Jason B. Baxter

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EDUCATION

ACS Petroleum Research Fund Alternative Energy Postdoctoral Fellow, July 2005-June 2007
Yale University, New Haven, CT, Department of Chemistry
Project Title: "Investigating Dynamics of Dye Sensitized Solar Cells with Time-Resolved Terahertz Spectroscopy"
Advisor: Professor Charles A. Schmuttenmaer

Doctor of Philosophy in Chemical Engineering, June 2005
University of California Santa Barbara
Thesis Title: "Growth and Characterization of ZnO Nanowires and Their Use in Dye Sensitized Solar Cells"
Advisor: Professor Eray S. Aydil

Bachelor of Chemical Engineering, Degree with Distinction, Magna Cum Laude, May 2000
University of Delaware, Newark, DE
Undergraduate Thesis: "Construction and Testing of Dye Sensitized Solar Cells"
Advisor: Professor T. W. Fraser Russell

PROFESSIONAL EXPERIENCE

- Associate Professor, Drexel University, Department of Chemical and Biological Engineering, 2013 - present
- Assistant Professor, Drexel University, Department of Chemical and Biological Engineering, Sept. 2007- 2013
- Postdoctoral Fellow, Yale University, 2005-2007
- Graduate Student Researcher, U. Calif. Santa Barbara, 2001-2005
- Teaching Assistant, U. Calif. Santa Barbara, 2002-2003
- Process Engineer/Intern, Lucent Technologies, Breinigsville, PA, summers 1998-2000

HONORS AND AWARDS

College of Engineering Outstanding Teacher Award	2015
Department of Chemical and Biological Engineering Outstanding Teacher Award	2014
NSF CAREER Award	2009
ACS Petroleum Research Fund Alternative Energy Postdoctoral Fellowship	2005
American Vacuum Society Top Level Graduate Student Award	2004
Materials Research Society Graduate Student Gold Award	2003
Southern California Chapter AVS- 2nd place, Best Student Paper	2002
National Science Foundation (NSF) Graduate Research Fellowship	2001
UCSB Dean's Fellow	2000

RESEARCH

Publications

Refereed Journal Articles:

36. B. Opasanont and J.B. Baxter, "Dynamic Speciation Modeling to Guide Selection of Complexing Agents for Chemical Bath Deposition: Case Study for ZnS Thin Films," *Cryst. Growth Design*, ASAP (2015).

35. D.V. Esposito, J.B. Baxter, J. John, N.S. Lewis, T.P. Moffat, T. Ogitsu, G.D. O'Neil, T.A. Pham, A.A. Talin, J. M.Velazquez and B.C. Wood, "Methods of Photoelectrode Characterization with High Spatial and Temporal Resolution," *Energy Environ. Sci.*, ASAP (2015).

34. B. Opasanont, K.T. Van, A.G. Kuba, K.R. Choudhury and J.B. Baxter, "Adherent and Conformal Zn(S,O,OH) Thin Films by Rapid Chemical Bath Deposition with Hexamethylenetetramine Additive," *ACS Appl. Mater. Interfaces,* **7**, 11516 (2015).

33. G.W. Guglietta, B.T. Diroll, E.A. Gaulding, J.L. Fordham, S. Li, C.B. Murray and J.B. Baxter, "Lifetime, Mobility, and Diffusion of Photoexcited Carriers in Ligand-Exchanged Lead Selenide Nanocrystal Films Measured by Time-Resolved Terahertz Spectroscopy," *ACS Nano,* **9**, 1820 (2015).

32. R.B. Comes, S.Y. Smolin, T.C. Kaspar, R. Gao, B.A. Apgar, L.W. Martin, M.E. Bowden, J.B. Baxter and S.A. Chambers, "Visible Light Carrier Generation in Co-Doped Epitaxial Titanate Films," *Appl. Phys. Lett.,* **106**, 092901 (2015).

