

# Hang Ren

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## **EDUCATION**

B.Sc. hon. (Chemistry), Sun Yat-Sen University, Guangzhou, China 2011

Ph.D. (Chemistry), University of Michigan, Ann Arbor, MI 2016  
Advisor: Dr. Mark E. Meyerhoff

## **PROFESSIONAL APPOINTMENTS**

**Assistant Professor** 2021 –present  
Department of Chemistry, University of Texas at Austin

**Assistant Professor** 2018 – 2021  
Department of Chemistry and Biochemistry, Miami University

**Postdoctoral Associate** 2016 – 2018  
Department of Chemistry, University of Utah. Advisor: Dr. Henry S. White

## **HONORS & AWARDS**

2024 Rising Star in Measurement Science

2023 Sloan Research Fellowship

2023 NSF CAREER Award

2022 NIH Maximizing Investigators' Research Award (MIRA)

2022 DARPA Director's Award

2022 Scialog Fellow: Negative Emissions Science (NES). Research Corporation for Science Advancement (RCSA).

2022 UT Austin CNS Catalyst Award

2020 DARPA Young Faculty Award

2020 ACS PRF Doctoral New Investigator Award

2019 MUACC Travel Award

2019 Dean's Summer Research Award, Miami University

2018 James W. and Carolyn L. Taylor MUACC Travel Award

2016 Outstanding Reviewer for Sensors & Actuators: B.

2015 George Ashworth Analytical Chemistry Fellowship

2014 Baxter Young Investigator Awards

2013 Rackham Travel Grant Awards

2010 First prize in the National Undergraduate Chemistry Laboratory Tournament, China

2010 National Scholarship (top 0.2% in China)

2007-09 First-Class Scholarship, Sun Yat-Sen University

## **RESEARCH INTEREST**

Nanoelectrochemistry, Single entity electrochemistry. Scanning electrochemical probe microscopy. Electrocatalysis. Electrochemical sensors. Electrochemical nucleation and phase transition.

