

LEA NIENHAUS

Department of Chemistry and Biochemistry
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WORK EXPERIENCE

2018–present Florida State University · Assistant Professor
2015–2018 Massachusetts Institute of Technology · Postdoctoral Research Assistant
Bawendi Group · EFRC Center for Excitonics

Triplet Exciton Transfer at Hybrid Interfaces

Exciton and Carrier Dynamics in Emerging Perovskite Materials

Advisor: Mounji G. Bawendi (Chemistry)

EDUCATION

2010–2015 University of Illinois at Urbana-Champaign · Ph.D. · Physical Chemistry

Single Molecule Optical Absorption Spectroscopy at Room Temperature Detected by Scanning Tunneling Microscopy

Advisors: Martin Gruebele (Chemistry) Joseph W. Lyding (Electrical Engineering)

2007–2010 Universität Ulm, Germany · B.Sc. · Chemistry

Folding Dynamics in Live Cells - In Vitro Experiments

Advisors: Martin Gruebele (UIUC) Dieter M. Kolb (Ulm)

RESEARCH EXPERIENCE

2010–2015 Graduate Research Assistant, Gruebele Group

2014 Nanohour Seminar Host
Beckman Institute of Advanced Science and Technology

2010 Visiting Undergraduate Research Assistant, Gruebele Group

HIGHLIGHTED PUBLICATIONS (*equal contribution)

1. Nienhaus, L.; Wu, M.; Geva, N.; Shepherd, J.J.; Wilson, M.W.B.; Bulović, V.; Van Voorhis, T.; Baldo, M.A.; Bawendi, M.G., Speed Limit for Triplet Exciton Transfer in Solid-State PbS Nanocrystal-Sensitized Photon Upconversion. *ACS Nano* **2017**, *11*, 7848-7857.
2. Nienhaus, L.*; Goings, J.J.*; Nguyen, D.; Wieghold, S.; Lyding, J.W.; Li, X.; Gruebele, M., Imaging Excited Orbitals of Quantum Dots: Experiment and Electronic Structure Theory. *J. Am. Chem. Soc.* **2015**, *137*, 14743-14750.
3. Nienhaus, L.; Wieghold, S.; Nguyen, D.; Lyding, J.W.; Scott, G.E.; Gruebele, M., Opto-electronic Switching of a Carbon Nanotube Chiral Junction Imaged with Nanometer Spatial Resolution. *ACS Nano* **2015**, *9*, 10563-10570.
4. Wieghold, S.*; Nienhaus, L.*; Knoller, F.; Schweinberger, F.F.; Shepherd, J.J.; Lyding, J.W.; Heiz, U.; Gruebele, M.; Esch, F., Plasmonic Support-Mediated Activation of 1 nm Platinum Clusters for Catalysis. *Phys. Chem. Chem. Phys.* **2017** *19*, 30570.

1. Wieghold, S.; Correa-Baena, J.-P.; Nienhaus, L.; Sun, S.; Tresback, J. S.; Liu, Z.; Shin, S. S.; Bawendi, M.G.; Buonassisi, T., Engineering Grain Structure of Mixed Halide Perovskites for High Efficiency Solar Cells. *in preparation* **2018**.
2. Correa-Baena, J.-P.; Luo, Y.; Snaider, J.; Sun, S.; Nienhaus, L.; Wieghold, S.; Poindexter, J. R.; Lai, B.; Bawendi, M. G.; Huang, L.; Fenning, D. P.; Buonassisi, T., Alkali Metal-Induced Elemental Distribution Influences Electronic Properties and Performance in Perovskite Solar Cells. *in preparation* **2018**.
3. Geva, N.; Nienhaus, L.; Wu, M.; Bulović, V.; Van Voorhis, T.; Baldo, M.A.; Bawendi, M.G., A Disordered Kinetics Model for Triplet Transfer. *in preparation* **2018**.
4. Correa-Baena, J.-P.; Nienhaus, L.; Shin, S.S.; Wieghold, S.; Kurchin, R.C.; Hartono, T.; Bawendi, M.G.; Buonassisi, T., A-Site Cation in Inorganic $\text{A}_3\text{Sb}_2\text{I}_9$ Perovskite Influences Structural Dimensionality, Exciton Binding Energy, and Solar Cell Performance. *under review* **2018**.
5. Geva, N.; Shepherd, J.J.; Nienhaus, L.; Bawendi, M.G.; Van Voorhis, T., Morphology of Passivating Organic Ligands Around a Nanocrystal. *under review* **2018**.
6. Shulenberger, K.E.; Bischof, T.S.; Caram, J.R.; Utzat, H.; Coropceanu, I.; Nienhaus, L.; Bawendi, M.G.; Multiexciton Lifetimes Reveal Triexciton Emission Pathway in CdSe Nanocrystals. *under review* **2018**.
7. Nienhaus, L.*; Wu, M.*; Bulović, V.; Baldo, M.A.; Bawendi, M.G., Using lead chalcogenide nanocrystals as spin mixers: a perspective on near-infrared-to-visible upconversion. *Dalton Trans.* **2018**, ASAP.
8. Turren-Cruz, S.H.; Saliba, M.; Mayer, M.T.; Santiesteban, H.J.; Mathew, X.; Nienhaus, L.; Bawendi, M.G.; Grätzel, M.; Abate, A.; Hagfeldt, A.; Correa-Baena, J.-P., Enhanced Charge Carrier Mobility and Lifetime Suppress Hysteresis and Improve Efficiency in Planar Perovskite Solar Cells. *Energy Environ. Sci.* **2018**, *11*, 78-86.
9. Polizzotti, J.A.; Faghaninia, A.; Poindexter, J.R.; Nienhaus, L.; Steinmann, V.; Hoye, R.L.Z.; Felten, A.; Deyin, A.; Mangan, N.M.; Correa-Baena, J.P.; Shin, S.S.; Jaffer, S.; Bawendi, M.G.; Lo, C.; Buonassisi, T., Improving the Carrier Lifetime of Tin Sulfide via Prediction and Mitigation of Harmful Point Defects. *J. Phys. Chem. Lett.* **2017**, *8*, 3661-3667.
10. Poindexter J.R.; Hoye, R.L.Z.; Nienhaus, L.; Kurchin, R.C.; Morishige, A.E.; Looney, E.E.; Oshero, A.; Lai, B.; Bulović, V.; Stevanović, V.; Bawendi, M.G.; Buonassisi, T., High Tolerance to Iron Contamination in Lead Halide Perovskite Solar Cells. *ACS Nano* **2017**, *11*, 7101-7109.
11. Hoye, R.L.Z.; Lee, L.C.; Kurchin, R.C.; Huq, T.N.; Zhang, K.H.L.; Sponseller, M.; Nienhaus, L.; Brandt, R.E. Polizzotti, J.A.; Kursumović, A.; Bawendi, M.G.; Bulović, V.; Stevanović, V.; Buonassisi, T.; MacManus-Driscoll, J.L. Strongly Enhanced Photovoltaic Performance and Defect Physics of Air-Stable Bismuth Oxyiodide (BiOI). *Adv. Mater.* **2017**, 1702176.

