SUOMING ZHANG

Education

Michigan State University 2014-present
Ph.D. Electrical Engineering GPA 4.0/4.0

Peking University 2011-2014
M.S. Microelectronics GPA 3.7/4.0

Experience

Apple. Inc
Intern 2017-present

- Assessing the performance of electronic technologies
- Developing simulation models to assess and improve device properties
- Work with suppliers to characterize and improve device performance Word cross-functionally with engineering staff across different groups at Apple
- Developing Apple Intellectual Property in areas of design and implementation
- Provide written and verbal reports on my work

Michigan State University 2014-present
Research Assistant (Advisor: Dr. Chuan Wang, cwang@msu.edu)

- Designed the whole process flow including 7 steps of micro fabrication (Photolithography, etching, metal deposition, alignment, printing) to achieve a Diamond (CVD grown) diode and optimized the current (up to 10 A) and the breakdown voltage (up to 1200V) of the diode by adding a ALD deposited Al2O3 as the field plate layer and adopting the quasi-vertical structure.
- Investigated fully printed stretchable Thin Film Transistor and active matrix displays on PDMS substrate.
- Investigated the printing process of Silver nanowires and demonstrated the application of stretchable conductor, pressure sensor and braille display.
- Inkjet-printed stretchable conductor and strain gauge made by serpentine silver nanoparticle pattern.
- Investigated the property of bolometer based on Carbon Nanotubes, compared the response between transistor using purified single chirality Carbon Nanotubes as the channel layer and transistor using purified semiconducting Carbon Nanotubes as the channel layer.

Peking University 2011-2014
Research Assistant & Teaching Assistant (Advisor: Dr. Yi Wang, imewangyi@pku.edu.cn)

- Designed and fabricated Zinc Oxide based Thin Film Transistors and lightening array unit using active matrix OLED.
- Investigated the effect of the oxygen percentage when depositing Gallium Zinc Oxide layer (by Sputter) on the properties of the transistor.
- Studied the effect of post annealing on the properties of Gallium Zinc Oxide Thin Film Transistors.

Publications

Journal Papers

1. **S. Zhang**, L. Cai, W. Li, J. Miao, T. Wang, J. Yeom, N. Sepulveda, C. Wang, "Fully-Printed Silver Nanoparticle Based Strain Gauges with Record High Sensitivity", Advanced Electronic Materials , under revision, 2017.

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2. **S. Zhang**, L. Cai, T. Wang, J. Miao, N. Sepulveda, C. Wang, "Fully Printed Flexible Carbon Nanotube Photodetector", Applied Physics Letters, under revision, 2016.
3. **S. Zhang**, L. Cai, T. Wang, R. Shi, J. Miao, L. Wei, Y. Chen, N. Sepúlveda, and C. Wang. "Bolometric-Effect-Based Wavelength Selective Photodetectors Using Sorted Single Chirality Carbon Nanotubes." Scientific reports 5 (2015).
4. L. Cai, **S. Zhang**, J. Miao, Z. Yu, C. Wang, "Fully-Printed Stretchable Thin-Film Transistors and Integrated Logic Circuits", ACS Nano, Vol. 10, 11459–11468, 2016.
5. J. Miao, **S. Zhang**, L. Cai, and C. Wang. "Black Phosphorus Schottky Diodes: Channel Length Scaling and Application as Photodetectors." Advanced Electronic Materials (2016).
6. J. Miao, L. Cai, **S. Zhang**, J. Nah, J. Yeom, C. Wang, "Air-Stable Humidity Sensor Using Few-Layer Black Phosphorus", ACS Applied Materials & Interfaces, under revision, 2016.
7. L. Cai, **S. Zhang**, J. Miao, Z. Yu, and C. Wang. "Fully Printed Foldable Integrated Logic Gates with Tunable Performance Using Semiconducting Carbon Nanotubes." Advanced Functional Materials 25, no. 35 (2015): 5698-5705.
8. J. Miao, **S. Zhang**, L. Cai, M. Scherr, and C. Wang. "Ultrashort Channel Length Black Phosphorus Field-Effect Transistors." ACS nano 9, no. 9 (2015): 9236-9243.
9. L. Cai, **S. Zhang**, J. Miao, Q. Wei, and C. Wang. "Capacitance-Voltage Characteristics of Thin-film Transistors Fabricated with Solution Processed Semiconducting Carbon Nanotube Networks." Nanoscale research letters 10, no. 1 (2015): 1-6.
10. H. Dedong, **S. Zhang**, F. Zhao, J. Dong, Y. Cong, S. Zhang, X. Zhang, and Y. Wang. "Transparent gallium doped zinc oxide thin-film transistors fabricated on glass substrate." Thin Solid Films 594 (2015): 266-269.
11. T. Yu, D. Han, **S. Zhang**, F. Huang, D. Shan, Y. Cong, J. Cai et al. "High-performance dual-layer channel indium gallium zinc oxide thin film transistors fabricated in different oxygen contents at low temperature." Japanese Journal of Applied Physics 53, no. 4S (2014): 04EF07.
12. D. Shan, D. Han, F. Huang, Y. Tian, **S. Zhang**, L. Qi, Y. Cong, S. Zhang, X. Zhang, and Y. Wang. "Fabrication and characteristics of high performance and high-stability aluminum-doped zinc oxide thin-film transistors." Japanese Journal of Applied Physics 53, no. 4S (2014): 04EJ07.

