

# Lawrence Tauzin

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Research Interests: Single molecule spectroscopy, Interfacial dynamics, plasmonics, chemistry

## Education

Ph.D. Rice University Houston, TX May 2016  
• Physical Chemistry  
• Master of Arts awarded May 2014

Bachelor of Science, Louisiana State University Baton Rouge, LA May 2011  
• Major: Chemistry (ACS Certified)  
• High Honors

## Research Experience

### **Postdoctoral Research Fellow**

Rice University Houston, TX May 2016-Present

- Projects
  - Determine the properties and mechanism of aluminum nanocrystal photoluminescence
  - Determined a link between Q-factor and quantum yield in gold nanorod luminescence
  - Prepared and submitted a successful NSF proposal
  - Manage projects and personnel in the Link and Landes labs.
- Advisor: Dr. Stephan Link

### **Graduate Research Assistant**

Rice University Houston, TX July 2011-May 2016

- Projects
  - Single molecule spectroscopic studies of interfacial dynamics on chromatographic membranes
    - Collaborative project with 3M
  - Protein binding kinetics to polymer films at the single molecule level
  - Discovered post assembly tunable interfacial dynamics between ions and tunable polyelectrolyte multilayers
  - Modified confocal microscope with time correlated single photon counting capability
  - Added 3D imaging capability to TIRF-widefield microscope
  - Tunable transport of single molecular ions in weak polyelectrolyte brushes
  - Developed algorithms for single particle tracking analysis, time correlated single photon counting analysis and fluorescence correlation spectroscopy
- Advisor: Dr. Christy Landes

### **Undergraduate Research Assistant**

Louisiana State University Baton Rouge, LA August 2007-June 2011

- Garno Research Group August 2009-June 2011
  - Nanofabrication using chemical vapor deposition and immersion methods
  - Atomic force microscopy analysis.
    - Assisted in the testing and implementation of new AFM mode, magnetic sample modulation
  - Advisor: Dr. Jayne Garno
- Chen Research Group August 2007-June 2011

- Used modified Aggregation Bias Monte Carlo algorithms to investigate ternary nucleation of water butanol clusters in the presence of an ion
- Advisor: Dr. Bin Chen

## Awards and Fellowships

**Harry B. Weiser Leadership Award** – Rice Univ. Chemistry Dept. leadership award August 2014  
**Harry B. Weiser Teaching Award** – Rice Univ. Chemistry Dept. teaching award August 2014  
**Shell Travel Award** – Rice Univ. Chemistry Dept. travel award March 2013  
**J. Evans Atwell-Welch Fellowship** – Rice Univ. Chemistry 1<sup>st</sup> year student award August 2011  
**Outstanding Undergraduate Research Award** – LSU natural sciences research award April 2010  
**ACS Analytical Chemistry Award** – Division of analytical chemistry research award May 2010  
**LSU Department of Chemistry Undergraduate Travel Award** September 2010

## Publications

Cai, Y.; Liu, J. G.; Tauzin, L. J.; Huang, D.; Sung, E.; Zhang, H.; Joplin, A.; Chang, W. S.; Nordlander, P.; Link, S. "Photoluminescence of Gold Nanorods: Purcell Enhanced Emission from Hot Carriers." *ACS Nano*, **2018**, 12, 976-985. [Link](#)

Moringo, N.; Shen, H.; Tauzin, L. J.; Wang, W.; Bishop, L. D. C.; Landes, C. F. "Variable Lysozyme Transport Dynamics on Oxidatively Functionalized Polystyrene Films." *Langmuir*, 2017, 33, 10818-10828. [Link](#)

Shen, H.; Tauzin, L. J.; Bayasi, R.; Wang, W.; Moringo, N.; Shuang, B.; Landes, C. F. "Single Particle Tracking: from Theory to Biophysical Applications." *Chemical Reviews*, **2017**, 117, 7331-7376. [Link](#)