## **PUBLICATIONS** ([Google Scholar](#))

### **Independent work:**

25. Ryu, C. H.; Ren, H.; Simultaneous Mapping of Electrocatalytic Activity and Selectivity via Hybrid Scanning Electrochemical Probe Microscopy, **2024 submitted**
24. Stringer, Blake; Schmeltzer, Alexandra; Ryu, C. Hyun; Ren, Hang; Luo, Long , Resistive Pulse Analysis of Chiral Amino Acids Utilizing Metal-Amino Acid Crystallization Differences, *Analyst* **2024**, *accepted*. DOI: [10.1039/d4an00347k](https://doi.org/10.1039/d4an00347k)
23. Al-Mualem, Z.; Lorenz-Ochoa, K.; Pan, L.; Ren, H.; Baiz, C.; Controlling Hydrogen-Bonding at a Gold Electrode Interface: The Effect of Organic Cosolvents. *J. Phys. Chem. Lett.* **2024** *15*, XXX, 4391–4399. DOI: [10.1021/acs.jpcllett.4c00645](https://doi.org/10.1021/acs.jpcllett.4c00645)
22. Lee, H.; Ren, H.; Tuning Electrocatalytic Oxygen Reduction Reaction with Dynamic Control of Electrochemical Interfaces, *J. Am. Chem. Soc.*, **2024**, *accepted* [10.1021/jacs.3c13694](https://doi.org/10.1021/jacs.3c13694)
21. Lee, H.; Matthews, K. C.; Zhan, X.; Warner, J. H.; Ren, H. \*; Precision Synthesis of Bimetallic Nanoparticles via Nanofluidics in Nanopipettes, *ACS Nano*, **2023**, *17*, (22), 22499–22507. DOI: [10.1021/acsnano.3c06011](https://doi.org/10.1021/acsnano.3c06011)
20. Mondaca-Medina, E.; García Carrillo, R.; Lee, H; Wang, Y.; Zhang, He; Ren, H. \*; Nanoelectrochemistry in Electrochemical Phase Transition Reactions, *Chem. Sci.*, **2023**, *14*, 7611-7619. DOI: [10.1039/D3SC01857A](https://doi.org/10.1039/D3SC01857A)
19. Al-Zubeidi, A.; Wang Y.; Lin, J; Flatebo, C.; Landes, C.; Ren, H. \*; Link, S.\*; d-band Holes React at the Tips of Gold Nanorods, *J. Phys. Chem. Lett.*, **2023**, *14*, 23, 5297–5304. DOI: [10.1021/acs.jpcllett.3c00997](https://doi.org/10.1021/acs.jpcllett.3c00997)
18. Wang, Y.; Li, M.; Ren, H.\*; Interfacial Structure and Energy Determine the Heterogeneity in the Electrochemical Metal Dissolution Activity at Grain Boundary, *Chem. Matter.*, **2023**, *35*, (11), 4243–4249, DOI: [10.1021/acs.chemmater.3c00220](https://doi.org/10.1021/acs.chemmater.3c00220) (Front Cover)
17. Ryu, C.H.; Lee, H.; Lee, H.; Ren, H.\*; Learning from the Heterogeneity at Electrochemical Interfaces, *J. Phys. Chem. Lett.*, **2022**, *13* (33), 7838–7846, DOI: [10.1021/acs.jpcllett.2c02009](https://doi.org/10.1021/acs.jpcllett.2c02009). (Perspective)
16. Li, M.; Wang, Y.; Gordon, E., Ren, H.\*; Mapping the Kinetics of Hydrogen Evolution Reaction on Ag via Pseudo-Single-Crystal Scanning Electrochemical Cell Microscopy, *Chinese J. Catal.* **2022**, *43* (12), 3170-3176. (invited) DOI: [10.1016/S1872-2067\(22\)64158-5](https://doi.org/10.1016/S1872-2067(22)64158-5)
15. Li, M.; Wang, Y.; Blount, B.; Gordon, E.; Muñoz-Castañeda, J. A.; Ye, Z.; Ren, H., Stochastic Local Breakdown of Oxide Film on Ni from Identical-Location Imaging: One Single Site at a Time. *Nano Lett.* **2022**, *22* (15), 6313–6319. DOI: [10.1021/acs.nanolett.2c02018](https://doi.org/10.1021/acs.nanolett.2c02018)
14. Wang, Y; Li, M.; Gordon, E.; Ye, Z.; Ren, H.\*; Nanoscale Colocalized Electrochemical and Structural Mapping of Metal Dissolution Reaction, *Anal. Chem.* **2022**, *94* (25), 9058–9064. DOI: [10.1021/acs.analchem.2c01283](https://doi.org/10.1021/acs.analchem.2c01283)
13. Wang, Y.; Li, M.; Ren, H.\*; Voltammetric Mapping of Hydrogen Evolution Reaction on Pt Locally via Scanning Electrochemical Cell Microscopy. *ACS Measurement Science Au*, **2022**, *2* (4), 304–308. DOI: [10.1021/acsmeasuresciau.2c00012](https://doi.org/10.1021/acsmeasuresciau.2c00012)
12. Li, M.; Ye, K.-H.; Qiu, W.; Wang, Y.; Ren, H.\*; Heterogeneity between and within Single Hematite Nanorods as Electrocatalysts for Oxygen Evolution Reaction. *J. Am. Chem. Soc.*, **2022**, *144* (12) 5247–5252 DOI: [10.1021/jacs.2c00506](https://doi.org/10.1021/jacs.2c00506)
11. Blount, B.; Juarez, G.; Wang, Y.; Ren, H.\*; iR Drop in Scanning Electrochemical Cell Microscopy. *Faraday Discuss.*, **2022**, *233*, 149 - 162. DOI: [10.1039/D1FD00046B](https://doi.org/10.1039/D1FD00046B)
10. Zheng, H.; Li, M.; Chen, J.; Quan, A.; Ye, K.; Ren, H.; Hu, S.; Cao, Y., Strain tuned efficient heterostructure photoelectrodes. *Chin. Chem. Lett.* **2022**, *33* (3), 1450-1454. DOI: [10.1016/j.cclet.2021.08.062](https://doi.org/10.1016/j.cclet.2021.08.062)
9. Ren, H.\*; Edwards, M. A. \*, Stochasticity in Single-Entity Electrochemistry. *Curr. Opin. Electrochem.* **2021**, *25*, 100632. DOI: [10.1016/j.coelec.2020.08.014](https://doi.org/10.1016/j.coelec.2020.08.014)

