; Yu, Shimeng; Datta, Suman. "BEOL Compatible Oxide Power Transistors for On-Chip Voltage Conversion in Heterogenous 3D (H3D) Integrated Circuits", *2023 IEEE International Electron Devices Meeting (IEDM)*, San Francisco, USA, Dec. 2023.
3. **Deng, Sunbin**; Kwak, Jungyoung; Lee, Junmo; Chakraborty, Dyutimoy; Shin, Jaewon; Phadke, Omkar; Kirtania, Sharadindu Gopal; Zhang, Chengyang; Aabrar, Khandker Akif; Yu, Shimeng; Datta, Suman. "Demonstration of On-Chip Switched-Capacitor DC-DC Converters using BEOL Compatible Oxide Power Transistors and Superlattice MIM Capacitors", *2024 IEEE Symposium on VLSI Technology & Circuits, Honolulu, USA*, June 2024.
4. **Deng, Sunbin**; Zhong, Wei; Dong, Shou-Cheng; Chen, Rongsheng; Li, Guijun; Zhang, Meng; Yeung, Fion Sze Yan; Wong, Man; Kwok, Hoi-Sing. "Thermal Budget Reduction in Metal Oxide Thin-Film Transistors via Planarization Process", *IEEE Electron Device Letters*, 42.2 (2021): 180-183.
5. **Deng, Sunbin**; Chen, Rongsheng; Li, Guijun; Zhang, Meng; Yeung, Fion Sze Yan; Wong, Man; Kwok, Hoi-Sing. "Gate Insulator Engineering in Top-Gated Indium-Tin-Oxide-Stabilized ZnO Thin-Film Transistors", *IEEE Electron Device Letters*, 40.7 (2019): 1104-1107.

▪ **Book Chapters**

1. Zhang, Meng; **Deng, Sunbin**; Yan, Yan; Wong, Man; Kwok, Hoi-Sing. "Fundamentals of Metal-Oxide Thin-Film Transistors", in Semiconducting metal oxide thin-film transistors, IOP Publishing, Bristol, UK. DOI: 10.1088/978-0-7503-2556-1ch2.

▪ **Journal Articles** (50+ articles in total including 20 articles as first/corresponding author)