31. A.J. Abel, I. Garcia-Torregrosa, A.M. Patel, B. Opasanont and J.B. Baxter, "SILAR-Deposited Hematite Films for Photoelectrochemical Water Splitting: Effects of Sn, Ti, Thickness, and Nanostructuring," *J. Phys. Chem. C,* **119**, 4454 (2015).

30. H.J. Yun, T.J. Paik, M.E. Edley, J.B. Baxter and C.B. Murray, "Enhanced Charge Transfer Kinetics of CdSe Quantum Dot-Sensitized Solar Cell by Inorganic Ligand Exchange Treatments," *ACS Appl. Mater. Interfaces,* **6**, 3721 (2014).

29. S.Y. Smolin, M.D. Scafetta, G.W. Guglietta, J.B. Baxter and S.J. May, "Ultrafast Transient Reflectance of Epitaxial Semiconducting Perovskite Thin Films," *Appl. Phys. Lett.,* **105**, 022103 (2014).

28. B. Opasanont, A.G. Kuba, E.G. Louderback, K. Roy Choudhury and J.B. Baxter, "Relating Deposition Conditions to Zn(S,O,OH) Thin Film Properties for Photovoltaic Buffer Layers Using a Continuous Flow Microreactor," *Chem. Mater.,* **26**, 6674 (2014).

27. H. Majidi, M.E. Edley, L. Spangler and J.B. Baxter, "Tailoring Absorber Thickness and the Absorber-Scaffold Interface in CdSe-Coated ZnO Nanowire Extremely Thin Absorber Solar Cells," *Electrochim. Acta,* **145**, 291 (2014).

26. G.W. Guglietta, K. Roy Choudhury, J.V. Caspar and J.B. Baxter, "Employing Time-Resolved Terahertz Spectroscopy to Analyze Carrier Dynamics in Thin-Film $Cu_2ZnSn(S,Se)_4$ Absorber Layers," *Appl. Phys. Lett.,* **104**, 253901 (2014).

25. J.B. Baxter, C. Richter and C.A. Schmuttenmaer, "Ultrafast Carrier Dynamics in Nanostructures for Solar Fuels," *Annu. Rev. Phys. Chem.,* **65**, 423 (2014).

24. K.M. McPeak, B. Opasanont, T. Shibata, D.-K. Ko, M.A. Becker, S. Chattopadhyay, H.P. Bui, T.P. Beebe, B.A. Bunker, C.B. Murray and J.B. Baxter, "Microreactor Chemical Bath Deposition of Laterally Graded $Cd_{1-x}Zn_xS$ Thin Films: A Route to High-Throughput Optimization for Photovoltaic Buffer Layers," *Chem. Mater.,* **25**, 297 (2013).

23. H. Majidi, K.T. Van and J.B. Baxter, "Nucleation and growth of extremely thin CdSe films electrodeposited from near-neutral electrolytes," *Journal of the Electrochemical Society,* **159**, D605 (2012).

22. H. Majidi, C.R. Winkler, M.L. Taheri and J.B. Baxter, "Microstructural changes in CdSe-coated ZnO nanowires evaluated by in situ annealing in transmission electron microscopy and X-ray diffraction," *Nanotechnology,* **23**, 265701 (2012).

21. J.B. Baxter, "Commercialization of Dye Sensitized Solar Cells: Present Status and Future Research Needs to Improve Efficiency, Stability, and Manufacturing," *Journal of Vacuum Science and Technology A,* **30**, 021201 (2012). **[invited review]**

20. J.B. Baxter and G.W. Guglietta, "Terahertz Spectroscopy," *Analytical Chemistry*, **83**, 4342 (2011). [invited review]

19. C.A. Wolden, J. Kurtin, J.B. Baxter, I. Repins, S.E. Shaheen, J.T. Torvik, A.A. Rockett, V.M. Fthenakis and E.S. Aydil, "Photovoltaic manufacturing: Present status, future prospects, and research needs," *Journal of Vacuum Science and Technology A,* **29**, 030801 (2011). [cover article]

18. H. Majidi and J.B. Baxter, "Electrodeposition of CdSe coatings on ZnO nanowire arrays for extremely thin absorber solar cells," *Electrochimica Acta,* **56**, 2703 (2011).

