

Long Luo

Assistant Professor of Chemistry

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Education

- 2011 – 2014 **University of Utah**, Salt Lake City, UT
Ph.D. Analytical Chemistry, GPA: **3.99/4.0**
Thesis title: "Electrolyte negative differential resistance, nanoparticle dynamics in nanopores, and nanobubble generation at nanoelectrodes"
Advisor: Prof. Henry S. White
- 2005 – 2009 **Beijing University of Aeronautics and Astronautics (BUAA)**, China
B.S. Applied Chemistry, minor in English (GPA: **3.84/4.0**; Rank **1st**)
Thesis title: "Electrochemical detection of parts-per-billion copper ion based on the self- cleavage of specific DNAs"
Advisor: Prof. Lidong Li

Professional Experience

- 2017 – Present **Assistant Professor**
Department of Chemistry, Wayne State University
- 2014 – 2017 **Post-doctoral Research Fellow**
Department of Chemistry, University of Texas at Austin
(PI: Prof. Richard M. Crooks)

Other Professional Activities

- 2015 Scientific consultant, **Revalesio Corporation**, Tacoma, WA

Research Interests

Electrocatalysis, Catalysis, Chemical and biosensing, Functional nanomaterials

Honors and Awards

- Ebbing Faculty Development Award, Wayne State University, 2017
- Dow Chemical First-Year Scholarship, University of Utah, 2012
- Nanotechnology Training Program Fellowship, University of Utah, 2011
- National Scholarship, BUAA, 2008
- The First-Class Scholarship, BUAA, 2006-07
- Kwang-Hua Scholarship, BUAA, 2006

Publications († Undergraduate researcher)