1. **Deng, Sunbin**; Park, Tae Joon; Yu, Haoming; Saha, Arnob; Islam, A. N. M. Nafiul; Wang, Qi; Sengupta, Abhronil; Ramanathan, Shriram. "Hydrogenated VO₂ Bits for Probabilistic Computing", *IEEE Electron Device Letters*, 44.10 (2023): 1776-1779.
2. **Deng, Sunbin**; Yu, Haoming; Park, Tae Joon; Islam, A. N. M. Nafiul; Manna, Sukrit; Pofelski, Alexandre; Wang, Qi; Zhu, Yimei; Sankaranarayanan, Subramanian K. R. S.; Sengupta, Abhronil; Ramanathan, Shriram. "Selective area doping for Mott neuromorphic electronics", *Science Advances*, 9.11 (2023): eade4838.
3. Park, Tae Joon*; **Deng, Sunbin***; Manna, Sukriti; Islam, A. N. M. Nafiul; Yu, Haoming; Yuan, Yifan; Fong, Dillon D.; Chubykin, Alexander A.; Sengupta, Abhronil; Sankaranarayanan, Subramanian K. R. S.; Ramanathan, Shriram. "Complex oxides for brain-inspired computing: A review", *Advanced Materials* (2022): 2203352. (***Equal contribution**)
4. **Deng, Sunbin**; Dong, Shou-Cheng; Chen, Rongsheng; Zhong, Wei; Li, Guijun; Zhang, Meng; Yeung, Fion Sze Yan; Wong, Man; Kwok, Hoi-Sing. "A Cost-Effective Fluorination Method for Enhancing the Performance of Metal Oxide Thin-Film Transistors", *Journal of the Society for Information Display*, 29.5 (2021): 318-327. (**Additional cover**)
5. **Deng, Sunbin**; Zhong, Wei; Dong, Shou-Cheng; Chen, Rongsheng; Li, Guijun; Zhang, Meng; Yeung, Fion Sze Yan; Wong, Man; Kwok, Hoi-Sing. "Thermal Budget Reduction in Metal Oxide Thin-Film Transistors via Planarization Process", *IEEE Electron Device Letters*, 42.2 (2021): 180-183.
6. Yin, Xuemei*; **Deng, Sunbin***; Li, Guoyuan; Zhong, Wei; Chen, Rongsheng; Li, Guijun; Yeung, Fion Sze Yan; Wong, Man; Kwok, Hoi Sing. "Low Leakage Current Vertical Thin-Film Transistors with ITO-stabilized ZnO Channel", *IEEE Electron Device Letters*, 41.2 (2020): 248-251. (***Equal contribution**)
7. **Deng, Sunbin**; Chen, Rongsheng; Li, Guijun; Zhang, Meng; Yeung, Fion Sze Yan; Wong, Man; Kwok, Hoi-Sing. "Gate Insulator Engineering in Top-Gated Indium-Tin-Oxide-Stabilized ZnO Thin-Film Transistors", *IEEE Electron Device Letters*, 40.7 (2019): 1104-1107.
8. Xu, Yuming*; **Deng, Sunbin***; Wu, Zhaohui; Li, Bin; Qin, Yuning; Zhong, Wei; Chen, Rongsheng; Li, Guijun; Wong, Man; Kwok, Hoi Sing. "The Implementation of Fundamental Digital Circuits With ITO-Stabilized ZnO TFTs for Transparent Electronics", *IEEE Transactions on Electron Devices*, 65.12 (2018): 5395-5399. (***Equal contribution**)
9. Zhong, Wei*; **Deng, Sunbin***; Wang, Kai; Li, Guijun; Li, Guoyuan; Chen, Rongsheng; Kwok, Hoi-Sing. "Feasible route for a large area few-layer MoS₂ with magnetron sputtering", *Nanomaterials*, 8.8 (2018): 590. (***Equal contribution**)
10. **Deng, Sunbin**; Chen, Rongsheng; Li, Guijun; Zhang, Meng; Xia, Zhihe; Wong, Man; Kwok, Hoi-Sing. "Threshold voltage adjustment in hybrid-microstructural ITO-stabilized ZnO TFTs via gate electrode engineering", *IEEE Electron Device Letters*, 39.7 (2018): 975-978.
11. **Deng, Sunbin**; Chen, Rongsheng; Li, Guijun; Xia, Zhihe; Zhang, Meng; Zhou, Wei; Wong, Man; Kwok, Hoi-Sing. "Hybrid-Phase Microstructural ITO-Stabilized ZnO TFTs with Self-Aligned Coplanar Architecture", *IEEE Electron Device Letters*, 38.12 (2017): 1676-1679.
12. **Deng, Sunbin**; Chen, Rongsheng; Li, Guijun; Xia, Zhihe; Zhang, Meng; Zhou, Wei; Wong, Man; Kwok, Hoi-Sing. "Investigation of high-performance ITO-stabilized ZnO TFTs with hybrid-phase microstructural channels", *IEEE Transactions on Electron Devices*, 64.8 (2017): 3174-3182.

