Sunbin DENG (邓孙斌，鄧孫斌), Ph.D.

Office: Room 4140, Marcus Nanotechnology Building
345 Ferst Dr. NW
Georgia Institute of Technology
Atlanta, GA 30332, USA

Tel: +1 765-746-9154
Email: sdeng76@gatech.edu
Website: www.sunbindeng.site
Last updated in Nov. 2023

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**
- **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

Beyond-silicon (e.g., metal oxide) **thin-film electronics** and **heterogenous integration** technologies for **advanced information displays** (e.g., AR/VR/MR, flexible displays), **alternative computing** (e.g., in-memory computing, probabilistic computing), and **enablers at leading-edge logic nodes** (e.g., backside power delivery).

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,** *International Conference on Display Technology*, 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,** *The International Display Manufacturing Conference*, 2017
11. **Best Oral Presentation Award,** *Postgraduate Workshop on Display Research*, 2016
12. **Distinguished Paper Award,** *The 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**
  Supervisor: Prof. Suman DATTA
  Position: Postdoctoral Fellow

1. **Oxide power electronics for on-chip power delivery at leading-edge logic technology nodes**
   a) Developed BEOL compatible oxide power transistors for 12-volt operation and relevant technology

for monolithic co-integration of depletion- and enhancement-mode power transistors

b) Demonstrated on-chip high-density superlattice MIM capacitors using nano laminate fluorite system

c) To demonstrate switch-capacitor based integrated voltage converters for vertical power delivery solutions across the multi-tier 3D stacks

2. Amorphous oxide semiconductor transistors for Computing in-Memory (CiM) Hardware

a) Improved reliability of scaled oxide access transistors (L_g < 100 nm) with a dual-gate structure

b) To explore performance-reliability boosters (device structure, fabrication processes, etc.) in ALD oxide access transistors

c) To develop asymmetric dual-gated oxide ferroelectric field-effect transistors (FeFETs) with area efficiency improved and read/write disturbance suppressed in CiM bit cells

- **09/2021 – 08/2022 School of Materials Engineering, Purdue University, West Lafayette**
  Supervisor: Prof. Shriram RAMANATHAN
  Position: Postdoctoral Researcher

1. Selective area doping technology for Mott neuromorphic electronics

a) Developed proton-doped VO_2 artificial synapses

b) Demonstrated neuromorphic circuits with monolithically integrated artificial neurons and synapses by selective area doping in VO_2

2. Hydrogenated Mott probabilistic bit (p-bit) generators

a) Reported nanometer scale mapping of hydrogen dopants in VO_2

b) Demonstrated proton-doped VO_2 p-bit generators with tunable phase transition characteristics for energy-efficient error-tolerant probabilistic computing

- **07/2020 – 08/2021 State Key Laboratory of Advanced Displays and Optoelectronics Technologies (SKL of ADT), HKUST**
  Supervisor: Prof. Hoi Sing KWOK & Prof. Ching Wan TANG
  Position: Postdoctoral Research Associate (in HK Research Talent Hub)

1. Extended research on oxide thin-film transistors (TFTs)

a) Developed fluorination in-package (FiP) technology for low-thermal-budget oxide TFTs

b) Implemented low-voltage (i.e., ≤1 V) circuits with all-oxide TFTs for wearable/biological electronics

2. Ultra-high-resolution SiN_x shadow mask technology for OLED displays

a) Fabricated micron-thin, self-tensioned (5000 ppi) SiN_x shadow masks

b) Demonstrated 3000-ppi 3-inch full-color OLED displays using the SiN_x shadow masks

- **09/2014 – 06/2020 SKL of ADT, HKUST**
  Supervisor: Prof. Hoi Sing KWOK
  Position: Ph.D. Student

1. Hybrid-phase indium-tin-zinc oxide (hp-InSnZnO) TFT technology

a) Designed hp-InSnZnO channels by modifying both element composition and crystal morphology

b) Investigated the relationship between channel properties and deposition parameters

c) Developed a high-quality type of PECVD-SiO_2 stacks as gate insulators

d) Employed gas permeability of gate electrodes as an effective aspect to modulate threshold voltage

e) Fabricated high-performance hp-InSnZnO TFTs with various (self-aligned, vertical, etc.) structures

f) Extracted compact models of the hp-InSnZnO TFTs

g) Prototyped a 2.2-inch AMOLED panel using the self-developed hp-InSnZnO TFT technology

h) Implemented fully transparent digital circuits and analog amplifiers for sensor interfacing