1. Lapp, A.S.; Luo, L.; Duan, Z.; Crooks, R.M. Facile One-Step Synthesis of Au@Pt Dendrimer-Encapsulated Nanoparticles, **2017**, Manuscript in Preparation.
2. Li, H.; Luo, L.; Kunal, P.; Bonifacio, C. S.; Duan, Z.; Yang, J. C.; Humphrey, S. M.; Crooks, R.M.; Henkelman, G. Oxygen Reduction Reaction at Classically Immiscible Bimetallics: A Case Study of RhAu, **2017**, Manuscript in Preparation.
3. Luo, L.; Timoshenko, J.; Lapp, A.; Frenkel, A.; Crooks, R. M. Synthesis, Characterization, and Electrochemistry of Dendrimer-Encapsulated Rh Nanoparticle, **2017**, Manuscript in Preparation.
4. Lapp, A. S; Luo, L.; Crooks, R. M. Magnetic Analysis of Gold Dendrimer-Encapsulated Nanoparticles and the Introduction of Magnetism Using Thiols, **2017**, Manuscript in Preparation.
5. Luo, L.; Duan, Z.; Li, H.; Kim, J.; Henkelman, G.; Crooks, R. M. Tunability of the Adsorbate Binding on Bimetallic Alloy Nanoparticles for the Optimization of Catalytic Hydrogenation, *J. Am. Chem. Soc.*, **2017**, *139* (15), 5538–5546.
6. Li, X.; Luo, L.; Crooks, R. M. Faradaic Ion Concentration Polarization on a Paper Fluidic Platform. *Anal. Chem.*, **2017**, *89* (7), 4294–4300
7. Lan, W.; Martin, E.; Luo, L.; Perera, R.; Wu, X.; Martin, C.; White, H.S. Voltage Rectified Current and Fluid Flow in Conical Nanopores, *Acc. Chem. Res.*, **2016**, *49*, 2605–2613.
8. Luo, L.; Zhang, L.; Duan, Z.; Henkelman, G.; Crooks, R. M. Efficient CO Oxidation using Dendrimer-Encapsulated Pt Nanoparticles Activated with <2% Cu Surface Atoms, *ACS Nano*, **2016**, *10*, 8760–8769.
9. German, S.R.; Edwards, M. A.; Chen, Q.; Luo, L.; White, H. S. Electrochemistry of Single Nanobubbles. Estimating the Critical Size of Bubble-Forming Nuclei for Gas-Evolving Electrode Reactions, *Faraday Discuss.*, **2016**, *193*, 223-240.
10. Cunningham, J. C.; Kogan, M. R.; Tsai, Y. J.; Luo, L.; Richards, I.; Crooks, R. M. Paper-based Electrochemical Detection of Silver Nanoparticle Labels by Galvanic Exchange, *ACS Sens.*, **2016**, *1*, 40–47. (**Featured on the front cover, Top 10 most read paper in 2016**)
11. Li, X.; Luo, L.; Crooks, R. M. Low-Voltage Paper Isotachopheresis Device for DNA Focusing, *Lab Chip*, **2015**, *15*, 4090-4098. (**The first two authors contributed equally.**)
12. Luo, L.; Zhang, L.; Henkelman, G.; Crooks, R. M. Unusual Activity Trend for CO Oxidation on Pd_xAu_{140-x}@Pt Core@Shell Nanoparticle Electrocatalysts, *J. Phys. Chem. Lett.*, **2015**, *6*, 2562–2568.
13. Chen, Q.; Luo, L.; White, H. S. Electrochemical Generation of a Hydrogen Bubble at a Recessed Platinum Nanopore Electrode, *Langmuir*, **2015**, *31*, 4573–4581.
14. Luo, L.; Li, X.; Crooks, R. M. Low-Voltage Origami-Paper-Based Electrophoretic Device for Rapid Protein Separation, *Anal. Chem.*, **2014**, *86*, 12390–12397.
15. Luo, L.; German, S.; Lan, W. J.; Mega, T. L.; White, H. S. Resistive Pulse Analysis of Nanoparticles, invited review by *Annu. Rev. Anal. Chem.*, **2014**, *7*, 513–535.
16. Chen, Q.; Luo, L.; Faraji, H.;† Feldberg, S.W.; White, H.S. Electrochemical Measurements of Single H₂ Nanobubble Nucleation and Stability at Pt Nanoelectrodes, *J. Phys. Chem. Lett.*, **2014**, *5*, 3539–3544.
17. Luo, L.; Holden, D. A.; White, H. S. Negative Differential Electrolyte Resistance in a Solid-State Nanopore Resulting from Electroosmotic Flow Bistability, *ACS Nano*, **2014**, *8*, 3023–3030. (**Featured on the book cover of Nanoelectrochemistry edited by**

Michael Mirkin and Shigeru Amemiya.)

18. Luo, L.; Johnson, R. P.; White, H. S. Numerical Modeling of the Bistability of Electrolyte Transport in Conical Nanopores. *Proceeding of the 2013 COMSOL Conference*, **2013**. **(Top 10 Abstracts recommended by the Program Committee)**
19. Luo, L.; White, H. S. Electrogenation of Single Nanobubbles at Sub-50-nm-Radius Platinum Nanodisk Electrodes. *Langmuir*, **2013**, *29*, 11169-11175.
20. German, S.R.; Luo, L.; White, H. S.; Mega, T. L. Controlling Nanoparticle Dynamics in Conical Nanopores, *J. Phys. Chem. C*, **2013**, *117*, 703-711.
21. Luo, L.; Holden, D.A.; Lan, W. J.; White, H. S. Tunable Negative Differential Electrolyte Resistance in a Conical Nanopore in Glass. *ACS Nano*, **2012**, *6*, 6507-6514.
22. Li, L.; Luo, L.; † Mu, X.; † Sun, T.; Guo, L. A Reagentless Signal-on Architecture for Electronic, Real-time Copper Sensors Based on Self-cleavage of DNAzymes, *Anal. Methods*, **2010**, *2*, 627-630.