13. **Deng, Sunbin**; Chen, Rongsheng; Li, Guijun; Xia, Zhihe; Zhang, Meng; Zhou, Wei; Wong, Man; Kwok, Hoi-Sing. "High-performance staggered top-gate thin-film transistors with hybrid-phase microstructural ITO-stabilized ZnO channels", *Applied Physics Letters*, 109.18 (2016): 182105.
14. **Deng, Sunbin**; Chen, Rongsheng; Zhou, Wei; Ho, Jacob Yeuk Lung; Wong, Man; Kwok, Hoi-Sing. "Fabrication of high-performance bridged-grain polycrystalline silicon TFTs by laser interference lithography", *IEEE Transactions on Electron Devices*, 63.3 (2016): 1085-1090.
15. Li, Hui; **Deng, Sunbin[^]**; Xu, Yuming; Zhong, Wei; Luo, Dongxiang; Li, Guijun; Kwok, Hoi Sing; Chen, Rongsheng. "A Differential Ring Oscillator with Tail Current Source Control Scheme Using N-Type Oxide TFTs", *IEEE Transactions on Electron Devices*, 69.4 (2022): 1870-1875. (**[^]Corresponding author**)
16. Xu, Yuming; Wu, Zhaohui; Li, Bin; **Deng, Sunbin[^]**; Zhong, Wei; Li, Guijun; Luo, Dongxiang; Yeung, Fion Sze Yan; Kwok, Hoi Sing; Chen, Rongsheng. "Oxide TFT Frontend Amplifiers for Flexible Sensing Systems", *IEEE Transactions on Electron Devices*, 68.12 (2021): 6190-6196. (**[^]Corresponding author**)
17. Xu, Yuming; Zhong, Wei; Li, Bin; **Deng, Sunbin[^]**; Fan, Houbo; Wu, Zhaohui; Lu, Lei; Yeung, Fion Sze Yan; Kwok, Hoi-Sing; Chen, Rongsheng. "An Integrator and Schmitt Trigger Based Voltage-to-Frequency Converter Using Unipolar Metal-Oxide Thin Film Transistors", *IEEE Journal of the Electron Devices Society*, 9 (2021): 144-150. (**[^]Corresponding author**)
18. Fan, Houbo; Li, Guoyuan; **Deng, Sunbin[^]**; Xu, Yuming; Qin, Yuning; Liu, Yuan; Yeung, Sze Yan Fion; Wong, Man; Kwok, Hoi Sing; Chen, Rongsheng. "A High Gain Low-Noise Amplifier based on ITO-Stabilized ZnO Thin-Film Transistors", *IEEE Transactions on Electron Devices*, 67.12 (2020): 5537-5543. (**[^]Corresponding author**)
19. Xu, Yuming; Li, Bin; **Deng, Sunbin[^]**; Qin, Yuning; Fan, Houbo; Zhong, Wei; Liu, Yuan; Wu, Zhaohui; Yeung, Fion Sze Yan; Wong, Man; Kwok, Hoi Sing; Chen, Rongsheng. "A Novel Envelope Detector Based on Unipolar Metal-Oxide TFTs", *IEEE Transactions on Circuits and Systems II: Express Briefs*, 67.11 (2020): 2367-2371. (**[^]Corresponding author**)
20. Qin, Yuning; Li, Guoyuan; Xu, Yuming; Chen, Rongsheng; **Deng, Sunbin[^]**; Zhong, Wei; Wu, Zhaohui; Li, Bin; Li, Guijun; Yeung, Sze Yan Fion; Wong, Man; Kwok, Hoi-Sing. "Low-Power Design for Unipolar ITO-Stabilized ZnO TFT RFID Code Generator Using Differential Logic Decoder", *IEEE Transactions on Electron Devices*, 66.11 (2019): 4768-4773. (**[^]Corresponding author**)
21. Zhu, Guanming; Chen, Zhiying; Zhang, Meng; Lu, Lei; **Deng, Sunbin**; Wong, Man; Kwok, Hoi-Sing. "Reliability of indium-tin-zinc-oxide thin-film transistors under dynamic drain voltage stress", *Applied Physics Letters*, 125.2 (2024): 023505.
22. Yuan, Yifan; Kotiuga, Michele; Park, Tae Joon; Patel, Ranjan; Ni, Yuanyuan; Saha, Arnob; Zhou, Hua; Sadowski, Jerzy; Al-Mahboob, Abdullah; Yu, Haoming; Du, Kai; Zhu, Minning; **Deng, Sunbin**; Bisht, Ravindra; Lyu, Xiao; Wu, Chung-Tse; Ye, Peide; Sengupta, Abhronil; Cheong, Sang-Wook; Xu, Xiaoshan; Rabe, Karin; Ramanathan, Shriram. "Hydrogen-Induced Tunable Remanent Polarization in a Perovskite Nickelate", *Nature Communications*, 15.1 (2024): 4717.
23. Pofelski, Alexandre; Jia, Haili; **Deng, Sunbin**; Yu, Haoming; Park, Tae Joon; Manna, Sukriti; Chan, Maria K. Y.; Sankaranarayanan, Subramanian K. R. S.; Ramanathan, Shriram; Zhu, Yimei. "Sub-nanometer Scale Mapping of Hydrogen Doping in Vanadium Dioxide", *Nano Letters*, 24.6 (2024): 1974-1980.
24. Chen, Yayi; Liu, Yuan; **Deng, Sunbin**; Chen, Rongsheng; Zhang, Jianfeng; Kwok, Hoi-Sing; Zhong, Wei. "Low-frequency noise in InSnZnO thin film transistors with high-quality SiO₂ gate oxide stacks", *Applied Physics Letters*, 124.2 (2024): 023501.
25. Zhang, Meng; Jiang, Zhendong; **Deng, Sunbin**; Chen, Zhiying; Ma, Xiaotong; Tien, Ching-Ho; Chen, Lung-Chien; Wong, Man; Kwok, Hoi-Sing. "Hot Carrier Degradation Accompanied by Recovery in InSnZnO Thin-Film Transistors", *IEEE Electron Device Letters*, 44.7 (2023): 1124-1127.