2. **Bridged-grain (BG) poly-Si TFTs using laser interference lithography (LIL)**
   a) Improved electrical characteristics of poly-Si channels with BG structure
   b) Introduced a self-built LIL system to define submicron BG strips
3. **Large-area few-layered MoS_2 film deposition via magnetron sputtering**
   a) Sputtered high-quality few-layer MoS_2 films on large-area Si wafers with thermally grown SiO_2
   b) Characterized the few-layer MoS_2 films using spectroscopic and microscopy techniques
   c) Attempted to fabricate TFTs using the few-layer MoS_2 channels
4. **Development of new-generation micro-LED displays**
   a) Investigated selective mass transfer and miniaturization techniques for micro-LED pixels
   b) Intended to assemble micro-LED pixels on metal oxide TFT backplanes
5. **Performance analysis of photoluminescence/electroluminescence (PL/EL) QD-LED displays**
   a) Evaluated color gamut and system efficiency in PL QD-LED displays
   b) Modeled light out-coupling efficiency of bottom-emitting EL QD-LEDs

- **05/2011** – **06/2014** **Wuhan National Laboratory for Optoelectronics (WNLO), HUST**
  Mentor: Prof. Jun ZHOU & Prof. Zhonglin WANG
  Position: Undergraduate Research Assistant

1. Fabrication of self-cleaning flexible infrared nano-sensors enabled by carbon nanoparticles
2. Development of three-dimensional ZnO porous films for self-cleaning ultraviolet photodetectors
3. Demonstration of broadband photodetectors based on ZnO nanowire array and PbS quantum dots

PROFESSIONAL ACTIVITIES

- **Participated Funding Programs**

1. Projects sponsored by SRC/DARPA JUMP 2.0 program, DoE EFRC program, ARO Neuro Fund, Samsung Electronics, EMD Electronics (a subsidiary of Merck), etc.
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-Voltaics 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.

- **Invited Talks**

1. "Fluorinated Metal Oxide Thin-Film Transistors with Low Process Thermal Budgets" on 2023 International Conference on Display Technology, Nanjing, China, 03/2023.
2. "Hybrid-Phase Metal Oxide Thin-Film Transistor Technology" on Young Leader Conference of ICDT 2021, Beijing, China, 06/2021.
3. "Hybrid-Phase Metal Oxide Thin-Film Transistors and their Applications" on Shanghai University League's Forum for International Young Scholars, Shanghai China, 05/2020.

- **Organized Conferences/Workshops**

1. Program committee member, *Cross-Strait Postgraduate Workshop on Display Research*, Guangzhou, China, 2016
2. Student helper, *16th International Conference on Ferroelectric Liquid Crystals*, Hong Kong, 2016
3. 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, Thin Solid Films, Journal of the Society for Information Display, Physical Review Applied, etc.

- **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

BOOK CHAPTERS

1. M. Zhang, **S. Deng,** Y. Yan, M. Wong, and H. S. Kwok, "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 PUBLICATIONS (citation > 650 with h-index = 12 per Google Scholar, ~50 articles in total including 21 as first/corresponding author)

1. **S. Deng**, *et al.* "Hydrogenated VO_2 Bits for Probabilistic Computing"*, IEEE Electron Device Letters*, 44.10 (2023): 1776-1779.
2. **S. Deng,** *et al.* "Selective area doping for Mott neuromorphic electronics", *Science Advances,* 9.11 (2023): eade4838.
3. T. J. Park*, **S. Deng***, et al. "Complex oxides for brain-inspired computing: A review", *Advanced Materials* (2022): 2203352. **(*Equal contribution)**
4. **S. Deng**, *et al.* "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. **S. Deng**, *et al.* "Thermal Budget Reduction in Metal Oxide Thin-Film Transistors via Planarization Process", *IEEE Electron Device Letters,* 42.2 (2021): 180-183.
6. X. Yin*, **S. Deng***, *et al.* "Low Leakage Current Vertical Thin-Film Transistors with ITO-stabilized ZnO Channel", *IEEE Electron Device Letters*, 41.2 (2019): 248-251. **(*Equal contribution)**

