WUYANG YU

ywy1217@gmail.com | ywy1217.github.io/yuwuyang/

Education

08/2012 – 08/2018 Ph.D. in Electrical and Computer Engineering – GPA 3.87/4
PURDUE UNIVERSITY – West Lafayette, IN, USA
- Advisor: Prof. Babak Ziaie

08/2008 – 07/2012 Bachelor of Science in Microelectronics – GPA 91.9/100
TSINGHUA UNIVERSITY – Beijing, China

Work and Research Experience

Sensor System Engineer *Zoox*

01/2022 – present **Perception Sensor Architecture**

- Develop top-down sub-system technical requirements for sensors and compute platform
- Sensor coverage simulation and analysis
- Lidar module modeling

Sensor Design & Integration Engineer *Apple*

10/2018 – 01/2022 **iPhone Touch & Force Sensor Technologies**

- Development of sensing solutions from conception through product release (iPhone 12 portfolio).
- Propose/design/build/measure prototype sensing solutions that demonstrate architecture feasibility.
- Develop architecture (AFE to DSP) modeling, optimization, and validation frameworks (MATLAB, Python, C).
- Define calibration, test, and reliability methodology/requirements across the supply chain.
- Cross-disciplinary experience in ASIC/firmware/algorithm/mechanical/system integration
- Design schematics and provide layout constraints for PCBs/FPCs.
- Analyze engineering build data (JMP) and assess process capability.
- Perform failure mode analysis, root-cause diagnosis, and technical problem-solving.
- Manage external partners and suppliers, including providing engineering guidance on failure analysis and corrective actions.
- Author hardware specifications, engineering build documentation and executive communications.

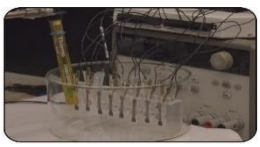
Graduate Research Assistant *Ziaie Biomedical Microdevices Laboratory, Purdue University*

09/2014 – 07/2018 **Autonomous diaper-embedded photometric sensing platform with on-board urine-activated battery for urinary tract disease screening** (*Ph.D. Dissertation*)

This platform is a thin and conformal add-on into a diaper, which autonomously wakes upon a urination event, analyzes the urine and sends results wirelessly (via BLE) to a mobile phone.

- System architecture and fabrication design: laser patterning polymeric films and metallic sheets with CorelDRAW layout; integration of off-the-shelf electronics with polymeric substrate and paper-based battery; device passivation and packaging
- Design and characterization of urine-activated battery: deviation from Nernst equilibrium; activation time; discharging capacity; geometry optimization
- Sensor calibration: light absorption in porous medium in various hydrated states; noise analysis
- Fluid transport control: capillary/microfluidic flow study in confined porous matrix
- Multi-sensor signal-multiplexing interface circuit design (Multisim simulation)
- Commercialization activities: product demo; manufacturing cost estimate

01/2017 – 02/2018 **Flexible electrochemical nitrate sensor by Roll-to-Roll fabrication for precision agriculture**



- Developed test fixtures for characterizing 16 sensors simultaneously, test automation process using multifunction DAQ (NI USB 6211), and EM noise prevention
- Designed 3D-printed prototyping mold for controlled coating of ion-selective membrane
- Analysis of nitrate sensor potential variations and drifts
- Investigation of biodegradable substrates and membrane materials for large-scale fabrication

01/2014 – 05/2017 **Magnetically-activated capsule for gastrointestinal tract location-specific drug release**

- Design (Solidworks) and laser machining/3D-printing fabrication of a ⌀9mm×26mm capsule with a magnetic-activated-fusible latch (low melting point thread)
- Characterization of 3D magnetic actuation range, and data fitting/visualization using MATLAB
- Study on supercapacitor discharging (*C*, *U*) to heat NiCr wire (T_{MAX})
- Integrated wireless charging capability
- In-vitro study on the performance and reliability of the capsule

11/2015 – 03/2016 **Modular customizable 3D-printed Zn-air batteries**

- Electroplating of Zn on 3D-printed conductive PLA (polylactic acid)
- Solidworks model design and rapid prototyping with dual-extrusion 3D printer
- Hand-on experience in assembly of extrusion 3D printer and filament maker (Filastruder)

03/2013 – 10/2014 **Stretchable/Flexible interconnect and strain sensor for wearable applications**

- Fabrication process innovation involving material science/engineering on elastomers and conductiv e/soluble polymers.
- Conducted electrical characterization of the strain sensors.
- Mechanical reliability characterization of stretchable interconnect.
- Developed MATLAB code for test automation using Agilent 4396B net analyzer

04/2016 – 07/2018 **Research group website management – https://engineering.purdue.edu/ZBML/**

- Modernized website style using open-source Bootstrap template.
- Created MySQL database for managing publication records and project information
- Created interactive visualization (keyword cloud) of highlighted research topics using JS/PHP

Graduate Teaching Assistant *Department of Mathematics, Purdue University*

08/2016 – 12/2016 Prepared online (Lon-capa) homework and solutions for course (MATH373 Financial Mathematics) using HTML/Perl/LaTeX.

Undergraduate Thesis *M. AI. N (MEMS, Advanced Integration, Nanotechnology) Group, Tsinghua University*

03/2012 – 06/2012 **Thermal stress analysis on through-silicon-vias (TSVs) with liners of different materials**

Created FEA models in ANSYS to simulate thermal stress mitigation by the liners made of different materials (SiO_2, BCB, air, etc.) between copper via and silicon wafer.