17. K.M. McPeak, T.P. Le, N.G. Britton, Z.S. Nickolov, Y.A. Elabd and J.B. Baxter, "Chemical Bath Deposition of ZnO Nanowires at Near-Neutral pH Conditions without Hexamethylenetetramine (HMTA): Understanding the Role of HMTA in ZnO Nanowire Growth," *Langmuir,* **27**, 3672 (2011).

16. K.M. McPeak, M.A. Becker, N.G. Britton, H. Majidi, B.A. Bunker and J.B. Baxter, "In Situ X-ray Absorption Near-Edge Structure Spectroscopy of ZnO Nanowire Growth During Chemical Bath Deposition," *Chemistry of Materials,* **22**, 6162 (2010).

15. J.B. Baxter and C.A. Schmuttenmaer, "Carrier Dynamics in Bulk ZnO. II. Photoconductivity Measured by Time Resolved Terahertz Spectroscopy," *Physical Review B,* **80**, 235206 (2009).

14. J.B. Baxter and C.A. Schmuttenmaer, "Carrier Dynamics in Bulk ZnO. I. Intrinsic Conductivity Measured by Terahertz Time Domain Spectroscopy," *Physical Review B,* **80**, 235205 (2009).

13. K.M. McPeak and J.B. Baxter, "ZnO Nanowires Grown by Chemical Bath Deposition in a Continuous Flow Microreactor," *Crystal Growth & Design,* 9, 4538-4545 (2009).

12. K.M. McPeak and J.B. Baxter, "Microreactor for High-Yield Chemical Bath Deposition of Semiconductor Nanowires: ZnO Nanowire Case Study," *Industrial & Engineering Chemistry Research,* **48,** 5954-5961 (2009).

11. J. Baxter, Z.X. Bian, G. Chen, D. Danielson, M.S. Dresselhaus, A.G. Fedorov, T.S. Fisher, C.W. Jones, E. Maginn, U. Kortshagen, A. Manthiram, A. Nozik, D.R. Rolison, T. Sands, L. Shi, D. Sholl, and Y.Y. Wu, "Nanoscale design to enable the revolution in renewable energy," *Energy & Environmental Science,* **2**, 559-588 (2009).

10. J.B. Baxter and E.S. Aydil, "Metallorganic Chemical Vapor Deposition of ZnO Nanowires from Zinc Acetylacetonate and Oxygen," *Journal of the Electrochemical Society,* **156,** H52-H58 (2009).

9. S. G. Abuabara, C. W. Cady, J. B. Baxter, C. A. Schmuttenmaer, R. H. Crabtree, G. W. Brudvig, V. S. Batista, "Ultrafast Photooxidation of Mn-Terpyridine Complexes Covalently Attached to TiO_2 Nanoparticles," *Journal of Physical Chemistry C*, **111**, 11982-11990 (2007).

8. J. B. Baxter and C. A. Schmuttenmaer, "Conductivity of ZnO Nanowires, Nanoparticles, and Thin Films Using Time Resolved Terahertz Spectroscopy," *Journal of Physical Chemistry B*, **110**, 25229-25239 (2006).

7. J. B. Pan, R. M. Pafchek, F. F. Judd, and J. B. Baxter, "Effect of chromium-gold and titanium-titanium nitride-platinum-gold metallization on wire/ribbon bondability,"
IEEE Transactions on Advanced Packaging, **29**, 707-713 (2006).

6. J. B. Baxter, A. M. Walker, K. van Ommering, and E. S. Aydil, "Synthesis and integration of ZnO nanowires into dye sensitized solar cells," *Nanotechnology*, **17**, S304-S312 (2006).

5. J. B. Baxter and E. S. Aydil, "Dye-sensitized solar cells based on semiconductor morphologies with ZnO nanowires," *Solar Energy Materials and Solar Cells*, **90**, 607-622 (2006).

4. J. B. Baxter and E. S. Aydil, "Nanowire based dye sensitized solar cells," *Applied Physics Letters*, **86**, 053114 (2005).

