Yunong Wang

Email: yunongwang@tamu.edu | Phone: +1 (812)-227-0433
Texas A&M University
Department of Chemistry, 580 Ross St., College Station, TX 77843

Education

Ph.D. Chemistry Student (Analytical), Texas A&M University College Station, TX. Jan. 2022 -- Present

Ph.D. Chemistry Student (Analytical), Indiana University Bloomington, IN. Aug. 2019 – Dec. 2021*

(*Moved with PI from Indiana University to Texas A&M University)

B.S. Chemistry, Southern University of Science and Technology (SUSTech), China. Aug. 2015 – Jun. 2019

Research Experience

Graduate Research Assistant, Department of Chemistry, Texas A&M University

Advisor: Dr. Lane A. Baker Jan. 2022 – Present

Graduate Research Assistant, Department of Chemistry, Indiana University Bloomington

Advisor: Dr. Lane A. Baker Sept. 2019 – Dec. 2021

Research Project #1: Applying Deep Learning to Fast-scan Cyclic Voltammetry Based Electrochemical Imaging

Aim: Develop a high-throughput scanning toolset, including instruments and post data analysis with deep learning model, to tell and analyze different biological cell types (e.g. normal and cancer cells) by chemical release with fast-scan voltametric methods.

- Built an automated carbon probe fabrication station and designed a navigation software with Qt-C++ to fabricate stable 800 nm single-sided carbon-filled dual barrel quartz pipettes.
- Built a scanning electrochemical microscopy-scanning ion conductance microscopy (SECM-SICM) from scratch and designed a software suite with LabVIEW on both computer and field-programmable gate array (FPGA) to drive the instrument. This set up can precisely control positioning and electrochemical detection of nanopipettes.
- Used SECM-SICM and dual-barrel carbon probes to scan micro-patterned Au electrode and biological cells to get both topographical and electrochemical mapping. High-speed electrochemical measurement is achieved by self-referenced fast-scan cyclic voltammetry (FSCV) at pipette's extended and retracted states.

Research Project #2: Mechanical Measurement of c-peptide Stimulated Single Erythrocytes from Multiple Sclerosis (MS) Patients with Scanning Ion Conductance Microscopy

Aim: Monitor the effect of c-peptide/Zn^{2+}/Albumin to the Young's Modulus change of Multiple Sclerosis Patients' red blood cells in real time and quantify the time-lapsed change with statistical results.

- Built a pressurized-SICM set up from scratch and obtain the real-time Young's Modulus with optimized software and system design. The instrument can obtain a 64x64 topographic and pressure map within 11 min.

- Batches of normal, MS cells were measured, and the mechanical changes were also calibrated compared to the normal cells treated with diamide (stiffened RBC group). The statistical result shows that MS RBCs shift to a stiffer region compared to normal RBCs.

Undergraduate Researcher, Southern University of Science and Technology (SUSTech), China

Advisor: Dr. Chongyang Liu Oct. 2016 – Jun. 2019

Research Project: Development of High-speed and Ultra-resolution Scanning Ion Conductance Microscopy Imaging System

Aim: Achieve both high resolution and high-speed scanning ion conductance microscopy imaging on nano-fabricated ITO (200 nm) and HSQ (50 nm) patterned sample.

- Retrofit and redesigned an SICM, and fully built another new SICM from scratch. I programmed both system (PC + FPGA) with LabVIEW and designed a highly effective scanning protocol. Both instruments were able to obtain 30 nm spatial resolution and 10 pixels per second scanning rate.

Skills

- HEK and MDCKII cell line culturing.
- Pyrolytic carbon probe fabrication and focus ion beam SEM polishing.
- Strong programming skills in LabVIEW, Python, MATLAB, Qt-C++, Java, C#, etc.
- COMSOL modeling and simulation
- Proficient in analog circuitry and embedded hardware design, 7 years of field programmable gate array (FPGA) design and coding experience.
- Deep learning model design in PyTorch

Publications

1. Zhu, C.; Huang, K.; Wang, Y.; Alanis, K.; Shi, W.; Baker, L. A. Imaging with Ion Channels, *Anal. Chem.*, **2021**, 93, 5355-5359.

Awards

1. 2017 SUSTech Second-Class Scholarship for Outstanding Academic Performance (Top 10%)
2. 2016 SUSTech Second-Class Scholarship for Outstanding Academic Performance (Top 10%)
3. 2015 Freshmen Scholarship of SUSTech (Top 15%)

Teaching Experience

- IUB Associate Instructor "C118: General Chemistry Lab" Sept. 2019 – May. 2021
- SUSTech Teaching Assistant "**Advanced Instrumentation System II**" Sept. 2018 – Jan. 2019
- SUSTech Teaching Assistant "**Advanced Instrumentation System I**" Feb. 2018 – Jun. 2018