

# BYRON H. FARNUM

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## Experience/Education

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Assistant Professor Auburn University Department of Chemistry and Biochemistry	2016-present
Postdoctoral Research Associate University of North Carolina at Chapel Hill Department of Chemistry Advisor: <i>Thomas J. Meyer</i>	2012-2016
Ph.D./M.S. in Chemistry Johns Hopkins University Department of Chemistry Advisor: <i>Gerald J. Meyer</i>	2008-2012
B.S. in Chemistry University of South Carolina Department of Chemistry and Biochemistry Advisor: <i>John L. Ferry</i>	2004-2008

## Honors/Awards

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• UNC Postdoctoral Award for Research Excellence	2015
• Perkin Medal Scholarship	2011
• JHU Chemistry Alumni Graduate Fellowship	2011
• ACS Undergraduate Student Award in Environmental Chemistry	2008
• Magellan Undergraduate Research Scholarship	2007

## Publications (\*denotes corresponding author)

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- 26) Bredar, A. C.; Blanchet, M. D.; Comes, R. B. Farnum, B. H.\* "Evidence and Influence of Copper Vacancies in p-Type CuGaO<sub>2</sub> Mesoporous Films" *Submitted*
- 25) Niklas, J. E.; Farnum, B. H.; Gorden, J. D.; Gorden, A. E. V.\* "Structural Characterization and Redox Activity of a Uranyl Dimer and Transition Metal Complexes of a Tetradentate BIAN Ligand" *Organometallics* **2017**, 36, 4626-4634.

### **Prior to Auburn University**

- 24) Wang, D.; Marquard, S. L.; Troian-Gautier, L.; Sheridan, M. V.; Sherman, B. D.; Wang, Y.; Eberhart, M. S.; Farnum, B. H.; Dares, C. J.\*; Meyer, T. J.\* "Interfacial Deposition of Ru(II) Bipyridine-Dicarboxylate Complexes by Ligand Substitution for Applications in Water Oxidation Catalysis" *J. Am. Chem. Soc.* **2018**, 140, 719-726.
- 23) Wang, D.; Sherman, B. D.; Farnum, B. H.; Sheridan, M. V.; Marquard, S. L.; Eberhart, M. S.;