Skills

Programming MATLAB, Python, C/C++, HTML/JS/PHP/MySQL

Simulation SPICE, Multisim, ANSYS

Graphic design Solidworks, CorelDRAW, Adobe Illustrator/Photoshop (for 3D model drawings, laser machining patterns, flexible PCB layouts and technical illustrations in project designs, reports, publications, patents and research proposals)

Data analysis JMP, Origin, SAS (statistical analysis and visualization)

Rapid prototyping Laser Machining, SLA and Extrusion 3D printing, Soft Lithography, PCB Design and Etching

Others Electrical measurements (multimeter, oscilloscope, LCR meter, network analyzer, Multifunction I/O DAQ), UV-Vis Spectroscopy, Electrochemistry, iWork/MS Office

Scholarship & Awards

2009 – 2011 Academic Merit Scholarship / *Zheng Geru* Scholarship, *Tsinghua University*
2010 *Li & Fung* scholarship, (for exchange study at the University of Hong Kong)
2009 First prize of Beijing University Student Physics Competition, Non-physical Group A
2007 First prize of China Physics Olympiad (CPHO) for high school students, *Jiangxi* Province

Publications – 8 journal publications, 11 conference publications & 2 patents

Journal

- H. Jiang, M. Ochoa, R. Rahimi, **W. Yu**, et al. "Laser-treated glass platform for rapid wicking-driven transport and particle separation in bio microfluidics." *RSC Advances* 9.34 (2019): 19531-19538.

- H. Jiang, **W. Yu**, et al. "A Smart Capsule with a Hydrogel-Based pH-Triggered Release Switch for GI-Tract Site-Specific Drug Delivery." *IEEE Transactions on Biomedical Engineering* (2018).
- W. Seo, **W. Yu**, et al. "Diaper-Embedded Urinary Tract Infection Monitoring Sensor Module Powered by Urine-Activated Batteries." *IEEE transactions on biomedical circuits and systems* 11.3 (2017): 681-691.
- R. Rahimi, **W. Yu**, et al. "Directly embroidered microtubes for fluid transport in wearable applications." *Lab on a Chip* 17.9 (2017): 1585-1593.
- **W. Yu**, et al. "A Smart Capsule With GI-Tract-Location-Specific Payload Release." *IEEE Transactions on Biomedical Engineering* 62.9 (2015): 2289-2295.
- R. Rahimi, M. Ochoa, **W. Yu**, et al. "Highly stretchable and sensitive unidirectional strain sensor via laser carbonization." *ACS applied materials & interfaces* 7.8 (2015): 4463-4470.
- R. Rahimi, M. Ochoa, **W. Yu**, et al. "A sewing-enabled stitch-and-transfer method for robust, ultra-stretchable, conductive interconnects." *Journal of Micromechanics and Microengineering* 24.9 (2014): 095018.
- Q. Chen, **W. Yu**, et al. "Reliability of through-silicon-vias (TSVs) with benzocyclobutene liners." *Microelectronics Reliability* 53.5 (2013): 725-732.

Conference

- H. Jiang, **W. Yu**, et al. "Inkjet-printed Solid-state Potentiometric Nitrate Ion Selective Electrodes for Agricultural Application." *IEEE Sensors*, 2019
- H. Jiang, **W. Yu**, et al. "A biodegradable sensor housed in 3d printed porous tube for in-situ soil nitrate detection." *Solid-State Sensors, Actuators and Microsystems Workshop,* Hilton Head, 2018.
- H. Jiang, **W. Yu**, et al. "A pH-sensitive hydrogel-based smart switch for GI-tract payload release." *Micro Electro Mechanical Systems (MEMS), 2017 IEEE 30th International Conference*.
- **W. Yu**, et al. "Modular customizable 3d-printed batteries for wearable applications", *The 20th International Conference on Miniaturized Systems for Chemistry and Life Sciences(MicroTAS), 2016.*
- **W. Yu**, et al. "A diaper-embedded disposable nitrite sensor with integrated on-board urine-activated battery for UTI screening." *Engineering in Medicine and Biology Society (EMBC), 2016 IEEE 38th Annual International Conference*.
- W. Seo, **W. Yu**, et al. "Diaper-embedded urinary tract infection monitoring system powered by a urine-powered battery." *Biomedical Circuits and Systems Conference (BioCAS), 2015 IEEE*.
- R. Rahimi, M. Ochoa, **W. Yu**, et al. "A highly stretchable pH sensor array using elastomer-embedded laser carbonized patterns." *Solid-State Sensors, Actuators and Microsystems (TRANSDUCERS), 2015 Transducers-2015 18th International Conference.*
- R. Rahimi, **W. Yu**, et al. "A low-cost fabrication technique for direct sewing stretchable interconnetions for wearable electronics." *Solid-State Sensors, Actuators and Microsystems (TRANSDUCERS), 2015 Transducers-2015 18th International Conference.*
- R. Rahimi, M. Ochoa, **W. Yu**, et al. "A facile fabrication technique for stretchable interconnects and transducers via laser carbonization." *Micro Electro Mechanical Systems (MEMS), 2015 28th IEEE International Conference*.
- R. Rahimi, M. Ochoa, **W. Yu,** et al. "Flexible supercapacitor based on MnO2 coated laser carbonized electrodes." *Journal of Physics: Conference Series*. Vol. 660. No. 1. IOP Publishing, 2015.
- **W. Yu**, et al. "Optical nitrite sensor and urine-activated electrochemical power source on paper through laser-assisted patterning and lamination." *Proceedings of the MicroTAS, San Antonio* (2014).

Patents

- B. Jung, B. Ziaie, **W. Yu**, W. Seo, "DEVICES, SYSTEMS, AND METHODS FOR DETECTING TARGETED COMPOUNDS." WIPO Patent Application WO2017160399A1. 21 Dec. 2017. Print.
- B. Ziaie, R. Rahimi, and **W. Yu**. "Smart capsule with GI-tract-location-specific payload release." U.S. Patent Application No. 14/919,120.