8. Liu, Y.; Jin, C.; Liu, Y.; Ruiz, K. H.; Ren, H.; Fan, Y.; White, H. S.; Chen, Q., Visualization and Quantification of Electrochemical H<sub>2</sub> Bubble Nucleation at Pt, Au, and MoS<sub>2</sub> Substrates. *ACS Sensors* **2021**, 6 (2), 355–363. DOI: [10.1021/acssensors.0c00913](https://doi.org/10.1021/acssensors.0c00913)
7. Allegranza, M. L.; Watuthanthrige, N. D. A.; Wang, Y.; Garcia, G. A.; Ren, H.; Konkolewicz, D.\* Substituent Effects in Iniferter Photo-Polymerization. Can Bond Homolysis Be Enhanced by Electronics? *Polymer Chemistry*, **2020**, 11, 6129–6133. DOI: [10.1039/D0PY01086C](https://doi.org/10.1039/D0PY01086C)
6. Blount, B.; Kilner, K.; Hu, H.; Gohmann, D.; Gordon, E.; Wang, Y.; Ren, H.\*, Electrochemically Induced Nucleation of Nanoscopic Ionic Solid. *J. Phys. Chem. C* **2020**, 124 (31), 17413–17417. DOI: [10.1021/acs.jpcc.0c05009](https://doi.org/10.1021/acs.jpcc.0c05009)
5. Ying, Y.-L.; Wang, J.; Leach, A. R.; Jiang, Y.; Gao, R.; Xu, C.; Edwards, M.; Pendergast, A. D.; Ren, H.; Weatherly Connor, K. T.; Wang, W.; Actis, P.; Mao, L.; White, H. S.; Long, Y.-T., Single-Entity Electrochemistry at Confined Sensing Interfaces. *SCIENCE CHINA Chemistry* **2020**, 63 (5), 1674–7291. DOI: [10.1007/s11426-020-9716-2](https://doi.org/10.1007/s11426-020-9716-2)
4. Wang, Y.; Gordon, E.; Ren, H.\*, Mapping the Potential of Zero Charge and Electrocatalytic Activity of Metal–Electrolyte Interface via a Grain-by-Grain Approach. *Anal. Chem.* **2020**, 92 (3), 2859–2865. DOI: [10.1021/acs.analchem.9b05502](https://doi.org/10.1021/acs.analchem.9b05502)
3. Wang, Y.; Gordon, E.; Ren, H. \*, Mapping the Nucleation of H<sub>2</sub> Bubble on a Polycrystalline Pt via Scanning Electrochemical Cell Microscopy. *J. Phys. Chem. Lett.* **2019**, 10 (14) 3887–3892. DOI: [10.1021/acs.jpcllett.9b01414](https://doi.org/10.1021/acs.jpcllett.9b01414)
2. Edwards, M. A. \*; White, H. S.; Ren, H. \*, Voltammetric Determination of the Stochastic Formation Rate and Geometry of Individual H<sub>2</sub>, N<sub>2</sub>, and O<sub>2</sub> Bubble Nuclei. *ACS Nano* **2019**, 13 (6), 6330–6340. DOI: [10.1021/acsnano.9b01015](https://doi.org/10.1021/acsnano.9b01015)
1. Zhao, X.; Ren, H.; Luo, L., Gas Bubbles in Electrochemical Gas Evolution Reactions. *Langmuir* **2019** 35 (16), 5392–5408. DOI: [10.1021/acs.langmuir.9b00119](https://doi.org/10.1021/acs.langmuir.9b00119)

**PhD and postdoc work:**

23. Robinson, D. A.; Edwards, M. A.; Liu, Y.; Ren, H.; White, H. S., Effect of Viscosity on the Collision Dynamics and Oxidation of Individual Ag Nanoparticles. *J. Phys. Chem. C* **2020**, 124 (16), 9068–9076. DOI: [10.1021/acs.jpcc.0c01447](https://doi.org/10.1021/acs.jpcc.0c01447)
22. Qiu, Y.; Ren, H.; Edwards, M. A.; Gao, R.; Barman, K.; White, H. S., Electrochemical Generation of Individual Nanobubbles Comprising H<sub>2</sub>, D<sub>2</sub>, and HD. *Langmuir* **2020**, 36 (22), 6073–6078. DOI: [10.1021/acs.langmuir.0c00232](https://doi.org/10.1021/acs.langmuir.0c00232)
21. Ren, H.; Edwards, M. A.; Wang, Y.; White, H. S. \*, Electrochemically Controlled Nucleation of Single CO<sub>2</sub> Nanobubbles via Formate Oxidation at Pt Nanoelectrodes. *J. Phys. Chem. Lett.* **2020**, 11 (4), 1291–1296. DOI: [10.1021/acs.jpcllett.9b03898](https://doi.org/10.1021/acs.jpcllett.9b03898)
20. Zhang, Y.; Robinson, D.; McKelvey, K.; Ren, H.; White, H. S.; Edwards, M. A. A High-Pressure System for Studying Oxygen Reduction During Pt Nanoparticle Collisions. *J. Electrochem. Soc.* **2020**, 167, 166507 DOI: [10.1149/1945-7111/abcde2](https://doi.org/10.1149/1945-7111/abcde2)
19. Terry Weatherly, C. K.; Ren, H.; Edwards, M. A.; Wang, L.; White, H. S., Coupled Electron- and Phase-Transfer Reactions at a Three-Phase Interface. *J. Am. Chem. Soc.* **2019**, 141 (45), 18091–18098. DOI: [10.1021/jacs.9b07283](https://doi.org/10.1021/jacs.9b07283)
18. Hunt, A. P.; Batka, A. E.; Hosseinzadeh, M.; Gregory, J. D.; Haque, H. K.; Ren, H.; Meyerhoff, M. E.; Lehnert, N., “Nitric Oxide Generation on Demand for Biomedical Applications via Electrocatalytic Nitrite Reduction by Copper BMPA- and BEPA-Carboxylate Complexes.” *ACS Catal.* **2019**, 9 (9), 7746–7758. DOI: [10.1021/acscatal.9b01520](https://doi.org/10.1021/acscatal.9b01520)
17. McCabe, M. M.; Hala, P.; Rojas-Pena, A.; Lautner-Csorba, O.; Major, T. C.; Ren, H.; Bartlett, R. H.; Brisbois, E. J.; Meyerhoff, M. E., “Enhancing Analytical Accuracy of Intravascular Electrochemical Oxygen Sensors via Nitric Oxide Release Using S-Nitroso-N-Acetyl-