3. C. A. Wolden, J. B. Baxter, T. M. Barnes, and E. S. Aydil, "Infrared detection of hydrogen generated free carriers in polycrystalline ZnO thin films," *Journal of Applied Physics*, **97**, 043522 (2005).

2. J. B. Baxter and E. S. Aydil, "Epitaxial Growth of ZnO Nanowires on a- and c-plane Sapphire," *Journal of Crystal Growth*, **274**, 407-411 (2005).

1. J. B. Baxter, F. Wu, and E. S. Aydil, "Growth mechanism and characterization of zinc oxide hexagonal columns," *Applied Physics Letters* **83**, 3797-3799 (2003).

Book chapters:

2. J.B. Baxter, "ZnO Nanowire-Based Solar Cells," invited book chapter in *Wide Band Gap Semiconductor Nanowires for Optical Devices: The Particular Case of GaN and ZnO*, Vincent Consonni and Guy Feuillet, ed., iSTE Wiley Hermes Science Publishing (2014).

1. J. B. Baxter and C. A. Schmuttenmaer, "Time Resolved Terahertz Spectroscopy and Terahertz Emission Spectroscopy," invited book chapter in *Terahertz Spectroscopy: Principles and Applications*, Susan Dexheimer ed., Taylor and Francis, LLC (2008).

Conference proceedings:

2. J. B. Baxter and C. A. Schmuttenmaer, "Carrier dynamics in nanowires and films measured by time-resolved terahertz spectroscopy," *Ultrafast Phenomena XV*, **88**, 766 (2007).

1. J. B. Baxter, R. E. M. W. Bessems, and E. S. Aydil, "Growth and characterization of ZnO nanowires," *Materials Research Society Symposium Proceedings* **776**, Q7.9.1 (2003).

PATENT APPLICATIONS

K.M. McPeak and J.B. Baxter. Microreactor for Solution Deposition and Method of Use. US Patent Application No. 12/469,645 (2008).

RESEARCH GRANTS AWARDED

Proposal Title: **Low-Voltage, Low-Waste Fabrication of Inorganic Semiconducting Thin Films by Electrophoretic Deposition Under Flow**
Source of Support: **National Science Foundation (CMMI)**
Total Award Amount: **$306,032**
Total Award Period Covered: **9/1/15 – 8/31/18**
Location of Project: **Drexel University**
Person-Month Per Year Committed to Project: Sumr: **0.3 mo** Acad: **0 mo**
PI: **Fafarman** Co-PIs: **Baxter**

Proposal Title: **Collaborative Research: SusChEM: Using Ultrafast Carrier Dynamics to Link Structure, Properties, and Performance in Single-Crystal $Cu_2ZnSn(S,Se)_4$ for Thin Film Photovoltaics**
Source of Support: **National Science Foundation (DMR)**
Total Award Amount: **$298,267**
Total Award Period Covered: **7/1/15 – 6/30/18**
Location of Project: **Drexel University**

Person-Month Per Year Committed to Project: Sumr: **0.7 mo** Acad: **0 mo**
PI: **Baxter** Co-PIs: **Birkmire (U. Delaware, separate budget)**

Proposal Title: **Collaborative Research: Ultrafast Carrier Dynamics in Semiconductor Nanocrystal Solar Cells**
Source of Support: **National Science Foundation (CBET)**
Total Award Amount: **$214,757**
Total Award Period Covered: **9/1/13 – 8/31/16**
Location of Project: **Drexel University**
Person-Month Per Year Committed to Project: Sumr: **0.4 mo** Acad: **0 mo**
PI: **Baxter** Co-PI: **Murray (Penn, separate budget)**

Proposal Title: **Photoexcited Carrier Dynamics in Oxide Semiconductors for Photovoltaics**
Source of Support: **National Science Foundation (ECCS)**
Total Award Amount: **$380,000**
Total Award Period Covered: **9/1/12 – 8/31/14**
Location of Project: **Drexel University**
Person-Month Per Year Committed to Project: Sumr: **0.4 mo** Acad: **0 mo**
PI: **May** Co-PIs: **Baxter**