- Dares, C. J.\*; Meyer, T. J.\* "Plasmon-enhanced light-driven water oxidation by a dye-sensitized photoanode" *Proc. Natl. Acad. Sci. U.S.A.* **2017**, *114*, 9809-9813.
- 22) Wang, D.; Sheridan, M. V.; Shan, B.; Farnum, B. H.; Marquard, S. L.; Sherman, B. D.; Eberhart, M. S.; Nayak, A.; Dares, C.; Das, A.; Bullock, R. M.; Meyer, T. J.\* "Layer-by-Layer Molecular Assemblies for Dye-Sensitized Photoelectrosynthesis Cells Prepared by Atomic Layer Deposition" *J. Am. Chem. Soc.* **2017**, *139*, 14518-14525.
- 21) Wang, D.; Farnum, B. H.; Sheridan, M. V.; Marquard, S. L.; Sherman, B. D.; Meyer, T. J.\* "Inner Layer Control of Performance in a Dye Sensitized Photoelectrosynthesis Cell" *ACS Appl. Mater. Interfaces* **2017**, *9*, 33533-33538.
- 20) Shan, B.; Farnum, B. H.; Wee, K-R.; Meyer, T. J.\* "Generation of Long-Lived Redox Equivalents in Self-Assembled Bilayer Structures on Metal Oxide Electrodes" *J. Phys. Chem. C* **2017**, *121*, 5882-5890.
- 19) Coppo, R. L.; Farnum, B. H.; Sherman, B. D.; Neyde, Y. M.\*; Meyer, T. J.\* "The Role of Layer-by-Layer, Compact TiO<sub>2</sub> Films in Dye-Sensitized Photoelectrosynthesis Cells" *Sustainable Energy & Fuels* **2017**, *1*, 112-118.
- 18) Shan, B.; Das, A. K.; Marquard, S.; Farnum, B. H.; Wang, D.; Bullock, R. M.; Meyer, T. J.\* "Photogeneration of Hydrogen from Water by a Robust Dye-Sensitized Photocathode" *Energy Environ. Sci.* **2016**, *9*, 3693-3697.
- 17) Farnum, B. H.; Wee, K-R.; Meyer, T. J.\* "Self-Assembled Molecular p/n Junction for Applications in Dye-Sensitized Photoelectrochemical Cells" *Nature Chem.* **2016**, *8*, 845-852.
- 16) Flynn, C. J.; McCullough, S. M.; Oh, E. E.; Li, L.; Mercado, C. C.; Farnum, B. H.; Li, W.; Donley, C. L.; You, W.; Nozik, A. J.; McBride, J. R.; Meyer, T. J.; Kanai, Y.; Cahoon, J. F.\* "Site-Selective Passivation of Defects in NiO Solar Photocathodes by Targeted Atomic Deposition" *ACS Appl. Mater. Interfaces* **2016**, *8*, 4754-4761.
- 15) Farnum, B. H.; Nakada, A.; Ishitani, O.; Meyer, T. J.\* "Bias-Dependent Oxidative and Reductive Quenching of a Molecular Excited-State Assembly Bound to a Transparent Conductive Oxide" *J. Phys. Chem. C* **2015**, *119*, 25180-25187.
- 14) Farnum, B. H.; Morseth, Z. A.; Brennaman, M. K.; Papanikolas, J. M.; Meyer, T. J.\* "Application of Degenerately Doped Metal Oxides in the Study of Photoinduced Interfacial Electron Transfer" *J. Phys. Chem. B* **2015**, *119*, 7698-7711.
- 13) Garvey, T.; Farnum, B. H.; Lopez, R.\* "Pulsed Laser Deposited Porous Nano-Carpets of Indium Tin Oxide Films and Their Use as Charge Collectors in Core-Shell Structures for Dye Sensitized Solar Cells" *Nanoscale* **2015**, *7*, 2400-2408.
- 12) Farnum, B. H.; Morseth, Z. A.; Brennaman, M. K.; Papanikolas, J. M.; Meyer, T. J.\* "Driving Force Dependent Photo-induced Electron Transfer at Degenerately Doped, Optically Transparent Semiconductor Nanoparticle Interfaces" *J. Am. Chem. Soc.* **2014**, *136*, 15869-15872.
- 11) Wee, K-R.; Brennaman, M. K.; Alibabaei, L.; Farnum, B. H.; Sherman, B.; Lapidés, A. M.; Meyer, T. J.\* "Stabilization of Ruthenium(II) Polypyridyl Chromophores on Nanoparticle Metal Oxide Electrodes in Water by Hydrophobic PMMA Overlayers" *J. Am. Chem. Soc.* **2014**, *136*, 13514-13517.
- 10) Song, W.; Vannucci, A. K.; Farnum, B. H.; Lapidés, A. M.; Brennaman, M. K.; Kalanyan, B.; Alibabaei, L.; Concepcion, J. J.; Losego, M. D.; Parsons, G. N.; Meyer, T. J.\* "Visible Light Driven Benzyl Alcohol Dehydrogenation in a Dye-Sensitized Photoelectrosynthesis Cell" *J. Am. Chem. Soc.* **2014**, *136*, 9773-9779.

- 9) Alibabaei, L.; Farnum, B. H.; Kalanyan, B.; Brennaman, M. K.; Losego, M.; Parsons, G. N.; Meyer, T. J.\* "Atomic Layer Deposition of TiO<sub>2</sub> on Mesoporous nanoITO: Conductive Core-Shell Photoanodes for Dye-Sensitized Solar Cells" *Nano Lett.* **2014**, *14*, 3255-3261.
- 8) Farnum, B. H.; Morseth, Z. A.; Lapidés, A.M.; Rieth, A. J.; Hoertz, P. G.; Brennaman, M. K.; Papanikolas, J. M.; Meyer, T. J.\* "Photo-induced Interfacial Electron Transfer within a Mesoporous Transparent Conducting Oxide Film" *J. Am. Chem. Soc.* **2014**, *136*, 2208-2211.
- 7) Ward, W. M.; Farnum, B. H.; Siegler, M.; Meyer, G. J.\* "Chloride Ion-Pairing with Ru(II) Polypyridyl Compounds in Dichloromethane" *J. Phys. Chem. A* **2013**, *117*, 8883-8894.
- 6) Farnum, B. H.; Ward, W. M.; Meyer, G. J.\* "Flash-Quench Studies on the One-Electron Reduction of Triiodide" *Inorg. Chem.* **2013**, *52*, 840-847.
- 5) Farnum, B. H.; Jou, J. J.; Meyer, G. J.\* "Visible Light Generation of I-I Bonds by Ru<sup>II</sup>-tris(diimine) Excited-States" *Proc. Natl. Acad. Sci. U.S.A.* **2012**, *109*, 15628-15633.
- 4) Farnum, B. H.; Gardner, J. M.; Marton, A.; Narducci-Sarjeant, A. A.; Meyer, G. J.\* "Influence of Ion Pairing on the Oxidation of Iodide by MLCT Excited States" *Dalton Trans.* **2011**, *40*, 3830-3838.
- 3) Rowley, J. G.; Farnum, B. H.; Ardo, S.; Meyer, G. J.\* "Iodide Chemistry in Dye-Sensitized Solar Cells: Making and Breaking I-I Bonds for Solar Energy Conversion" *J. Phys. Chem. Lett.* **2010**, *1*, 3132-3140.
- 2) Farnum, B. H.; Gardner, J. M.; Meyer, G. J.\* "Flash-Quench Technique Employed to Study the One-Electron Reduction of Triiodide in Acetonitrile: Evidence for a Diiodide Reaction Product" *Inorg. Chem.* **2010**, *49*, 10223-10225.
- 1) Gardner, J. M.; Abrahamsson, M.; Farnum, B. H.; Meyer, G. J.\* "Visible Light Generation of Iodine Atoms and I-I Bonds: Sensitized I<sup>-</sup> Oxidation and I<sub>3</sub><sup>-</sup> Photodissociation" *J. Am. Chem. Soc.* **2009**, *131*, 16206-16214.