Patents

1. **L. Luo**; X. Li; R. M. Crooks, Devices, systems and methods for electrophoresis. **2014** U.S. Provisional Patent Application 62/084,076, filed November 25, 2014. U.S. Patent Application 14/952,008, filed November 25, 2015. Published as 20160146755 A1 on May 26, 2016.
2. R. M. Crooks; I. Richards; J. Cunningham; M. Kogan; Y. Tsai; **L. Luo**, Methods, systems for the detection of analytes. **2015** Application Number: 62/144,902, filed: April 8, 2015. Patent pending.

Invited Seminars at Universities

1. Department of Chemistry & Biochemistry, University of California, Los Angeles, Los Angeles, CA, Jan. **2017**.
2. Department of Chemistry, University of Georgia, Athens, GA, Jan. **2017**
3. Department of Chemistry, Wayne State University, Detroit, MI, Dec. **2016**.
4. Department of Chemistry & Biochemistry, Kent State University, Kent, OH, Dec. **2016**.
5. Department of Chemistry & Biochemistry, Boise State University, Boise, ID, Nov. **2016**.
6. Department of Chemistry, Saint Louis University, St. Louis, MO, Nov. **2016**.
7. Chemistry Department, University of North Carolina-Chapel Hill, Chapel Hill, NC, Nov. **2016**.
8. Department of Chemistry, University of Cincinnati, Cincinnati, OH, Nov. **2016**
9. Department of Chemistry and Biochemistry, California State University, Los Angeles, Los Angeles, CA, Feb. **2016**.
10. Chemical Engineering and Materials Science Department, the University of Minnesota, Minneapolis, MN, Feb. **2016**.
11. Department of Chemistry, Marquette University, Milwaukee, WI, Jan. **2016**.
12. Department of Chemistry and Chemical Biology, University of California, Merced, Merced, CA, Dec. **2015**.
13. School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta, GA, Nov. **2015**.

Conference Presentations

1. **Luo, L.**; Kim, J.; Duan, Z.; Li, H.; Henkelman, G.; Crooks, R. M. A Comparative Study of Dendrimer- encapsulated PtAu and PdAu Alloy Nanoparticles for Allyl Alcohol Hydrogenation, Center for Electrochemistry (CEC) Annual Workshop on Electrochemistry, **2016** Austin, TX. (Poster)
2. **Luo, L.**; Zhang, L.; Duan, Z.; Kim, J.; Li, H.; Henkelman, G.; Crooks, R. M. Theoretical and Experimental Approach for Correlating Nanoparticle Structure and Catalytic Activity, Electrochemistry Gordon Research Conference, **2016** Ventura, CA. (Poster)
3. **Luo, L.**; Li, X.; Crooks, R. M. Low Voltage Origami Paper-Based Electrophoretic Devices (oPEpDs) for Rapid Protein Separation Applications, Pittcon Conference & Expo, **2015** New Orleans, LA. (Oral)
4. **Luo, L.**; Li, X.; Crooks, R. M. Low Voltage Paper-based Electrophoretic Devices, Center for Electrochemistry (CEC) Annual Workshop on Electrochemistry, **2015** Austin, TX. (Poster)
5. **Luo, L.**; Johnson, R. P.; White, H.S. Numerical Modeling of the Bistability of Electrolyte Transport in Conical Nanopores, COMSOL Conference, October **2013**, Boston, MA. (Oral & Poster)
6. **Luo, L.**; Holden, D. A.; White, H. S. Electrolyte Negative Differential Resistance (NDR) in Glass Nanopores and its Sensing Applications, the 87th ACS 2013 Colloid & Surface Science Symposium, June **2013**, Riverside, CA. (Oral)
7. The Second Nanobubbles and Biological Systems Conference, April **2013**, Tacoma, WA. (Invited attendee)
8. NanoUtah 2012 Conference & Expo, October **2012**, Salt Lake City, UT.

Reviewer for Journals:

Journal of the American Chemical Society, Journal of Physical Chemistry Letters, Langmuir, ACS Applied Materials & Interfaces, RSC Advances, Journal of Electroanalytical Chemistry, Sensors & Actuators: B. Chemical

Reviewer for Funding Agencies:

The Czech Science Foundation (August 2016)