Proposal Title: **REU Supplement to NSF CAREER**
Source of Support: **National Science Foundation (CBET)**
Total Award Amount: **$5,000**
Total Award Period Covered: **03/01/12 – 02/28/13**
Location of Project: **Drexel University**
Person-Month Per Year Committed to Project: Sumr: **0.0 mo** Acad: **0 mo**
PI: **Baxter** Co-PIs: **None**

Proposal Title: **NUE: Nanomanufacturing for Energy and Biomedical Engineering**
Source of Support: **National Science Foundation (CMMI)**
Total Award Amount: **$199,400**
Total Award Period Covered: **10/1/11 – 9/30/13**
Location of Project: **Drexel University**
Person-Month Per Year Committed to Project: Sumr: **0.25 mo** Acad: **0 mo**
PI: **Sun** Co-PIs: **Baxter, Li, Ji, Papazoglou**

Proposal Title: **DURIP: Laser Sources for Characterization of Functional Oxide Materials**
Source of Support: **Army Research Office**
Total Award Amount: **$198,618**
Total Award Period Covered: **6/1/11 – 5/31/13**
Location of Project: **Drexel University**
Person-Month Per Year Committed to Project: Sumr: **0 mo** Acad: **0 mo**
PI: **Spanier** Co-PIs: **Baxter, May**

Proposal Title: **GAANN: Renewable Energy Technologies and Infrastructure Networks (RETAIN)**
Source of Support: **Department of Education**
Total Award Amount: **$525,030**
Total Award Period Covered: **9/1/10 – 8/31/13**
Location of Project: **Drexel University**
Person-Month Per Year Committed to Project: Sumr: **0 mo** Acad: **0 mo**
PI: **Spanier** Co-PIs: **Baxter, Olson, Nwankpa, and others**

Proposal Title: **Large-Scale Fabrication of Printable Hybrid Solar Cells**
Source of Support: **Ben Franklin Technology Partners, Energy Commercialization Institute**
Total Award Amount: **$150,000**
Total Award Period Covered: **10/1/10 – 6/30/12**
Location of Project: **Drexel University**
Person-Month Per Year Committed to Project: Sumr: **0.25 mo** Acad: **0 mo**
PI: **Sun** Co-PIs: **Baxter, Kagan, Neretina, Singh**

Proposal Title: **MRI: Acquisition of a High Resolution X-Ray Microdiffractometer System for Advanced Materials Research and Education at Drexel**
Source of Support: **National Science Foundation (OIA/DMR)**
Total Award Amount: **$419,300**
Total Award Period Covered: **10/1/10 – 9/30/12**
Location of Project: **Drexel University**
Person-Month Per Year Committed to Project: Sumr: **0 mo** Acad: **0 mo**
PI: **Li** Co-PIs: **Baxter, Barsoum, May, Shih**

Proposal Title: **Upgrade and Renovation of Drexel Microfabrication Facility**
Source of Support: **National Science Foundation (OIA)**
Total Award Amount: **$1,111,170**
Total Award Period Covered: **10/01/10 - 3/31/13**
Location of Project: **Drexel University**
Person-Month Per Year Committed to Project: Sumr: **0 mo** Acad: **0 mo**
PI: **Noh** Co-PIs: **Baxter, Spanier, Barbee, Sun**

Proposal Title: **REU Supplement to NSF CAREER**
Source of Support: **National Science Foundation (CBET)**
Total Award Amount: **$6,500**
Total Award Period Covered: **06/01/09 – 05/31/10**
Location of Project: **Drexel University**
Person-Month Per Year Committed to Project: Sumr: **0.0 mo** Acad: **0 mo**
PI: **Baxter** Co-PIs: **None**

