

# Kristen Alanis

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Texas A&M University, Department of Chemistry, 580 Ross St, College Station, TX 77843

## EDUCATION

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**Ph.D. Candidate (Analytical)**, Texas A&M University College Station, TX Jan. 2022 – Present

**Ph.D. Candidate (Analytical)**, Indiana University Bloomington, IN Aug. 2018 – Dec. 2021

**B.S. Chemistry**, University of Illinois at Urbana-Champaign, IL Sept. 2014 – Dec. 2017

## RESEARCH EXPERIENCE

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### **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. 2018 – Dec. 2021

#### Research Project #1: *Modulation of Ion Transport Across Nanopores*

- Used scanning ion conductance microscopy (SICM) to investigate the ion transport properties across nanopores under applied transmembrane potential and a concentration gradient. Fabricated nanostructures in different substrates with a focused ion beam, developed chemically modified nanopores to display selective charge transport.

#### Research Project #2: *Ion Channel Probe-Scanning Ion Conductance Microscopy for Selective Ion/Molecule Mapping*

- Used patch-clamp technique to construct ion channel probe from donor cells transfected to express specific ion channels for detecting desired ions/molecules. Coupled with SICM to allow simultaneous ion channel recording and SICM mapping of porous membranes and biological samples. Utilized confocal microscopy and immunolabelling to visualize transfected donor cells.

### **Undergraduate researcher, University of Illinois, Urbana-Champaign, IL**

Advisor: Dr. Mei Shen

Jan. 2017 – May 2018

#### Research Project: *High Spatiotemporal Study of Somatic Exocytosis with Scanning Electrochemical Microscopy and NanoITIES Electrodes*

- Detected acetylcholine release at individual soma cells based on the ion transfer across a polarized interface between two immiscible electrolyte solutions (ITIES). Constructed nanoITIES electrodes, performed animal dissections, cell isolation, and computational simulations utilizing COMSOL Multiphysics.

## PUBLICATIONS

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1. **Alanis, K.**; Alden, S. E.; Baker, L. A; Satheesan, A. E; Jetmore, H. D.; Shen, M. Micro and Nanopipettes for Electrochemical Imaging and Measurement, in Scanning

- Electrochemical Microscopy Third Edition; Mirkin, M.V., Bard, A.J., Eds.; CRC Press: Boca Raton, FL, **2021**, submitted
- Zhu, C.; Jagdale, G.; Gandolfo, A.; **Alanis, K.**; Abney, R.; Zhou, L.; Bish, D.; Raff, J. D.; Baker, L. A. Surface Charge Measurements with Scanning Ion Conductance Microscopy Provide Insight into Nitrous Acid Speciation at the Kaolin Mineral-Air Interface. *Environ. Sci. Technol.* **2021**, *18*, 12233-12242.
  - Chen, R.; **Alanis, K.**; Welle, T. M.; Shen, M. Nanoelectrochemistry in the Study of Single-Cell Signaling. *Anal Bioanal. Chem.* **2020**, *412*, 6121-6132.
  - Huang, K.; Zhou, L.; **Alanis, K.**; Hou, J.; Baker, L. A., Imaging effects of hyperosmolality on individual tricellular junctions. *Chem. Sci.* **2020**, *11*, 1307-1315.
  - Welle, T. M.; **Alanis, K.**; Colombo, M. L.; Sweedler, J. V.; Shen, M. High Spatiotemporal Study of Somatic Exocytosis with Scanning Electrochemical Microscopy and NanoITIES Electrodes. *Chem. Sci.* **2018**, *9*, 4937-4941.

### AWARDS & FELLOWSHIPS

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- National Institutes of Health Quantitative and Chemical Biology Fellowship, Indiana University Bloomington, 2019 – 2021.

### CONFERENCES & PRESENTATIONS

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#### Orals:

- Alanis, K.**; Zhu, C.; Lucas, R.; Siwy, Z. S.; Baker, L. A. “Modulation of Ion Transport Across Nanopores”. Pittcon Conference & Expo, Virtual, March 2021

#### Posters:

- Alanis, K.**; Zhu, C.; Lucas, R.; Siwy, Z. S.; Baker, L. A. “Development of Nanofluidic Devices for Iontronics”. Pittcon Conference & Expo, Chicago, IL, March 2020
- Alanis, K.**; Zhu, C.; Lucas, R.; Siwy, Z. S.; Baker, L. A. “Coupling Ion Channel Probes with Synthetic Nanodevices”. 10th Annual Watanabe Symposium, Indiana University Bloomington, IN, October 2019.
- Alanis, K.**; Zhu, C.; Lucas, R.; Siwy, Z. S.; Baker, L. A. “Development of Synthetic Nanodevices for Iontronics”. Turkey Run Analytical Chemistry Conference, Marshall, IN, September 2019.
- Alanis, K.**; Zhu, C.; Lucas, R.; Siwy, Z. S.; Baker, L. A. “Development of Synthetic Nanodevices for Iontronics”. 6th Annual Materials Research Symposium, Indiana University Bloomington, IN, July 2019.

### PROFESSIONAL ACTIVITIES

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2020 – Present	Member – International Society of Electrochemistry
2019 – Present	Member – Electrochemical Society
2021 – 2022	Vice President – IU Student Chapter of the Electrochemical Society
2019 – 2021	Treasurer – IU Student Chapter of the Electrochemical Society

### TEACHING EXPERIENCE

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2019 Spring	Associate instructor: C101 Elementary Chemistry
2018 Fall	Associate instructor: C101 Elementary Chemistry