7. **S. Deng,** *et al.* “Gate Insulator Engineering in Top-Gated Indium-Tin-Oxide-Stabilized ZnO Thin-Film Transistors”, *IEEE Electron Device Letters*, 40.7 (2019): 1104-1107.
8. Y. Xu*, **S. Deng***, *et al.* “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. W. Zhong*, **S. Deng***, *et al.* “Feasible route for a large area few-layer MoS_2 with magnetron sputtering”, *Nanomaterials*, 8.8 (2018): 590. **(*Equal contribution)**
10. **S. Deng,** *et al.* “Threshold voltage adjustment in hybrid-microstructural ITO-stabilized ZnO TFTs via gate electrode engineering”, *IEEE Electron Device Letters*, 39.7 (2018): 975-978.
11. **S. Deng,** *et al.* “Hybrid-Phase Microstructural ITO-Stabilized ZnO TFTs with Self-Aligned Coplanar Architecture”, *IEEE Electron Device Letters*, 38.12 (2017): 1676-1679.
12. **S. Deng,** *et al.* “Investigation of high-performance ITO-stabilized ZnO TFTs with hybrid-phase microstructural channels”, *IEEE Transactions on Electron Devices*, 64.8 (2017): 3174-3182.
13. **S. Deng,** *et al.* “High-performance staggered top-gate thin-film transistors with hybrid-phase microstructural ITO-stabilized ZnO channels”, *Applied Physics Letters*, 109.18 (2016): 182105.
14. **S. Deng,** *et al.* “Fabrication of high-performance bridged-grain polycrystalline silicon TFTs by laser interference lithography”, *IEEE Transactions on Electron Devices*, 63.3 (2016): 1085-1090.
15. H. Li, **S. Deng^**, *et al.* “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. Y. Xu, Z. Wu, B. Li, **S. Deng^**, *et al.* “Oxide TFT Frontend Amplifiers for Flexible Sensing Systems”, *IEEE Transactions on Electron Devices*, 68.12 (2021): 6190-6196. **(^Corresponding author)**
17. Y. Xu, B. Li, W. Zhong, **S. Deng^**, *et al.* “A Unipolar TFT-Based Amplifier with Enhanced DC Offset Suppression”, *Electronics Letters,* 57.2 (2021): 67-70. **(^Corresponding author)**
18. Y. Xu, W. Zhong, B. Li, **S. Deng^**, *et al.* “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 (2020): 144-150. **(^Corresponding author)**
19. H. Fan, **S. Deng^**, *et al.* “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)**
20. Y. Xu, B. Li, **S. Deng^**, *et al.* “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)**
21. Y. Qin, G. Li, Y. Xu, R. Chen^, **S. Deng^**, *et al.* “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)**
22. M. Zhang, Z. Jiang, **S. Deng**, *et al.* “Hot Carrier Degradation Accompanied by Recovery in InSnZnO Thin-Film Transistors”, *IEEE Electron Device Letters*, 44.7 (2023): 1124-1127.
23. J. Zhang, C. Yao, X. Liu, Z. Ding, Y. Liu, B. Liu, **S. Deng,** *et al.* “Controllable Transformation of 2D Perovskite for Multifunctional Sensing Properties”, *The Journal of Physical Chemistry C,* 127.16 (2023): 7730-7739.
24. Z. Chen, M. Zhang, **S. Deng**, *et al.* “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)**