Proposal Title: **Microreactor for High-Yield Solution Deposition of Thin Films and Nanowires**
Source of Support: **National Science Foundation (CMMI)**
Total Award Amount: **$315,000**
Total Award Period Covered: **8/1/10 – 7/31/13**
Location of Project: **Drexel University**
Person-Month Per Year Committed to Project: Sumr: **1 mo** Acad: **0 mo**
PI: **Baxter** Co-PIs: **None**

Proposal Title: **MRI: Acquisition of an Ultrafast Laser System for Terahertz Spectroscopy and Sub-Picosecond Dynamics**
Source of Support: **National Science Foundation (OIA/DMR)**
Total Award Amount: **$332,291 ($474,291 including Drexel cost-share)**
Total Award Period Covered: **09/01/09 - 08/31/11**
Location of Project: **Drexel University**
Person-Month Per Year Committed to Project: Sumr: **0 mo** Acad: **0 mo**
PI: **Baxter** Co-PIs: **Spanier, Nabet, Li, Papazoglou**

Proposal Title: **CAREER: Interfaces and Their Effect on Electron Transport in Extremely Thin Absorber Solar Cells**
Source of Support: **National Science Foundation (CBET)**
Total Award Amount: **$400,000**
Total Award Period Covered: **06/01/09 – 05/31/14**
Location of Project: **Drexel University**
Person-Month Per Year Committed to Project: Sumr: **0.75 mo** Acad: **0 mo**
PI: **Baxter** Co-PIs: **None**

PROFESSIONAL PRESENTATIONS

Invited Presentations

31. Nano, Polar, and Inorganic/Organic Materials: New Vistas in Photovoltaics Symposium, Philadelphia, PA. "Ultrafast Carrier Dynamics in Photovoltaic Absorber Materials," J.B. Baxter, June 2015.

30. University of Massachusetts, Dept. of Chemical Engineering, Amherst, MA. "Designing and Probing Photovoltaic Materials," J.B. Baxter, April 2013.

29. Washington University in St. Louis, Dept. of Chemical Engineering, St. Louis, MO. "Designing and Probing Photovoltaic Materials," J.B. Baxter, Feb. 2013.

28. Gordon Research Conference on *Nanomaterials for Applications in Energy Technology*, Ventura, CA. "Nanostructured Solar Cells," J.B. Baxter, Feb. 2013.

27. Wharton Social Impact Conference, Energy/Sustainability Workshop, Philadelphia, PA. "Solar Photovoltaics: Status and Opportunities," J.B. Baxter, Nov. 2012.

26. Catalysis Club of Philadelphia, Wilmington, DE, "Designing and Probing Photovoltaic and Photocatalytic Materials," J.B. Baxter, Nov. 2012.

25. Colorado School of Mines, Dept. of Chemical Engineering, Golden, CO. "Designing and Probing Photovoltaic Materials," J.B. Baxter, Oct. 2012.

24. 244th American Chemical Society National Meeting, Philadelphia, PA. "Charge Separation in Extremely Thin Absorber Solar Cells," J.B. Baxter, Aug. 2012.

23. DuPont Central Research and Development, Wilmington, DE. "Designing and Probing Photovoltaic Materials," J.B. Baxter, July 2012.

22. University of Maryland Baltimore County, Physics Department. "Nanostructured Solar Cells: Materials Design and Ultrafast Photophysics," J.B. Baxter, November 9, 2011.

21. University of Delaware, Institute of Energy Conversion. "Designing and Probing Photovoltaic Materials," J.B. Baxter, October 28, 2011.

20. Winterschool on "Nanomaterials for Energy," Duisburg, Germany. "Nanostructured Solar Cells," J.B. Baxter, Dec. 2011.

19. American Institute of Chemical Engineers Annual Meeting, Minneapolis, MN. "Solar Cells Based on Sensitized Nanowire Arrays," J.B. Baxter, Oct. 2011.

18. University of Maryland Baltimore County, Dept of Physics, "Ultrafast Carrier Dynamics in Nanostructured Solar Cells," J.B. Baxter, June 2011.

17. Naval Research Laboratory, Electronics Science and Technology Division, Washington DC. "Ultrafast Carrier Dynamics in Nanostructured Solar Cells," J.B. Baxter, June 2011.