- Penicillamine (SNAP) Impregnated Catheter Tubing." *Talanta* **2019**, 205, 12077. DOI: 10.1016/j.talanta.2019.06.077
16. Tan, C.; Fleming, A. M.; Ren, H.; Burrows, C. J.; White, H. S., "γ-Hemolysin Nanopore is Sensitive to Guanine-to-Inosine Substitutions in Double-Stranded DNA at the Single-Molecule Level." *J. Am. Chem. Soc.* **2018** *140* (43), 14224–14234 DOI: 10.1021/jacs.8b08153
  15. Edwards, M. A.; Robinson, D. A.; Ren, H.; Cheyne, C. G.; Tan, C. S.; White, H. S. "Nanoscale Electrochemical Kinetics & Dynamics: The Challenges and Opportunities of Single-Entity Measurements." *Faraday Discuss.* **2018** *210* (0), 9–28. DOI: 10.1039/C8FD00134K
  14. Robinson, D. A.; Edwards, M. A.; Ren, H.; White, H. S., "Effects of Instrumental Filters on Electrochemical Measurement of Single-Nanoparticle Collision Dynamics." *ChemElectroChem* **2018**, *5*, 3059. DOI: 10.1002/celec.201800696
  13. Soto, A.; German, S. R.; Edwards, M. A.; Ren, H.; White, H. S., "The Nucleation Rate of Single O<sub>2</sub> Nanobubbles at Pt Nanoelectrodes." *Langmuir* **2018**, *34* (25), 7309–7318. DOI: 10.1021/acs.langmuir.8b01372
  12. Ren, H.; Cheyne, C.; Fleming, A. M.; Burrows, C. J.; White, H. S., "Titration of a Single Captured Molecule in a Protein Nanoreactor Reveals Protonation/Deprotonation Mechanism of a C:C Mismatch in Nano-Confinement." *J. Am. Chem. Soc.* **2018**, *140* (15), 5153–5160. DOI: 10.1021/jacs.8b00593
  11. Zeng, T.; Fleming, A. M.; Ding, Y.; Ren, H.; White, H. S.; Burrows, C. J., "Nanopore Analysis of the 5-Guanidinohydantoin to Iminoallantoin Isomerization in Duplex DNA" *J. Org. Chem* **2018**, *83* (7), 3973–3978. DOI: 10.1021/acs.joc.8b00317
  10. German, S. R.; Edwards M. A.; Ren, H.; White, H. S., "Critical Nuclei Size, Rate, and Activation Energy of H<sub>2</sub> Gas Nucleation." *J. Am. Chem. Soc.* **2018** *140* (11), 4047–4053. DOI: 10.1021/jacs.7b13457
  9. Ren, H.; German, S. R.; Edwards, M. A.; Chen, Q.; White, H. S., "Electrochemical Generation of Individual O<sub>2</sub> Nanobubbles via H<sub>2</sub>O<sub>2</sub> Oxidation." *J. Phys. Chem. Lett.* **2017**, *8* (11), 2450–2454. DOI: 10.1021/acs.jpcclett.7b00882
  8. Yu, Q.; Zajda, J.; Brisbois, E. J.; Ren, H.; Toomasian, J.; Rojas-Pena, A.; Bartlett, R. H.; Hunt, A.; Lehnert, N.; Meyerhoff, M. E. et. al., "Portable Nitric Oxide (NO) Generator Based on Electrochemical Reduction of Nitrite for Potential Applications in Inhaled NO Therapy and Cardiopulmonary Bypass Surgery." *Mol. Pharmaceutics* **2017**, *14* (11), 3762–3771. DOI: 10.1021/acs.molpharmaceut.7b00514
  7. Ren, H.; Bull, J. L.; Meyerhoff, M. E., "Transport of Nitric Oxide (NO) in Various Biomedical Grade Polyurethanes: Measurements and Modeling Impact on NO Release Properties of Medical Devices." *ACS Biomater. Sci. Eng.* **2016**, *2* (9), 1483–1492. DOI: 10.1021/acs.jpcclett.7b00882
  6. Ren, H.; Wu, J.; Colletta, A.; Meyerhoff, M. E.; Xi, C., "Efficient Eradication of Mature *Pseudomonas Aeruginosa* Biofilm via Controlled Delivery of Nitric Oxide Combined with Antimicrobial Peptide and Antibiotics." *Frontiers in Microbiology*, **2016**, *7* (1260). DOI: 10.3389/fmicb.2016.01260
  5. Lee, W. <sup>§</sup>; Ren, H.<sup>§</sup>; Wu, J; Xi, C.; Meyerhoff, M. E., "Electrochemically Modulated Nitric Oxide Release from Flexible Silicone Rubber Patch: Antimicrobial Activity for Potential Wound Healing Applications." *ACS Biomater. Sci. Eng.* **2016**, *2* (9), 1432–1435.
  4. Ren, H.; Coughlin, M. A.; Major, T. C.; Aiello, S.; Rojas, A. P.; Bartlett, R. H.; Meyerhoff, M. E. "Improved *In Vivo* Performance of Amperometric Oxygen (PO<sub>2</sub>) Sensing Catheters via Electrochemical Nitric Oxide Generation/Release." *Anal. Chem.* **2015**, *87* (16), 8867–8872. DOI: 10.1021/acs.analchem.5b01590
  3. Zheng, Z.; Ren, H.; Meyerhoff, M. E., "Highly Sensitive Amperometric Pt-Nafion Gas Phase Nitric Oxide (NO) Sensors: Performance and Application in Characterizing NO-Releasing Biomaterials." *Anal. Chim. Acta* **2015**, *887* (16), 186–191. DOI: 10.1016/j.aca.2015.06.016