Kisley, L.; Patil, U.; Dhamane, S.; Kourentzi, K.; Tauzin, L. J.; Wilson, R.; Landes, C. F. "Competitive Multicomponent Anion Exchange of Proteins: Comparison of Single Molecule Dynamics and Isocratic Chromatographic Retention." *Analyst*, **2017**, 142, 3127-3131. [Link](#)

Shen, H.; Tauzin, L. J.; Wang, W.; Hoener, B.; Kisley, L.; Hoggard, A.; Landes, C. F. "Single-Molecule Kinetics of Protein Adsorption on Thin Nylon 6,6 Films." *Analytical Chemistry*, 2016, 88, 9926-9933. [Link](#)

Wang, W.; Shen, H.; Shuang, B.; Hoener, B.; Tauzin, L. J.; Landes, C. F. "Super Temporal-Resolved Microscopy (STReM)." *Journal of Physical Chemistry Letters*, **2016**, 7, 4524-4529. [Link](#)

Shuang, B.; Wang, W.; Shen, H.; Tauzin, L. J.; Flatebo, C.; Chen, J.; Moringo, N.; Bishop, L.; Kelly, K.; Landes, C. F. "Generalized Recovery Algorithm for 3D Super-Resolution Microscopy Using Rotational Phase Masks." *Scientific Reports*, **2016**, 6. [Link](#)

Tauzin, L. J.; Shen, H.; Bothof, C. A.; Griesgraber, G. W.; McNulty, A. K.; Rasmussen, J. K.; Landes, C. F. "Variable Surface Transport Modalities on Functionalized Nylon Films Revealed with Single Molecule Spectroscopy." *RSC Advances*, **2016**, 6, 27760-27766. [Link](#)

Dominguez-Medina, S.; Kisley, L.; Tauzin, L. J.; Hoggard, A.; Shuang, B.; Indrasekara, P.; Chen, S.; Wang, L.; Derry, P.; Liopo, A.; Zubarev, E.; Landes, C. F.; Link, S. "Adsorption of a Single Protein Triggers Nanoparticle Aggregation." *ACS Nano*, **2016**, 10, 2103-2112. [Link](#)

Kisley, L.; Brunetti, R.; [Tauzin, L. J.](#); Shuang, B.; Yi, X.; Kirkemide, A. W.; Higgins, D. A.; Weiss, S; Landes, C.F. "Characterization of Porous Materials by Fluorescence Correlation Spectroscopy Super-Resolution Optical Fluctuation Imaging (fcsSOFI)." *ACS Nano*, **2015**, 9, 9158-9166. [Link](#)

Chen, J; Poddar, N. K.; [Tauzin, L. J.](#); Cooper, D.; Kolomeisky, A. B.; Landes, C. F. "Single-Molecule FRET Studies of HIV TAR- DNA Hairpin Unfolding Dynamics." *J. Phys. Chem. B*, **2014**, 118(42),12130-12139. [Link](#)

[Tauzin, L. J.](#); Shuang, B.; Kisley, L. M.; Mansur, A. P.; Chen, J.; Leon, A.; Advincula, R. C.; Landes, C. F. "Charge-Dependent Transport Switching of Single Molecular Ions in a Weak Polyelectrolyte Multilayer." *Langmuir*, **2014**, 30, 8391-8399. [Link](#)

Cooper, D.; Uhm, H.; [Tauzin, L. J.](#); Poddar, N.; Landes, C.F. "Photobleaching Lifetimes of Cyanine Dyes Used for Single Molecule Förster Resonance Energy Transfer in the Presence of Various Photoprotection Systems." *ChemBioChem*, **2013**, 14,1075. [Link](#)

Daniels C. R.; [Tauzin L. J.](#); Foster E.; Advincula R. C.; Landes, C. F. "On the pH-Responsive, Charge-Selective, Polymer-Brush-Mediated Transport Probed by Traditional and Scanning Fluorescence Correlation Spectroscopy." *J. Phys. Chem. B*, **2013**, 117(16), 4284-4290. [Link](#)

## Presentations

### **Oral Presentations**

"Variable Surface Transport Modalities on Functionalized Chromatographic Supports Revealed with Single Molecule Spectroscopy" 251<sup>st</sup> National ACS Meeting, San Diego, CA. March 2016.