25. Z. Luo, B. Liu, X. Luo, T. Zheng, **S. Deng**, *et al.* “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.
26. H. Yan, J. Huang, X. Zhang, M. Wang, J. Liu, C. Meng, **S. Deng**, *et al.* “A buried functional layer for inorganic CsPb0.75Sn0.25I2Br perovskite solar cells”. *Solar RRL*, 6.4 (2022): 2100899.
27. W. Zhong, J. Zhang, Y. Liu, L. Tan, L. Lan, **S. Deng**, *et al.* “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
28. J. Zhang, W. Zhong, Y. Liu, J. Huang, **S. Deng**, *et al.* “A High-Performance Photodetector Based on 1D Perovskite Radial Heterostructure”, *Advanced Optical Materials*, 9.24 (2021): 2101504.
29. X. Luo, T. Zheng, Z. Luo, J. Liu, **S. Deng**, *et al.* “Visual Electrocardiogram Synchronization Monitor Using Perovskite-Based Multicolor Light-Emitting Diodes”, *ACS Photonics*, 8.11 (2021):3337-3345.
30. W. Zhong, L. Kang, **S. Deng**, *et al.* “Effect of Sc_2O_3 Passivation Layer on the Electrical Characteristics and Stability of InSnZnO Thin-Film Transistors”, *IEEE Transactions on Electron Devices*. 68.10 (2021): 4956-4961.
31. W. Shi, L. Hu, Y. Liu, **S. Deng**, *et al.* “Arithmetic and Logic Circuits Based on ITO-Stabilized ZnO TFT for Transparent Electronics”, *IEEE Transactions on Circuits and Systems I: Regular Papers*, 69.1 (2021): 356-365.
32. X. Yin, Y. Chen, G. Li, W. Zhong, **S. Deng**, *et al*. “Analysis of low frequency noise in in situ fluorine-doped ZnSnO thin-film transistors”, *AIP Advances*, 11.4 (2021): 045326.
33. J. Huang, H. Yan, D. Zhou, J. Zhang, **S. Deng**, *et al.* “Introducing Ion Migration and Light-induced Secondary Ion Redistribution for Phase-stable and High-Efficiency Inorganic Perovskite Solar Cells”, *ACS Applied Materials & Interfaces*, 12.36 (2020): 40364-40371.
34. M. Zhang, **S. Deng**, *et al.* “Reversely-Synchronized-Stress-Induced Degradation in Polycrystalline Silicon Thin-Film Transistors and Its Suppression by a Bridged-Grain Structure”, *IEEE Electron Device Letters*, 41.8 (2020): 1213-1216.
35. Y. Liu, Y. Huang, **S. Deng**, *et al.* “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 (2020): 435-441.
36. M. Zhang, Y. Yan, G. Li, **S. Deng**, *et al.* “High-Performance Polycrystalline Silicon Thin-Film Transistors without Source/Drain Doping by Utilizing Anisotropic Conductivity of Bridged-Grain Lines”, *Advanced Electronic Materials*, 6.2 (2020): 1900961.
37. J. Zhang, B. Ren, **S. Deng**, *et al.* “Voltage-dependent Multicolor Perovskite Electroluminescent Device”, *Advanced Functional Materials*, 30.4 (2020): 1907074.
38. M. Zhang, X. Ma, **S. Deng**, *et al.* “Degradation Induced by Forward Synchronized Stress in Poly-Si TFTs and Its Reduction by a Bridged-Grain Structure”, *IEEE Electron Device Letters*, 40.9 (2019): 1467-1470.
39. S. Weng, R. Chen, W. Zhong, **S. Deng**, *et al.* “High Performance Amorphous Zinc Tin Oxide Thin Film Transistors with Low Tin Concentration”, *IEEE Journal of the Electron Devices Society*, 7 (2019): 632-637.
40. B. Ren, G. Yuen, **S. Deng**, *et al.* “Multifunctional Optoelectronic Device Based on an Asymmetric Active Layer Structure”, *Advanced Functional Materials*, 29.17 (2019): 1807894.
41. M. Zhang, Y. Yan, G. Li, **S. Deng**, *et al.* “OFF-State-Stress-Induced Instability in Switching Polycrystalline Silicon Thin-Film Transistors and Its Improvement by a Bridged-Grain Structure”, *IEEE*

Electron Device Letters, 39.11 (2018): 1684-1687.

42. G. Li, **S. Deng**, *et al.* "Achieving High Open-Circuit Voltage for p-i-n Perovskite Solar Cells Via Anode Contact Engineering", *Solar RRL*, 2.10 (2018): 1800151.
43. R. Chen, **S. Deng**, *et al.* "Investigation of top gate GaN thin-film transistor fabricated by DC magnetron sputtering", *Journal of Vacuum Science & Technology B, Nanotechnology and Microelectronics: Materials, Processing, Measurement, and Phenomena*, 36.3 (2018): 032203.
44. R. Chen, W. Zhou, **S. Deng**, *et al.* "Passivation of Poly-Si Thin Film Employing Si Self-Implantation and Its Application to TFTs", *IEEE Journal of the Electron Devices Society*, 6 (2018): 240-244.
45. Y. Liu, **S. Deng**, *et al.* "Low-frequency noise in hybrid-phase-microstructure ITO-stabilized ZnO thin-film transistors", *IEEE Electron Device Letters*, 39.2 (2017): 200-203.
46. G. Li, Y. Jiang, **S. Deng**, *et al.* "Overcoming the Limitations of Sputtered Nickel Oxide for High-Efficiency and Large-Area Perovskite Solar Cells", *Advanced Science*, 4.12 (2017): 1700463.
47. Z. Xia, L. Lu, J. Li, Z. Feng, **S. Deng**, *et al.* "Characteristics of elevated-metal metal-oxide thin-film transistors based on indium-tin-zinc oxide", *IEEE Electron Device Letters*, 38.7 (2017): 894-897.
48. Y. Cao, **S. Deng**, *et al.* "Three-dimensional ZnO porous films for self-cleaning ultraviolet photodetectors", *RSC Advances*, 5.104 (2015): 85969-85973.

