Adam Wang

8790 NW 37th Pl, FL 33324

Phone: 954-205-3699 **Email:** wang.y.adam@gmail.com

EDUCATION

Georgia Institute of Technology (Georgia Tech), Cumulative GPA: 3.90/4.0 **Aug 2017 - Dec 2022**

- Doctor of Philosophy
  Major: Electrical and Computer Engineering
- Master of Science
  Major: Electrical and Computer Engineering

Vanderbilt University, Cumulative GPA: 3.934/4.0, Dean's List **Aug 2014 - May 2022**

- Bachelor of Engineering, *summa cum laude*
  Majors: Electrical Engineering (with Honors), Mathematics – *double major*

AWARDS

- Georgia Tech Student Fellowship **Aug 2022**
- Analog Devices Inc. Outstanding Student Designer Award **Feb 2020**
- National Defense Science and Engineering Graduate (NDSEG) Fellow **Apr 2019**
- Intel-GT Outstanding RFIC Student Designer Award **May 2018**
- NSF Graduate Research Fellowship Honorable Mention **Apr 2018**
- President's Fellow, Georgia Tech **Apr 2017**
- Dean's Award Outstanding Scholar **May 2017**
- Joanne Fleming Hayes Scholarship **Aug 2014**

SKILLS

Circuits and System: Design, layout, and simulation of Analog/Digital/Mixed-mode Integrated Circuits using Cadence Virtuoso/H-Spice. EM design and simulation using Agilent ADS and Ansys HFSS.

Cleanroom: Photolithography/electron-beam lithography, Nanoscribe 3d lithography, Dry/wet etching, Various material deposition via sputtering/e-beam/atomic layer deposition, Carbon-nanotube growth, Passivation deposition through chemical vapor deposition/thermal oxidation, Microfluidic design and molding with PDMS and SU-8.

Biocompatible CMOS Post-Processing: CMOS die-level post processing such as Au/Pt/ITO/TiN/IrO_2/AgCl/ PEDOT:PSS deposition on small, dense sensing arrays in place of foundry default bioincompatible aluminum top layer

Bio-experimentation: Culturing and seeding of bio-specimens onto CMOS sensor assays such as cardiomyocytes/neurons/hydrogel-encapsulating cells as tissue models

Programming: Labview for automated measurements. MATLAB and Python for data post-processing.

Measurement Equipment: Spectrum Analyzer, Oscilloscope, Power Sensor/Meter, Signal Generator, Power Supplies, Arbitrary Waveform Generator, Potentiostat/Galvanostat

Device Packaging: PCB Assembly, Wire bonding

Foundry Platform and Tapeout Experience: Global Foundries (GF) 130 nm BiCMOS, 22nm FD-SOI, 45 nm SOI, 55 nm BCDLite

EXPERIENCE

Graduate Research Assistant, Georgia Institute of Technology, Advisor Prof. Hua Wang **August 2017- May 2022**

- Developed multi-modal and multifunctional joint sensing/stimulating/actuating CMOS hybrid bio-microelectronic platforms featuring the smallest (13 μm × 13 μm) and densest (5900 pixels/mm^2) reported CMOS multi-modal pixel design integrated with readout circuitry on-chip with an array of 21952 sensing and actuating pixels.
- Developed die-level fabrication processes to improve the interface between CMOS and biology and optimized ultraminiaturized microelectrodes for low-noise subcellular biosensing and manipulation of specimens via dielectrophoresis.
- Developed of high-aspect ratio 3D nanopillar electrodes on CMOS for intracellular recording.
- Conducted bio-experiments with cardiomyocytes, neurons, and synthetic bacteria utilizing CMOS multi-modal sensors.

Investigated the electrochemical performance of ultraminiaturized biocompatible microelectrodes at the subcellular dimensions composed of varying materials and conductive polymer coatings and developed a comprehensive circuit model to characterize the electrode-electrolyte interfacial impedance of microelectrodes scaled down to the subcellular level. Graduate Research Assistant,

Graduate Teaching Assistant, Georgia Institute of Technology **Aug 2017, Jan 2019**

- Guided students to better understand undergraduate and graduate course topics/projects and lectured when the instructor is not present. Head Teaching Assistant for Operational Amplifier Design (ECE 4435) and Senior Design (ECE 4012).

Undergraduate Researcher, Vanderbilt **Jan 2017-May 2017**

- Investigated Total Implantation Dose radiation effects on MOSFETs ISDE. Presented to engineering dean and faculties: Total Ionizing Dose Characterization of Deep Submicron MOSFET for On-Chip Radiation Measurement Circuit.

Solar Powered Capacitive Deionization Project Engineer **Aug 2016-May 2017**

- Received a grant of $10,000 to create a scaled down model of a capacitive deionization cell that reduces the concentration of ions in brackish water for Senior Design Project. Presented at Vanderbilt Design Day 2017 and at TechConnect World Innovation Conference and Expo.