16. Army Research Lab workshop on *Advanced Concepts in Semiconductor Materials and Devices for Energy Conversion*, Beltsville, MD. "Sensitized Nanowire Solar Cells," J.B. Baxter, Dec. 7-8, 2010.

15. *Catalyzing Innovation in Photovoltaics Manufacturing: An NSF Workshop*, "Dye Sensitized Solar Cells: R&D Issues," J.B. Baxter, Golden, CO, May 2010.

14. Rutgers University, Dept. of Materials Science, New Brunswick, NJ. "ZnO Nanowire Solar Cells," J.B. Baxter, Feb. 2010.

13. Miami University, Dept. of Paper and Chemical Engineering, Miami, OH. "ZnO Nanowire Solar Cells," J.B. Baxter, Jan. 2010.

12. Univ. of Pennsylvania, Wharton School of Business, "Smart Energy, Solar Energy!," J.B. Baxter, Feb. 2009.

11. Drexel University, Dept. of Chemistry, Philadelphia, PA. "ZnO Nanowire Dye Sensitized Solar Cells: Charge Transport and Materials Chemistry," J.B. Baxter, Feb. 2009.

10. Drexel Energy Club, "Smart Energy, Solar Energy!,"J.B. Baxter, Dec. 2008.

9. American Society of Mechanical Engineers 3rd Energy Nanotechnology International Conference, Jacksonville, FL. "ZnO Nanowire Dye Sensitized Solar Cells," J.B. Baxter, Aug. 2008.

8. Drexel University, Dept. of Materials Science and Engineering, Philadelphia, PA. "ZnO Nanowire Dye Sensitized Solar Cells," J.B. Baxter, Mar. 2008.

7. University of Massachusetts, Dept. of Chemical Engineering, Amherst, MA. "ZnO Nanowire Dye Sensitized Solar Cells," J.B. Baxter, Mar. 2005.

6. Cornell University, Dept. of Chemical Engineering, Ithaca, NY. "ZnO Nanowire Dye Sensitized Solar Cells," J.B. Baxter, Feb. 2005.

5. Northeastern University, Dept. of Chemical Engineering, Boston, MA. "ZnO Nanowire Dye Sensitized Solar Cells," J.B. Baxter, Feb. 2005.

4. Colorado School of Mines, Dept. of Chemical Engineering, Golden, CO. "ZnO Nanowire Dye Sensitized Solar Cells," J.B. Baxter, Feb. 2005.

3. Princeton University, Dept. of Chemical Engineering, Princeton, NJ. "ZnO Nanowire Dye Sensitized Solar Cells," J.B. Baxter, Feb. 2005.

2. Drexel University, Dept. of Chemical Engineering, Philadelphia, PA. "ZnO Nanowire Dye Sensitized Solar Cells," J.B. Baxter, Jan. 2005.

1. University of Houston, Dept. of Chemical Engineering, Houston, TX. "ZnO Nanowire Dye Sensitized Solar Cells," J.B. Baxter, Jan. 2005.

Contributed Presentations

S.Y. Smolin, M.D. Scafetta, A.K. Choquette, M.Y. Sfeir, G.W. Guglietta, J.B. Baxter, and S.J. May, "Dynamic Optoelectronic Properties of Epitaxial Perovskite Ferrite Thin Films," *International Conference on Electroceramics* (State College, PA, May 2015).

G.W. Guglietta, K. Roy Choudhury, J.V. Caspar, and J.B. Baxter, "Understanding Carrier Dynamics in $Cu_2ZnSn(S,Se)_4$ Using Time-Resolved Terahertz Spectroscopy," *Pacific Rim Symposium on Surfaces, Coatings & Interfaces* (Kohala Coast, HI, Dec. 2014).

S.Y. Smolin, M.D. Scafetta, G.W. Guglietta, J.B. Baxter, and S.J. May, "Ultrafast Transient Reflectance of Epitaxial Semiconducting Perovskite Thin Films" (poster), *Materials Research Society Fall Meeting* (Boston, MA, Dec. 2014).