CONFERENCE PRESENTATIONS

- **Oral presentation**

1. *2023 IEEE International Electron Devices Meeting (IEDM),* San Francisco, USA, Dec. 2023.
   "BEOL Compatible Oxide Power Transistors for On-Chip Voltage Conversion in Heterogenous 3D (H3D) Integrated Circuits"
   and "Improved Reliability and Enhanced Performance in BEOL Compatible W-doped In_2O_3 Dual-Gate Transistor"
2. *Microscopy and Microanalysis 2023,* Minneapolis, USA, July 2023.
   "Dopant Mapping of Partially Hydrogenated Vanadium Dioxide using the Energy Loss Near Edge Structure Technique"
3. *Society for Information Display's Display Week 2023*, Log Angeles, USA, May 2023.
   "Ultrahigh-Resolution Corrugated Silicon Nitride Masks for Direct Patterning of OLED Microdisplays"
4. *2023 International Conference on Display Technology*, Nanjing, China, March 2023. **(Invited)**
   "Fluorinated Metal Oxide Thin-Film Transistors with Low Process Thermal Budget"
5. *2022 MRS Fall Meeting & Exhibit, Boston, MA, USA, Nov. 2022.*
   "VO_2 Insulator-Metal Phase Change Based Neuromorphic Materials and Devices"
6. *2022 International Conference on Display Technology*, Fuzhou, China, Oct. 2022.
   "3000-ppi Silicon Nitride Masks for Direct Patterning of OLED Microdisplays"
7. *Young Leaders in Displays (HK) and Postgraduate Workshop*, Hong Kong, Dec. 2021. **(Best Paper Award)**
   "Oxide TFT Frontend Amplifiers for Flexible Sensing Systems"
8. *Society for Information Display's Display Week 2021*, virtual conference, May 2021. **(Distinguished Paper Award)**
   "A Cost-Effective Fluorination Method for Enhancing the Performance of Metal Oxide Thin-Film Transistors Using a Fluorinated Planarization Layer"
9. *2021 International Conference on Display Technology*, Beijing, China, May. 2021.

"All-Oxide Thin-Film Transistors for Low-Voltage-Operation Circuits"

10. *2018 IEEE International Conference on Electron Devices and Solid-State Circuits*, Shenzhen, China, June 2018.
    "Vertical Channel ITO-stabilized ZnO Thin-Film Transistors"
11. *EuroDisplay 2017*, Berlin, Germany, Nov. 2017.
    "A Study on Hybrid-Phase Microstructural ITO-Stabilized ZnO TFTs with Different Gate Insulators and Electrodes"
12. *2017 International Conference on Display Technology*, Fuzhou, China, Feb. 2017.
    "High Performance Thin-film Transistors with Hybrid-phase ITO-stabilized ZnO Active Channel Layer"
13. *23rd International Display Workshops & Asian Display*, Fukuoka, Japan, Dec. 2016.
    "Achievement of High-Performance and Environmentally Stable TFTs by Introducing Hybrid-Phase Microstructure into InSnZnO Channels"
14. *2016 Postgraduate Workshop on Display Research*, Guangzhou, China, Sept. 2016. **(Best Oral Presentation Award)**
    "Hybrid-Phase Microstructure in Indium-Tin-Zinc-Oxide Thin Films and Its Application to High-Performance Thin-film Transistors"
15. *The International Display Manufacturing Conference*, Taipei, Taiwan, Aug. 2015. **(Distinguished Paper Award)**
    "Fabrication of High-Performance Bridged-Grain Polycrystalline Silicon Thin-Film Transistors with Laser Interference Lithography Technology"