12. Brandt, R.E.; Poindexter, J.R.; Gorai, P.; Kurchin, R.C.; Hoye, R.L.Z.; Nienhaus, L.; Wilson, M.W.B.; Polizzotti, J.A.; Sereika, R.; Žaltauskas, R.; Lee, L.C.; MacManus-Driscoll, J.L.; Bawendi, M.G.; Stevanović, V.; Buonassisi, T. Searching for "Defect-Tolerant" Photovoltaic Materials: Combined Theoretical and Experimental Screening. *Chem. Mater.* **2017**, *29*, 4667-4674.
13. Wieghold, S.; Nienhaus, L.; Siebel, A.; Krause, M.; Wand, P.; Schweinberger, F.; Gruebele, M.; Heiz, U.; Esch, F., Au(111)-supported Platinum Nanoparticles: Ripening and Activity. *MRS Advances* **2017**, 1-6.
14. Nasilowski, M.; Nienhaus, L.; Bertram, S.N.; Bawendi, M.G., Colloidal Atomic Layer Deposition Growth of PbS/CdS Core/Shell Quantum Dots. *Chem. Commun.* **2017**, *53*, 869-872.
15. Koepke, J.C.*; Wood, J.D.*; Chen, Y.; Schmucker, S.; Liu, X.; Chang, N.; Nienhaus, L.; Do, J. W.; Carrion, E. A.; Hewaparakrama, J.; Rangarajan, A.; Datye, I.; Mehta, R.; Haasch, R.T.; Gruebele, M.; Girolami, G.; Pop, E.; Lyding, J.W., Role of Pressure in the CVD Growth of Hexagonal Boron Nitride Thin Films from Ammonia-Borane. *Chem. Mater.* **2016**, *28*, 4169-4179.
16. Nguyen, D; Nienhaus, L.; Haasch, R.T.; Lyding, J.W.; Gruebele, M., Sub-nanometer glass surface dynamics induced by illumination. *J. Chem. Phys.* **2015**, *142*, 234505.
17. Nienhaus, L.; Dustin, D.E.; Xue, Z.; Moore, J.S.; Gruebele, M., Intramolecular Energy Transfer in a Synthetic Dendron-Based Light Harvesting System. *J. Photochem. Photobiol. A* **2014**, *295*, 26-33.
18. Nienhaus, L.; Scott, G.E.; Haasch, R.T.; Wieghold, S.; Lyding, J.W.; Gruebele, M., Transparent Metal Films for Detection of Single-Molecule Optical Absorption by Scanning Tunneling Microscopy. *J. Phys. Chem. C* **2014**, *118*, 13196-13202.
19. Wood, J.D.; Schmucker, S.W.; Haasch, R.T.; Doidge, G.P.; Nienhaus, L.; Damhorst, G.L.; Lyons, A.S.; Gruebele, M.; Bashir, R.; Pop, E.; Lyding, J.W., Improved Graphene Growth and Fluorination on Cu with Clean Transfer to Surfaces. *IEEE-NANO* **2012**, 1-4.
20. Dhar, A.; Samiotakis, A.; Ebbinghaus, S.; Nienhaus, L.; Homouz, D.; Gruebele, M.; Cheung, M.S., Structure, Function, and Folding of Phosphoglycerate Kinase Are Strongly Perturbed by Macromolecular Crowding. *Proc. Nat. Acad. Sci.* **2010**, *107*, 17586-17591.

HONORS AND AWARDS

<i>Aug. 2013 - Aug. 2014</i>	Harry G. Drickamer Fellowship
<i>Aug. 2011 - May 2012</i>	Lester E. & Kathleen A. Coleman Fellowship
<i>Nov. 2010</i>	Honors for the best degree in the class of 2010.
<i>May 2009 - Dec. 2012</i>	Fellowship by the German National Academic Science Foundation (Studienstiftung des Deutschen Volkes).
<i>Oct. 2008 - Aug. 2010</i>	Full tuition waiver.
<i>Feb. 2008 - Aug. 2008</i>	Tuition waiver.