2. Ren, H.; Colletta, A.; Koley, D.; Wu, J.; Xi, C.; Major, T.; Bartlett, R. H.; Meyerhoff, M. E., "Thromboresistant/Anti-Biofilm Catheters via Electrochemically Modulated Nitric Oxide Release." *Bioelectrochemistry* **2015**, 104, 10–16. DOI: 10.1016/j.bioelechem.2014.12.003
1. Ren, H.; Wu, J.; Xi, C.; Lehnert, N.; Major, T.; Bartlett, R. H.; Meyerhoff, M. E., "Electrochemically Modulated Nitric Oxide (NO) Releasing Biomedical Devices via Copper(II)-Tri(2-pyridylmethyl)amine Mediated Reduction of Nitrite." *ACS Appl. Mater. Interfaces* **2014**, 6 (6), 3779–3783. DOI: 10.1021/am406066a

## **PATENT**

1. "Gas Delivery Devices", US Patent, (US2017021655)
2. "Nitric Oxide Delivery Devices", US Patent, (US 20140294672)
3. "Nitric Oxide Generation Formulations and Kits", US Patent, (US20190054038A1)

## **ORAL PRESENTATIONS**

1. Ren, H., "Controlling Droplet Cell Environment in Scanning Electrochemical Cell Microscopy (SECCM) via Migration and Electroosmotic Flow.", Faraday Discussion: New Horizons in Nanoelectrochemistry, Nanjing, China, Oct 14 - 16, 2024 (Invited)
2. Ren, H., "Bridging the Gap: Mapping Local Activity and Selectivity in Electrocatalysis using a Hybrid SECM-SECCM Probe", 75th Annual Meeting of the International Society of Electrochemistry, Montréal, Canada, Aug 18-23, 2024 (Invited)
3. Ren, H., "Learning from the Nanoscale Heterogeneity at the Electrochemical Interfaces", University of Washington, Seattle, WA. April 22, 2024 (Invited)
4. Ren, H., "Heterogeneity at the Nanoscale Electrochemical Interfaces: From Metal Dissolution Reactions to Ion Insertion Reaction", Goodenough Lecture Series, April 11th, 2024 (Invited)
5. Ren, H., "Towards High-throughput Precision Synthesis of Bimetallic Nanoparticles for Electrocatalysis Screening", ACS National Meeting, New Orleans, LA, Mar 28, 2024 (Invited)
6. Ren, H., Lee, H., "Precision Synthesis of Bimetallic Nanoparticles via Fluidic Control in Nanopipettes", Pittcon, San Diego, CA. Feb 26, 2024 (Invited)
7. Ren, H., "Learning from the Nanoscale Heterogeneity at the Electrochemical Interfaces", University of Florida, Gainesville, FL. Feb 22, 2024 (Invited)
8. Ren, H., "Learning from the Nanoscale Heterogeneity at the Electrochemical Interfaces", Gordon Research Conference in Electrochemistry, Ventura, CA, Jan 7-12, 2024 (Invited)
9. Ren, H., "Learning from the Nanoscale Heterogeneity at the Electrochemical Interfaces", Florida State University, Tallahassee, FL. Oct 19, 2023 (Invited)
10. Ren, H., Ryu, C.H., 11<sup>th</sup> SECM workshop, Montreal, Quebec, Canada, Sept 25 -27, 2023 (Invited)
11. Ren, H., Wang, Y., Li, M., Understanding and Controlling Electro-dissolution and Electrodeposition using Nanopipettes, ACS National Meeting, San Francisco, Aug 13, 2023
12. Ren, H., "Learning from the Nanoscale Heterogeneity at the Electrochemical Interfaces", ACS National Meeting, Indianapolis, Mar 29, 2023 (Invited)
13. Ren, H., "Nanoelectrochemistry on the Initiation of Metal Dissolution Reaction", Pittcon, Philadelphia, PA, Mar 20, 2023 (Invited)
14. Ren, H., Revealing the Heterogeneity in Metal Dissolution Reaction via Colocalized Electrochemical and Structural Imaging, Austin Community College, Austin, TX, Feb 16, 2023 (Invited)
15. Ren, H., Wang, Y., Blount, B., Li, M., Revealing the Heterogeneity in Metal Dissolution Reaction via Colocalized Electrochemical and Structural Imaging, Eastern Analytical Symposium, Plainsboro, NJ, Nov 14, 2022 (Invited)