PUBLICATIONS

Journals:

[J-1] **A. Wang**, Y. Sheng, W. Li, D. Jung, G. Junek, H. Liu, J. Park, D. Lee, M. Wang, S. Maharjan, S. Kumashi, J. Hao, Y. Zhang, and H. Wang, "A Multimodal and Multifunctional CMOS Cellular Interfacing Array for Digital Physiology and Pathology Featuring an Ultra Dense Pixel Array and Reconfigurable Sampling Rate," IEEE Transactions on Biomedical Circuits and Systems, pp. 1-18, 2022.

[J-2] **A. Wang**, D. Jung, D. Lee, and H. Wang, "Impedance Characterization and Modeling of Subcellular to Micro-sized Electrodes with Varying Materials and PEDOT:PSS Coating for Bioelectrical Interfaces," ACS Applied Electronic Materials, vol. 3, no. 12, pp. 5226-5239, 2021.

[J-3] D. Jung, G. Junek, J. Park, S. Kumashi, **A. Wang**, S. Li, S. Grijalva, H. Cho, and H. Wang, "A CMOS 21 952-Pixel Multi-Modal Cell-Based Biosensor With Four-Point Impedance Sensing for Holistic Cellular Characterization," IEEE Journal of Solid-State Circuits, vol. 56, no. 8, pp. 2438-2451, 2021.

[J-4] S. Kumashi, D. Jung, J. Park, S. Sanz, S. Grijalva, **A. Wang**, S. Li, H. C. Cho, C. A.-Franklin and H. Wang, "A CMOS Multi-Modal Electrochemical and Impedance Cellular Sensing Array for Massively Paralleled Exoelectrogen Screening," IEEE Transactions on Biomedical Circuits and Systems, pp. 1-1, 2021.

[J-5] **A. Wang**, D. Jung, J. Park, G. Junek and H. Wang, "Electrode–Electrolyte Interface Impedance Characterization of Ultra-Miniaturized Microelectrode Arrays Over Materials and Geometries for Sub-Cellular and Cellular Sensing and Stimulation," IEEE Transactions on NanoBioscience, vol. 18, no. 2, pp. 248-252, 2019.

[J-6] J. Park, S. I. Grijalva, M. K. Aziz, T. Chi, S. Li, M. N. Sayegh, **A. Wang**, H. Cho and H. Wang, "Multi-parametric cell profiling with a CMOS quad-modality cellular interfacing array for label-free fully automated drug screening," Lab on a Chip, vol. 18, no. 19, pp. 3037-3050, 2018.

Conferences:

[C-1] **A. Wang**, Y. Sheng, W. Li, D. Jung, G. Junek, D. Lee, M. Wang, S. Maharjan, J. Park, S. Kumashi, J. Hao, Y. S. Zhang, K. Eggan, and H. Wang, "A CMOS Cellular Interface Array for Digital Physiology Featuring High-Density Multi-Modal Pixels and Reconfigurable Sampling Rate," in 2022 IEEE International Solid- State Circuits Conference (ISSCC), 2022, vol. 65, pp. 202-204.

[C-2] D. Lee, **A. Wang**, and H. Wang, "Long-term stable and micro-sized on-chip reference electrode with biocompatible coating," in Proc. The 25th International Conference on Miniaturized Systems for Chemistry and Life Sciences (uTAS), Oct. 2021.

[C-3] F. Wang, **A. Wang**, H. Wang, "A 22-37 GHz Broadband Compact Linear Mm-Wave Power Amplifier Supporting 64-/256-/512-QAM Modulations for 5G Communications," in Proc. IEEE International Microwave Symposium (IMS), Aug. 2020.

[C-4] D. Jung, S. R. Kumashi, J. Park, S. T. Sanz, S. Grijalva, **A. Wang**, S. Li, H. C. Cho, C. Ajo-Franklin, and H. Wang, "28.4 A CMOS Multimodality In-Pixel Electrochemical and Impedance Cellular Sensing Array for Massively Paralleled Synthetic Exoelectrogen Characterization," in 2020 IEEE International Solid- State Circuits Conference (ISSCC), 2020, pp. 436-438.

[C-5] D. Jung, J. Park, G. Junek, S. Grijalva, S. Kumashi, **A. Wang**, S. Li, H. Cho, H. Wang, "A 21952-Pixel Multi-Modal CMOS Cellular Sensor Array with 1568-Pixel Parallel Recording and 4-Point Impedance Sensing," in 2019 Symposium on VLSI Circuits, 2019, pp. C62-C63.

[C-6] **A. Wang**, D. Jung, J. Park, G. Junek, and H. Wang, "Electrode-Electrolyte Interface Impedance Characterization of Ultra-Miniaturized Microelectrode Arrays over Materials and Geometries for Sub-Cellular and Cellular Sensing and Stimulation," in Proc. IEEE EMBS Micro and Nanoengineering in Medicine Conference (MNM), Dec 2018.

[C-7] **A. Wang**, J. Park, D. Jung, G. Junek, and H. Wang, "Enabling AI-Assisted Drug Screening and Synthetic Biology Engineering: Multi-Parametric Data-Driven Cell Profiling by CMOS Multi-Modal Cellular Interfacing Arrays," in Proc. Association for the Advancement of Artificial Intelligence (AAAI) Fall Symposium: Artificial Intelligence for Syntheic Biology, Oct 2018.