## Presentations

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### Invited Seminars

- 5) "New Synthetic Methods and Aqueous Electrochemical Characterization of p-Type CuGaO<sub>2</sub> Nanocrystals" ACS National Meeting – New Orleans, LA 03/2018
- 4) "Nanocrystalline CuMO<sub>2</sub> p-Type Materials: Synthesis and Characterization" ACS Florida Annual Meeting and Exposition (FAME) – Tampa, FL 05/2017
- 3) "Self-Assembled Molecular p/n Junctions for Applications in Dye-Sensitized Solar Energy Conversion" ACS Spring National Meeting – San Diego, CA 03/2016
- 2) "Core-Shell Photocathodes for Dye-Sensitized Solar Energy Conversion" Gordon Research Seminar: Electron Donor-Acceptor Interactions – Newport, RI 08/2014
- 1) "Fundamental Insights into Regeneration and Recombination with Iodide/Triiodide in Dye-Sensitized Solar Cells" ACS Middle Atlantic Regional Meeting – Baltimore, MD 06/2012

### Contributed Posters

- 6) "Toward Multi-Electron Redox Cycles with Nickel Coordination Compounds" Gordon Research Conference: Electron Donor-Acceptor Interactions – Newport, RI 08/2018
- 5) "Photoanodic and Photocathodic Charge Separation at Mesoporous Sensitized nanoITO Electrodes," UNC EFRC Annual Research Review – Chapel Hill, NC 05/2015

- 4) "Photoinduced Electron Transfer at ITO Nanoparticle Interfaces: Fundamental Studies and Applications Toward Core-Shell Photoelectrodes," Gordon Research Conference: Electron Donor-Acceptor Interactions – Newport, RI 08/2014
- 3) "Synthesis and Characterization of Core-Shell nanoITO-NiO p-Type Materials," UNC EFRC Annual Research Review – Chapel Hill, NC 05/2014
- 2) "Nanostructured Metal Oxide Based Materials for Applications in Dye-Sensitized Photoelectrosynthesis Cells," Department of Energy EFRC Principle Investigator Meeting – Washington, DC 07/2013
- 1) "Dye-Sensitized Solar Cells: A Molecular Based Approach to Solar Energy Conversion," Chemical Heritage Foundation Innovation Day – Philadelphia, PA 09/2011

## Funding

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- Comes, R. B.; Farnum, B. H. "Exploration of Electronic and Catalytic Behavior in Epitaxial Complex Oxide Films and Nanocomposites" **NSF: DMR-SSMC** (Co-PI) 7/1/2018-6/30/2021

## Leadership/Service

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- External Advisory Board – ACS Applied Energy Materials 2018-present
- New Faculty Scholar – Auburn University 2016-2017
- Associate Chair – Gordon Research Seminar: Photochemistry 2011
- Active Memberships
  - American Chemical Society 2008-present

## Teaching Experience

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### Auburn University

- CHEM 7100 – Advanced Inorganic Chemistry (Fall 2016, Fall 2017)
- CHEM 7160 – Advanced Topics in Inorganic Chemistry: Solid State (Spring 2018)
- CHEM 4100 – Inorganic Chemistry (Fall 2018)