16. Ren, H., Nanoscale Electrochemical Mapping, Scialog® – Negative Emissions Science, Tucson, Arizona, Nov 9, 2022
17. Ren, H., Wang, Y., Blount, B., Nanoelectrochemistry of Metal Dissolution and Corrosion Initiation, Gordon Research Conference on Electrochemistry, Ventura, CA, Sept 11-16, 2022
18. Ren, H., Nanoelectrochemistry on the Initiation of Metal Dissolution Reaction, ACS National Meeting, Chicago, Aug 22, 2022 (Invited)
19. Ren, H., Nanoelectrochemistry on the Initiation of Metal Dissolution Reaction, ACS National Meeting, San Diego, March 21, 2022 (Invited)
20. Ren, H., Ren, H., Imaging the Heterogeneity at Complex Electrochemical Interfaces, ACS National Meeting, San Diego, CA, March 20, 2022
21. Ren, H., “Stochasticity and Heterogeneity at Nanoelectrochemical Interfaces”, Nanopore Weekly Meeting, Jan 24, 2022 (virtual)
22. Ren, H., “Heterogeneity at the Electrode/Electrolyte Interface”, Invited, University of Akron, September 28, 2021 (Invited, cancelled)
23. Ren, H., Wang, Y., “Heterogeneity at the Electrode/Electrolyte Interface”, Invited IBAC seminar, University of Utah, Spring 2021 (virtual) June 18, 2021
24. Ren, H., Wang, Y., and Gordon, E., “Mapping the Local Potential of Zero Charge at the Electrode/Electrolyte Interface”, ACS Spring 2021 (virtual)
25. Ren, H., Wang, Y., and Gordon, E., “Mapping the Heterogeneity at the Electrode/Electrolyte Nano-Interfaces” Pittcon 2021 (Invited)
26. Ren, H. “Nanoscale Electrochemical Mapping of the Electrode/Electrolyte Interface”, University of Massachusetts Lowell, March 17, 2021 (virtual)
27. Ren, H. “Nanoscale Revelation of Corrosion Initiation”, DARPA Young Faculty Award Event, Feb 4, 2021
28. Ren, H. “Nanoscale Electrochemical Mapping of the Electrode/Electrolyte Interface”, University of Louisville, Jan 29, 2021
29. Ren, H. “Nanoscale Revelation of Corrosion Initiation”, DARPA Functional Materials Review Meeting, Jan 21, 2021
30. Ren, H. “Stochasticity and Heterogeneity in Nanoscale Electrochemistry.” UT Austin, Dec 8, 2020.
31. Ren, H. “Mapping the Potential of Zero Charge Using Scanning Electrochemical Cell Microscopy”, NanoScientific Symposium, October 2020 (virtual)
32. Ren, H. “Electrochemical Nucleation of Single Entities”, ACS National Meeting, August 2020. (virtual)
33. Ren, H. “Functional Nanoscale Mapping using Scanning Electrochemical Probe Technique”, Gordon Research Conference Electrochemistry, Ventura, CA, January 2020.
34. Ren, H. “Functional Nanoscale Mapping using Scanning Electrochemical Probe Technique”, MUACC 2019, Indianapolis, IN, Nov 2019
35. Ren, H. “Functional Nanoscale Mapping using Scanning Electrochemical Probe Technique”, Northern Kentucky University, Oct 16, 2019 (Invited)
36. Ren, H. “Functional Nanoscale Mapping using Scanning Electrochemical Probe Technique”, Ball State University, Oct 4, 2019 (Invited)
37. Ren, H. “Functional Imaging via Scanning Electrochemical Probe Microscopy”. Potter’s Lodge Meeting, 2019, Minnow Creek Conference Center, NY, Sept 5, 2019 (Invited)
38. Ren, H. “Single Entity Electrochemistry in the Noise”. Pittcon 2019, Philadelphia, PA, Mar 21, 2019
39. Ren, H. “Nanopore Electrode for Single Entity Electrochemistry”. MUACC 2018, East Lansing, MI, Nov 2018