Conference Papers and Presentations

1. **S. Zhang**, L. Cai, J. Miao, C. Wang, “Fully Printed Stretchable Conductor and Strain Gauge”, MRS 2016 Fall Meeting, Boston, MA, USA
2. **S. Zhang**, L. Cai, Jinshui Miao, T. Wang, W. Li, N. Sepúlveda, C. Wang, “Fully Printed Stretchable Conductor and Strain Gauge”, MSU Engineering Graduate Research Symposium 2016, East Lansing, MI, USA.
3. **S. Zhang**, L. Cai, T. Wang, J. Miao, N. Sepulveda, C. Wang, "Bolometric-Effect-Based Wavelength-Selective Light Sensors Using Sorted Single Chirality Carbon Nanotubes", MRS 2015 Fall Meeting, Boston, MA, USA.
4. **S. Zhang**, L. Cai, T. Wang, J. Miao, Q. Wei, N. Sepúlveda, C. Wang, “Bolometric Effect Application for The TFT Based On Single Chirality Carbon Nanotubes”, MSU Engineering Graduate Research Symposium 2015, East Lansing, MI, USA.
5. **S. Zhang**, Y. Tian, D. Han, D. Shan, F. Huang, S. Wang, X. Zhang, S. Zhang, and Y. Wang. "High-performance fully transparent Ga-doped ZnO TFTs fabricated by RF magnetron sputtering." In 2013 International Symposium on VLSI Technology, Systems and Application (VLSI-TSA). 2013.

6. **S. Zhang**, D. Han, S. Wang, Y. Tian, D. Shan, F. Huang, Y. Cong, S. Zhang, X. Zhang, and Y. Wang. "Fabrication optimization to improve performance of gallium-doped zinc oxide thin film transistors." In Active-Matrix Flatpanel Displays and Devices (AM-FPD), 2013 Twentieth International Workshop on, pp. 121-124. IEEE, 2013.
7. L. Cai, **S. Zhang**, J. Miao, Z. Yu, C. Wang, "Fully Printed Intrinsically Stretchable Thin-Film Transistors and Integrated Logic Gates", MRS 2016 Fall Meeting, Boston, MA, USA.
8. J. Miao, L. Cai, **S. Zhang**, C. Wang, "Air-Stable Humidity Sensors Using Few-Layer Black Phosphorus", MRS 2016 Fall Meeting, Boston, MA, USA
9. T. A. Grotjohn, S. A. Zajac, N. Suwanmonka, A. Bhattacharya, S. Nad, A. Charris, **S. Zhang**, N. Miller, J. Albrecht, J. Asmussen, T. Hogan, C. Wang, R. Rechenberg, A. Hardy, M. Muehle, M. Becker and T. Schuelke, "Experimental and Simulation Study of Diamond Based Power Diodes", MRS 2016 Fall Meeting, Boston, MA, USA.
10. T. A. Grotjohn, S. A. Zajac, N. Suwanmonka, A. Bhattacharya, S. Nad, A. Charris, **S. Zhang**, N. Miller, J. Albrecht, J. Asmussen, T. Hogan, C. Wang, R. Rechenberg, A. Hardy, M. Becker and T. Schuelke, "Diamond Based Power Electronics: Material and Devices", 2016 E-MRS Fall Meeting, Warsaw, Porland.
11. L. Cai, **S. Zhang**, J. Miao, Z. Yu, C. Wang, "Ink-jet Printed Silver Nanowires as Stretchable Conductor" , MRS 2016 Spring Meeting, Phoenix AZ USA.
12. J. Miao**, S. Zhang,** L. Cai, C. Wang, "Device Applications of Black Phosphorus: Ultrascaled Transistors, Schottky Diodes and Photodetectors", MRS 2016 Spring Meeting, Phoenix AZ USA.
13. T. A. Grotjohn, S. A. Zajac, N. Suwanmonka, A. Bhattacharya, S. Nad, A. Charris, **S. Zhang**, N. Miller, J. Albrecht, J. Asmussen, T. Hogan, C. Wang, R. Rechenberg, A. Hardy, M. Becker and T. Schuelke, "Diamond Material Properties and Resulting Vertical Diode Characteristics", MRS 2016 Spring Meeting, Phoenix, AZ, USA.
14. L. Cai, **S. Zhang**, J. Miao, Z. Yu, C. Wang, "Fully-Printed Foldable Integrated Logic Circuits with Tunable Performance Using Semiconducting Carbon Nanotubes", MRS 2015 Fall Meeting, Boston, MA, USA.
15. J. Miao, **S. Zhang**, L. Cai, and C. Wang. "(Invited) Ultrashort Channel Length Black Phosphorus Field-Effect Transistors." In Meeting Abstracts, no. 31, pp. 1169-1169. The Electrochemical Society, 2015.
16. J. Miao, **S. Zhang**, L. Cai, M. Scherr, C. Wang, "Ultrashort Channel Length Black Phosphorus Field-Effect Transistors", IPS15 International Phosphorene Symposium, East Lansing, MI, USA.
17. J. Miao, **S. Zhang**, L. Cai, Q. Wei, C. Wang, "Ultrashort Channel Length Black Phosphorus Field-Effect Transistors", MSU Engineering Graduate Research Symposium 2015, East Lansing, MI, USA.
18. L. Cai, **S. Zhang**, J. Miao, Q. Wei, C. Wang, "Fully Printed, Ultra Flexible Logic Gates With Tunable Performance Based On Carbon Nanotubes", MSU Engineering Graduate Research Symposium 2015, East Lansing, MI, USA
19. Y. Cong, D. Han, D. Shan, Y. Tian, F. Huang, **S. Zhang**, Z. Chen et al. "High mobility transparent Al-Sn-Zn-O thin film transistors fabricated at low temperature." In VLSI Technology, Systems and Application (VLSI-TSA), Proceedings of Technical Program-2014 International Symposium on, pp. 1-2. IEEE, 2014.
20. Y. Tian, D.D. Han, **S.M. Zhang**, F.Q. Huang, D.F. Shan, Y.Y. Cong, J. Cai, L.L. Wang, S.D. Zhang, X. Zhang and Y. Wang. "High-performance Single/Dual-layer Channel IGZO TFT Fabricated on Glass Substrates at Low-temperature." In 2013 International Conference on Solid State Devices and Materials (SSDM 2013).