26. Zhu, Guanming; Zhang, Meng; Jiang, Zhendong; Huang, Jinyang; Huang, Yuxiang; **Deng, Sunbing**; Lu, Lei; Wong, Man; Kwok, Hoi-Sing. "Significant Degradation Reduction in Metal Oxide Thin-Film Transistors via the Interaction of Ionized Oxygen Vacancy Redistribution, Self-Heating Effect, and Hot Carrier Effect", *IEEE Transactions on Electron Devices*, 70.8 (2023): 4198-4205.
27. Zhang, Jianfeng; Yao, Chuang; Liu, Xinhui; Ding, Ziyi; Liu, Yuan; Liu, Baoxing; **Deng, Sunbin**; Kwok, Hoi-Sing; Li, Guijun. "Controllable Transformation of 2D Perovskite for Multifunctional Sensing Properties", *The Journal of Physical Chemistry C*, 127.16 (2023): 7730-7739.
28. Chen, Zhiying; Zhang, Meng; **Deng, Sunbin**; Jiang, Zhendong; Yan, Yan; Han, Suting; Zhou, Ye; Wong, Man; Kwok, Hoi-Sing. "Effect of Moisture Exchange Caused by Low-Temperature Annealing on Device Characteristics and Instability in InSnZnO Thin-Film Transistors". *Advanced Materials Interfaces*, 9.14 (2022): 2102584. **(Inside back cover)**
29. Luo, Zhongming; Liu, Baoxing; Luo, Xi; Zheng, Ting; **Deng, Sunbin**; Chen, Rongsheng; Tian, Bingbing; Xu, Ping; Kwok, Hoi-Sing; Li, Guijun. "A Generic Protocol for Highly Reproducible Manufacturing of Efficient Perovskite Light-Emitting Diodes Using In-Situ Photoluminescence Monitoring", *Advanced Materials Technologies*, 7.5 (2022): 2100987.
30. Jiang, Zhendong; Zhang, Meng; **Deng, Sunbing**; Yang, Yuyang; Wong, Man; Kwok, Hoi-Sing. "Evaluation of Positive-Bias-Stress-Induced Degradation in InSnZnO Thin-Film Transistors by Low Frequency Noise Measurement", *IEEE Electron Device Letters*, 43.6 (2022): 886-889.
31. Yan, Huibo; Huang, Jincheng; Zhang, Xiaohui; Wang, Ming; Liu, Jun; Meng, Chunfeng; **Deng, Sunbin**; Lu, Lei; Xu, Ping; Kwok, Hoi-Sing; Li, Guijun. "A buried functional layer for inorganic CsPb_{0.75}Sn_{0.25}I₂Br perovskite solar cells". *Solar RRL*, 6.4 (2022): 2100899.
32. Zhong, Wei; Zhang, Jianfeng; Liu, Yuan; Tan, Lijun; Lan, Linfeng; **Deng, Sunbin**; Yeung, Fion Sze Yan; Kwok, Hoi Sing; Chen, Rongsheng. "Gate Dielectric Treated by Self-Assembled Monolayers (SAMs) to Enhance the Performance of InSnZnO Thin-Film Transistors", *IEEE Transactions on Electron Devices*, 69.5 (2022): 2398-2403.