## **GRANTS AND CONTRACTS**

### *Current Support:*

1. Sloan Research Fellowship  
Total Award: \$75,000.                      Role: Sole PI                      Period: 09/15/23-09/14/25
2. Welch Research Grant, "Single-Entity Electrocatalysis at Structurally Well-Defined Nanoparticles." F-2158-20230405  
Total Award: \$300,000.                      Role: Sole PI                      Period: 06/01/23-05/31/26
3. NSF CAREER Award, "CAREER: Developing Nanoscale Scanning Electrochemical Probe Systems to Reveal the Electrical Double Layer at Electrocatalytic Interfaces." CHE-2240113  
Total Award: \$625,000.                      Role: Sole PI                      Period: 03/01/23-02/28/28
4. SciaLog: Negative Emission Science (NES) Award, "Robust scalable multifunctional electrode for CO<sub>2</sub> reduction and C-C coupling in seawater." #29149  
Total Award: \$55,000.                      Role: PI                      Period: 02/01/23-01/31/24
5. NIH Maximizing Investigators' Research Award (MIRA), "Spatially and temporarily resolved precision delivery for quantitative biological studies." 1R35GM147172-01  
Total Award: \$1,914,330                      Role: Sole PI                      Period: 08/16/22-07/31/27

### **Completed Project:**

#### External

1. DARPA Director's Award, "Nanoscale revelation of the nucleation of corrosion." W911NF-20-1-0304  
Total Award: \$215,555                      Role: Sole PI                      Period: 08/01/22-07/31/23
2. DARPA Young Faculty Award (YFA), "Nanoscale revelation of the nucleation of corrosion." W911NF-20-1-0304  
Total Award: \$930,087                      Role: Sole PI                      Period: 08/01/20-07/31/22
3. ACS Petroleum Research Fund, "Mapping the Kinetics for Solid Nucleation via Nanoscale Electrochemical Imaging." PRF# 61155-DNI5  
Total Award: \$110,000                      Role: Sole PI                      Period: 08/01/20-07/31/23

#### Internal

1. UT Austin CNS Catalyst Grant, College of Natural Sciences.  
Total Award: \$50,000                      Role: PI                      Period: 06/01/22-05/31/23
2. Miami University Tech Fee Award, "Low Noise Electrochemical Devices for Single Molecule Measurement."  
Total Award: \$31,872                      Role: PI                      Period: 01/01/19-08/31/19
3. Miami University Tech Fee Award. "Trace Metals Analysis using Digital Microscopes."  
Total Award: \$4,782                      Role: co-PI                      Period: 01/01/19-08/31/19
4. Miami University CAS Summer Research Grant  
Total Award: \$5,000                      Role: PI                      Period: 5/30/19-8/20/19
5. Miami University CFR Faculty Research Grants, "Electrochemically Controlled Synthesis of Catalytic Metal Particles"  
Total Award: \$29,000                      Role: PI                      Period: 1/1/19-12/31/20

## **COURSES TAUGHT**

<b>Title</b>	<b>Enrollment</b>	<b>Credit</b>	<b>Terms</b>
<b>UT Austin</b>			
CH 381 M Adv. Anal. Chem.	12	3	2023 Fall
CH 456 Analytical Chemistry	23	3	2023 Spring

CH 381 M Adv. Anal. Chem.	17	3	2022 Fall
CH 381 M Adv. Anal. Chem.	17	3	2021 Fall
<b>Miami University</b>			
CHM 460/760A Electrochemistry	15	3	2021 Spring
CHM 454/554 Instrumental Analysis	18	3	2020 Fall
CHM 780 Analytical, Inorg. and Phys. Chem. Seminar	10	3	2020 Fall
CHM 142 General Chemistry II	68	3	2020 Spring
CHM 780 Analytical, Inorg. and Phys. Chem. Seminar	14	3	2019 Fall
CHM 454/554 Instrumental Analysis	18	3	2019 Fall
CHM 460/760A Electrochemistry: Energy	20	3	2019 Spring
CHM 454/554 Instrumental Analysis	17	3	2018 Fall