- **Poster presentation**

1. *2023 IEEE International Symposium on the Physical and Failure Analysis of Integrated Circuits (IPFA)*, Pulau Pinang, Malaysia, July 2023.
   "Long-Term Recovery Behavior in InSnZnO Thin-Film Transistors after Negative Bias Stress"
2. *2022 International Conference on Display Technology*, Fuzhou, China, Oct. 2022.
   "Frontend Amplifier with Unipolar Oxide TFTs for Heart Rate Measurements"
3. *23rd International Conference on Solid State Ionics (SSI-23)*, Boston, USA, July 2022.
   "Hydrogenated VO_2 Switches for Neuromorphic Functions"
4. *2019 IEEE 26th International Symposium on Physical and Failure Analysis of Integrated Circuits (IPFA)*, Hangzhou, China, July 2019.
   "Output Breakdown Characteristics and the Related Degradation Behaviors in Metal Oxide Thin Film Transistors"
   and "Light-Illumination-Induced Degradation and Its Long-Term Recovery in Indium-Tin-Zinc Oxide Thin-Film Transistors"
5. *Society for Information Display's Display Week 2019*, San Jose, USA, May 2019.
   "Stacked PECVD SiO_2 Gate Insulators for Top-Gate Metal Oxide Thin-Film Transistors in Enhancement Operation Mode"
   and "Gate-Bias-Stress-Induced Instability in Hybrid-Phase Microstructural ITO-Stabilized ZnO TFTs"
6. *2018 Postgraduate Workshop on Display Research*, Hong Kong, Dec. 2018. **(Best Poster Presentation Award)**
   "Gate Insulator Engineering in Top-Gated ITO-Stabilized ZnO TFTs"

7. *2018 IEEE International Conference on Electron Devices and Solid-State Circuits*, Shenzhen, China, June 2018.
   "Degradation Behaviors of Driving Thin-Film Transistors in Active-Matrix Organic Light-Emitting Diode Displays"
8. *Society for Information Display's Display Week 2018*, Log Angeles, USA, May 2018.
   "Towards High-Performance and Cost-Effective Top-Gated Oxide TFTs with Hybrid-Phase Microstructural Channels"
9. *2018 International Conference on Display Technology*, Guangzhou, China, Apr. 2018.
   "Back-Channel-Etched Oxide TFTs with Hybrid-Phase Microstructural ITO-Stabilized ZnO Channels",
   "Characterization of Self-Aligned Top-Gate Microcrystalline Silicon Thin Film Transistors",
   "Photoluminescence and Electrical Properties study of ITO-stabilized ZnO Thin-Film Transistors with different annealing temperatures",
   and "Transparent Basic Logic Circuits with ITO-Stabilized ZnO Thin Film Transistors"
10. *2017 IEEE International Conference on Electron Devices and Solid-State Circuits*, Hsinchu, Taiwan, Oct. 2017.
    "A study on the bottom-gate ITO-stabilized ZnO thin-film transistors"
11. *The International Display Manufacturing Conference*, Taipei, Taiwan, Sept. 2017. **(Distinguished Poster Award)**
    "Self-Aligned Hybrid-Phase Microstructural ITO-Stabilized ZnO TFTs Achieved via a Combination of PECVD Processes"
12. *7th International Conference on Computer Aided Design for Thin-Film Transistors*, Beijing, China, Oct. 2016.
    "Hybrid-Phase Microstructure in InSnZnO Thin Film and Its Application to High-Performance TFT"
13. *The International Display Manufacturing Conference*, Taipei, Taiwan, Aug. 2015.
    "Bridged-Grain Metal-Induced Crystallization Poly-Si TFTs with Silicon Self-Implantation"

PATENTS

1. Chen Rongsheng, **Deng Sunbin**, Kwok Hoi Sing, "Method for Manufacturing a Top-Gate Self-Aligned Indium-Tin-Zinc Oxide Thin-Film Transistor", United States Patent No.: US 11,049,881 B2, Issue Date: 2021 Jun 29.
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 (REI, 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

REFEREE INFORMATION

- **Prof. Hoi Sing Kwok**
  Current affiliation: the Hong Kong University of Science and Technology
  Email: eekwok@ust.hk

- **Prof. Shriram Ramanathan**
  Current affiliation: Rutgers, The State University of New Jersey
  Email: shriram.ramanathan@rutgers.edu

- **Prof. Suman Datta**
  Current affiliation: Georgia Institute of Technology
  Email: sdatta68@gatech.edu