33. Shi, Weiwei; Hu, Lizhi; Liu, Yuan; **Deng, Sunbin**; Xu, Yuming; Kwok, Hoi-Sing; Chen, Rongsheng. "Arithmetic and Logic Circuits Based on ITO-Stabilized ZnO TFT for Transparent Electronics", *IEEE Transactions on Circuits and Systems I: Regular Papers*, 69.1 (2022): 356-365.
34. Xu, Yuming; Li, Bin; Zhong, Wei; **Deng, Sunbin**; Fan, Houbo; Wu, Zhaohui; Yeung, Fion Sze Yan; Kwok, Hoi Sing; Chen, Rongsheng. "A Unipolar TFT-Based Amplifier with Enhanced DC Offset Suppression", *Electronics Letters*, 57.2 (2021): 67-70.
35. Zhang, Jianfeng; Zhong, Wei; Liu, Yuan; Huang, Jincheng; **Deng, Sunbin**; Zhang, Meng; Kwok, Hoi-Sing; Li, Guijun. "A High-Performance Photodetector Based on 1D Perovskite Radial Heterostructure", *Advanced Optical Materials*, 9.24 (2021): 2101504.
36. Luo, Xi; Zheng, Ting; Luo, Zhongming; Liu, Jun; **Deng, Sunbin**; Chen, Rongshen; Zhang, Meng; Kwok, Hoi Sing; Zhang, Jianfeng; Li, Guijun. "Visual Electrocardiogram Synchronization Monitor Using Perovskite-Based Multicolor Light-Emitting Diodes", *ACS Photonics*, 8.11 (2021):3337-3345.
37. Zhong, Wei; Kang, Liangyun; **Deng, Sunbin**; Lu, Lei; Yao, Ruohu; Lan, Linfeng; Kwok, Hoi Sing; Chen, Rongsheng. "Effect of Sc₂O₃ Passivation Layer on the Electrical Characteristics and Stability of InSnZnO Thin-Film Transistors", *IEEE Transactions on Electron Devices*. 68.10 (2021): 4956-4961.
38. Yin, Xuemei; Chen, Yayi; Li, Guoyuan; Zhong, Wei; **Deng, Sunbin**; Lu, Lei; Li, Guijun; Kwok, Hoi Sing; Chen, Rongsheng. "Analysis of low frequency noise in in situ fluorine-doped ZnSnO thin-film transistors", *AIP Advances*, 11.4 (2021): 045326.
39. Liu, Yuan; Huang, Yu-Xuan; **Deng, Sunbin**; Wong, Man; Kwok, Hoi-Sing; Chen, Rongsheng. "Dimension Scaling Effects on Conduction and Low Frequency Noise Characteristics of ITO-Stabilized ZnO Thin Film Transistors", *IEEE Journal of the Electron Devices Society*, 8 (2021): 435-441.
40. Huang, Jincheng; Yan, Huibo; Zhou, Dingjian; Zhang, Jianfeng; **Deng, Sunbin**; Xu, Ping; Chen,