### **INNOVATIONS IN TEACHING**

Qualitative Analysis in Gen Chem Lab through Digital Microscopy Detection of Precipitates (General Chemistry Lab)	2019
Single Entity Measurement for Special Project in Upper-Level Analytical Chemistry Lab	2019

### **PROFESSIONAL DEVELOPMENT**

New Faculty Grant Planning and Support Program (GPS) Phase I and II	2019
Cottrell Foundation New Faculty Workshop, Washington D.C.	2018
Certified Mentor, Undergrad Research Development Program, University of Utah	2017

### **MENTORING**

#### ***Postdoc***

Heekwon Lee (2022-present), Tamilselvi Gurusamy (2022-present), He Zhang (2022-present), Md Maksudur Rahman (2022-present).

#### ***PhD Students***

Yufei Wang (2019-present), Elias Mondaca (2022-present), Hyein Lee (2022-present), Changhyun Ryu (2022-present), Debasree Mandal (2022-present), Roberto Garcia-Carrillo (2023-present), Yang Tao (2023-present), Sam Wenzel (2023-present), Joseph Sampson (2024-).

#### ***Previous Postdoc***

Mingyang Li (2019-2022)

#### ***Previous Graduate Students***

Brandon Blount (2019-2022), Drew Gohmann (2019-2021), Emma Gordon (2018-2021), Lei Pan (2019-2023)

#### ***Previous Undergraduate***

Thomas D Pope (2023- ), Elaine Chang (2023-), Jesus A Munoz-Castaneda (2021-2022), Nick Mazurowski (2022 REU), Jack Seaquist (2022 CREATE summer), Samantha (Sammy) E Koplos (2021-2022), Hannah Newell (2019-2021), Huy Bai (2019-2020), Hao Hu (2019-2020), Echo Devries (2019 REU, *Chemistry PhD at Iowa State Univ.*), Keith Kilner (2018-2019 transferred to *Northwestern Univ.*), Yitong Wang (2018-2019, *Chemistry PhD at Carnegie Mellon Univ.*)

#### ***Doctoral Thesis Committee***

Raul Antonio Marquez Montes, Jason A Weeks, Xuening Zhou, Kenta Kawashima, Austin G Paul-Orecchio, Caitlin M Benway-Trejo, Claire Hallock

### **MEMBERSHIP**

American Chemical Society (ACS)	2014 - present
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Electrochemical Society (ECS)	2017 - present
Society for Electroanalytical Chemistry (SEAC)	2018 - present

## **SERVICE**

### **Profession**

Advisory Board, the Society of Electroanalytical Chemistry	2022-present
Texas Electrochemistry Round-up (co-founder with Prof. Lane Baker)	2022-present
Member-at-large, the Physical and Analytical Electrochemistry Division, Electrochemical Society	2022-present
Symposium Chair of ACS National Meeting: "Advances in Electrochemistry"	2020-present
Manuscript reviewer (since 2016):	2016-present
Journal of the American Chemical Society, Nature Communication, ACS Nano, Nano Letters, Chemical Science, Chemical Communication, The Journal of Physical Chemistry Letter, Journal of Physical Chemistry C, Analytical Chemistry, ACS Sensors, Physical Chemistry Chemical Physics, Journal of Materials Chemistry B, Sensors & Actuators B, Applied Surface Science, Analyst, Analytical Methods, Natural Sciences.	
Proposal Reviewer	2020-present
DOE, ACS PRF, DOD-ARO.	

### **University**

Advisory Board for the Center for Electrochemistry	2022-present
Louis Stokes Alliances for Minority Participation (LSAMP) advisory Committee	2020-2021
Instrumentation Laboratory Advisory Committee	2019-2021
Department Chair Search Committee	2020

### **Department**

Co-Chair of Graduate Admission Committee	2022-present
DEI Task Force Committee	2022-2023
Department Safety Committee	2022
Qualifying Exam/Graduate Program Committee	2021-2022
Equipment & Supplies Committee (Miami)	2020-2021
Graduate Student Admission Committee (Miami)	2018-2021
Graduate Student Recruitment Committee (Miami)	2018-2021
Faculty Search Committee (Miami)	2019-2020
General Chemistry Committee (Miami)	2020
Department Chair Search Committee	2020

## **ORGANIZATIONS AND ACTIVITIES**

- Volunteer for the Biomedical Engineering Society Annual Meeting, San Antonio, TX, 2014
- Volunteer for the 16th Asian Games, Guangzhou, China, 2010

## **LANGUAGES**

English, Chinese, and Teochew.