21. D. Shan, D. Han, F. Huang, Y. Tian, **S. Zhang**, Y. Cong, X. Zhang and Y. Wang. “High Performance and Stability Fully Transparent Aluminum-doped Zinc Oxide Thin-Film Transistors”, In 2013 International Conference on Solid State Devices and Materials (SSDM 2013).
22. F. Huang, D. Han, F. Shan, **S. Zhang**, Y. Tian, Y. Cong, J. Cai, X. Zhang and Y. Wang. “Flexible Dual-layer Channel Gallium-doped ZnO Thin-film Transistors Fabricated on Plastic Substrates at Room Temperature”, In 2013 International Conference on Solid State Devices and Materials (SSDM 2013).
23. D. Shan, D. Han, F. Huang, Y. Tian, **S. Zhang**, Y. Cong, Y. Wang, L. Liu, X. Zhang, and S. Zhang. "Fabrication and characteristics of fully transparent Aluminum-doped zinc oxide thin-film transistors." In Electron Devices and Solid-State Circuits (EDSSC), 2013 IEEE International Conference of, pp. 1-2. IEEE, 2013.
24. F. Huang, D. Han, D. Shan, Y. Tian, **S. Zhang**, Y. Cong, Y. Wang, L. Liu, X. Zhang, and S. Zhang. "Room-temperature fabrication of flexible gallium-doped zinc oxide thin-film transistors on plastic substrates." In Electron Devices and Solid-State Circuits (EDSSC), 2013 IEEE International Conference of, pp. 1-2. IEEE, 2013.

Skills

- Able to design the layout using L-edit or Cadence. Able to do the circuit design.
- Able to design, optimize and print out PCB.
- Able to grow, characterize and optimize the Diamond sample with the seeds.
- Proficiency in operation and maintain of Mask Aligner, Sputtering system, E-beam Evaporation system, PECVD, MBE, ALD system, Oxygen plasma and the Micro-Plotter Printer, be able to assemble those equipment with the necessary component .
- Proficiency in characterization technique including SEM, AFM, XRD, XPS and Raman.
- Able to design the experiment, analyze the data and solve the problems occurred, proficiency in using L-edit, Cadence, Origin, Matlab, Latex, 3D Max, Photoshop and MS.
- Self-motivated and independent worker, work well with others in a team, good communication skills.

Professional Activities

Journal Reviewer
Nano-Micro Letters
Nanoscale Research Letters

Awards

Graduate Excellence Fellowship 2014
Scholarship of Peking University, 2011-2014
Outstanding Student Fellowship, 2010

Related Courses

Michigan State University

Advanced VLSI Design ECE 813
Physical Electronics ECE 874
Electronic Devices ECE 875
Cleanroom Procedures ECE 877

Peking University

Design and Analysis of Analog IC
Analysis and design of VLSI
CAD Technologies for IC Devices
Solar Power Science and Engineering
Analysis and Design of CMOS Circuit
VHDL Hardware Description Language
Semiconductor Device and Technology
Thin Film Transistor and Flat Panel Display