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8. **Deng, Sunbin**; Kwak, Jungyoun; Lee, Junmo; Yu, Shimeng; Datta, Suman. "BEOL-Compatible On-Chip DC-DC Converter", *2024 IEEE International Interconnect Technology Conference (IITC)*, San Jose, USA, June 2024. **(Invited)**
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 25. Zhang, Meng; Jiang, Zhendong; **Deng, Sunbin**; Ma, Xiaotong; Yan, Yan; Li, Guijun; Chen, Rongsheng; Wong, Man; Kwok, Hoi-Sing. "Gate-Bias-Stress-Induced Instability in Hybrid-Phase Microstructural ITO-Stabilized ZnO TFTs", *Society for Information Display's Display Week 2019*, San Jose, USA, May 2019.
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37. Chen, Rongsheng; **Deng, Sunbin**; Xia, Zhihe; Zhang, Meng; Zhou, Wei; Wong, Man; Kwok, Hoi-Sing. "High Performance Thin-film Transistors with Hybrid-phase ITO-stabilized ZnO Active Channel Layer", *2017 International Conference on Display Technology*, Fuzhou, China, Feb. 2017.
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40. **Deng, Sunbin**; Chen, Rongsheng; Li, Guijun; Xia, Zhihe; Zhang, Meng; Zhou, Wei; Wong, Man; Kwok, Hoi-Sing. "Hybrid-Phase Microstructure in Indium-Tin-Zinc-Oxide Thin Films and Its Application to High-Performance Thin-film Transistors", *2016 Postgraduate Workshop on Display Research*, Guangzhou, China, Sept. 2016. **(Best Oral Presentation Award)**
41. **Deng, Sunbin**; Chen, Rongsheng; Zhou, Wei; Ho, Jacob Yeuk Lung; Wong, Man; Kwok, Hoi-Sing. "Fabrication of High-Performance Bridged-Grain Polycrystalline Silicon Thin-Film Transistors with Laser Interference Lithography Technology", *International Display Manufacturing Conference*, Taipei, Taiwan, Aug. 2015. **(PG Workshop Distinguished Paper Award)**
42. **Deng, Sunbin**; Xia, Zhihe; Wong, Man; Kwok, Hoi-Sing; Zhang, Meng; Zhou, Wei; Chen, Rongsheng. "Bridged-Grain Metal-Induced Crystallization Poly-Si TFTs with Silicon Self-Implantation", *International Display Manufacturing Conference*, Taipei, Taiwan, Aug. 2015.
- **Patents (3 issued, 3 to be issued)**
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 2. Chen, Rongsheng; **Deng, Sunbin**; Kwok Hoi -Sing. "Inorganic Metallic Oxide Thin Film with Composite Crystal Form and Manufacturing Method Thereof", United States Pub. No.: US 2020/0350167 A1, Pub. Date: Nov. 05, 2020.
 3. 一种自对准顶栅铟锡锌氧化物薄膜晶体管及其制造方法, 陈荣盛, **邓孙斌**, 郭海成, Chinese Invention Patent No.: ZL 201710792095.9, Issue Date: Oct. 11, 2019.
 4. 一种二硫化钼薄膜的制备方法, 陈荣盛, 钟伟, **邓孙斌**, 李国元, 吴朝晖, 李斌, Chinese Invention Patent No.: ZL 201910049361.8, Issue Date: Aug. 28, 2020.
 5. 垂直结构的复合晶型金属氧化物薄膜晶体管及其制造方法, 陈荣盛, 尹雪梅, 李国元, **邓孙斌**, 郭海成, Chinese patent application No.: 2019 1 0975945.8, Pub. Date: Oct. 15, 2019.
 6. 一种金属氧化物薄膜晶体管及其钝化层的制备方法, 陈荣盛, 钟伟, **邓孙斌**, 尹雪梅, 郭海成, Chinese patent application No.: 2018 1 1405391.X, Pub. Date: Nov. 23, 2018.

TECHNICAL SKILLS & QUALIFICATION

- **Lab Skills**
 1. Skilled in nanofabrication techniques including, but not limited to, the following:
 - a) Film growth/deposition (sputtering, EBE, PLD, PECVD, ALD, thermal diffusion, implantation, etc.)

- b) Lithography (photolithography, e-beam lithography, laser-interference lithography, etc.)
- c) Dry/wet etching (RIE, ICP, DRIE, etc.) and chemical-mechanical polishing
- 2. Skilled in layout design (L-edit, Klayout, etc.), device characterizations (Keithley 4200A-SCS, Keysight B1500A, etc.), and data analysis
- 3. Experienced with material characterizations (XPS, UPS, XRD, SIMS, AFM, SEM, TEM, etc.)
- 4. Experienced with device modelling and circuit simulation toolkits (Silvaco TCAD, Cadence, etc.)
- **Qualification**
 - 1. Grade II (C language) & Grade IV (Network Engineer), National Computer Rank Examination of China
 - 2. Second-grade Referee, China Tennis Association

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