**Invited Presentation** "Understanding Single-Molecule Dynamics at Interfaces." Pittcon 2015. New Orleans, LA. March 10, 2015.

"pH Switchable, Charge Dependent Transport in a Weak Polyelectrolyte Multilayer." Pittcon 2015. New Orleans, LA. March 8, 2015.

"Charge-Dependent Transport Switching of Single Molecular Ions in a Weak Polyelectrolyte Multilayer." 28<sup>th</sup> RQI Summer Research Colloquium. Houston, TX. August 8, 2014.

"On the pH responsive, charge selective, polymer brush-mediated transport probed by traditional and scanning fluorescence correlation spectroscopy." 245<sup>th</sup> ACS National Meeting. New Orleans, LA. April 10, 2013.

### **Selected Poster Presentations**

"Charge-Dependent Transport Switching of Single Molecular Ions in a Weak Polyelectrolyte Multilayer." 1st SCI Summer Research Colloquium. August 7, 2015.

"Charge Dependent, Nanoscale Transport Switching of Single Molecular Ions in a Weak Polyelectrolyte Multilayer." Nortex Nano Summit. Houston, TX. October 13, 2014.

"pH Switchable, Charge Dependent Transport in a Weak Polyelectrolyte Multilayer" Workshop: Light Driven Processes for Bio-Inspired Materials and Systems. Houston, TX. December 15, 2014.



## Department

### **Webmaster**

LSU ACS Student Chapter                      Baton Rouge, LA                      March 2009 – March 2010

- Maintained the LSU ACS Student Chapter website.
- Participated in outreach events including Earth Day and Super Science Saturday geared toward introducing scientific concepts to local children

### **President**

LSU ACS Student Chapter                      Baton Rouge, LA                      March 2010 – March 2011

- Organized outreach activities for chemistry majors at LSU
- Liaison between undergraduate students and department

### **President**

Rice University CGSA                      Houston, TX                      April 2013 – April 2014

- Facilitated outreach activities for Rice University chemistry graduate students
- Organized monthly happy hours for ~100 chemistry graduate students and faculty to promote communication and camaraderie.
- Organized breakfast club talks to allow students to practice scientific talks and receive feedback from their peers

### **Lounge Manager**

Rice University CGSA                      Houston, TX                      April 2015 – April 2016

- Managed the Chemistry Graduate Association lounge including access control and policy enforcement
- Assisted the president in organizing CGSA outreach and departmental activities

## Laboratory

### **Safety Officer**

Landes Research Group                      Houston, TX                      February 2012 – May 2016

- Responsible for lab safety training, ensuring lab compliance with university safety policies, and maintaining lab safety documentation

## Mentoring Experience

### **Mentor**

Landes Research Group                      Houston, TX                      August 2012 – Present

- Train and manage undergraduate researchers
  - Margaret Roddy, Rice University, January 2015 – Present
  - Mirko Montigny, Mainz University, Germany, August 2012 – March 2013
    - International exchange student from Germany

Rice University IBB                      Houston, TX                      July 2012

- Mentored 2 local high school students. Trained them in laboratory procedure and the scientific method. Advised them on short research projects that culminated in an oral presentation

## Teaching Experience

### **Graduate Teaching Assistant**

Rice University                      Houston, TX                      January 2012 – December 2014

- Quantitative Analysis Lab (Spring 2012, Spring 2013, Spring 2014)

- Assisted with all aspects of the quantitative analysis laboratory for 3 semesters including development and trialing of new labs, grading, ensuring lab safety, inventory management, and fielding student questions
- Received an A+ in Spring 2014 Chemistry Teaching Practicum for teaching excellence
- Honors General Chemistry (Fall 2013)
  - Ran twice weekly review sessions covering all aspects of general chemistry including quantum chemistry

### Professional and Academic Society Membership

American Chemical Society (2010; Greater Houston Chapter, 2014)