G.W. Guglietta, K. Roy Choudhury, J.V. Caspar, and J.B. Baxter, "Understanding Carrier Dynamics in $Cu_2ZnSn(S,Se)_4$ Using Time-Resolved Terahertz Spectroscopy," *61st International AVS Symposium* (Baltimore, MD, Nov. 2014).

G.W. Guglietta, K. Roy Choudhury, J.V. Caspar, and J.B. Baxter, "Understanding Carrier Dynamics in $Cu_2ZnSn(S,Se)_4$ Using Time-Resolved Terahertz Spectroscopy," *Materials Research Society Spring Meeting* (San Francisco, CA, April 2014). [award for outstanding contribution in Session E: Earth-Abundant Inorganic Solar Energy Conversion]

I. García Torregrosa, A.J. Abel, A.M. Patel, and J.B. Baxter, "Photoelectrochemical Water Splitting with Solution-Deposited Hematite Thin Films and Coated Scaffolds," *Materials Research Society Spring Meeting* (San Francisco, CA, April 2014).

H. Majidi, M.E. Edley, G.W. Guglietta, L.C. Spangler, and J.B. Baxter, "Designing Morphology and Interfaces in Extremely Thin Absorber Solar Cells," *Materials Research Society Spring Meeting* (San Francisco, CA, April 2014).

B. Opasanont, A.G. Kuba, E.G. Louderback, J.B. Baxter, "Nucleation and Growth of Graded Zn(S,O,OH) Thin Films Deposited with a Continuous Flow Microreactor for Photovoltaic Buffer Layers" (poster), *Materials Research Society Spring Meeting* (San Francisco, CA, April 2014).

H. Majidi, M.E. Edley, L. Spangler, and J.B. Baxter, "Interfacial Charge Transfer in Extremely Thin Absorber Solar Cells," *58th International AVS Symposium*, (Long Beach, CA October 2013).

H. Majidi, G.W. Guglietta, E.M. Bressler, and J.B. Baxter, "Determining Optimal Absorber Thickness in Extremely Thin Absorber Solar Cells," *Electronic Materials Conference*, (State College, PA, June 2012).

H. Majidi, G.W. Guglietta, L. Spangler, and J.B. Baxter, "Charge Separation in Extremely Thin Absorber Solar Cells," American Institute of Chemical Engineers Annual Meeting, Pittsburgh, PA, Oct. 2012.

K.M. McPeak, B. Opasanont, T. Shibata, D.-K. Ko, M.A. Becker, S. Chattopadhyay, H.P. Bui, T.P. Beebe, B.A. Bunker, C.B. Murray and J.B. Baxter, "Microreactor Chemical Bath Deposition of Laterally Graded $Cd_{1-X}Zn_xS$ Thin Films," American Institute of Chemical Engineers Annual Meeting, Pittsburgh, PA, Oct. 2012.

G.W. Guglietta, H. Majidi, and J.B. Baxter. "Ultrafast Transient Absorption Spectroscopy for Understanding Extremely Thin Absorber Solar Cells," *Annual Meeting of the Materials Research Society*, (San Francisco, CA, Apr. 2012).

H. Majidi, C.R. Winkler, M.L. Taheri, and J.B. Baxter. "Microstructural Changes in CdSe-Coated ZnO Nanowires Evaluated by in situ Annealing in Transmission Electron Microscopy and X-Ray Diffraction," (poster) *Annual Meeting of the Materials Research Society*, (San Francisco, CA, Apr. 2012). [award for excellent poster in session]

K.M McPeak, B. Opasanont, M.A. Becker, T. Shibata, S. Chattopadhyay, D.K. Ko, H. Bui, T.P. Beebe, C.B. Murray, B.A. Bunker, and J.B. Baxter. "Combinatorial $Cd_{1-x}Zn_xS$ Thin Films for Solar Cells Deposited with a Continuous Flow Microreactor," (poster) *Annual Meeting of the Materials Research Society*, (San Francisco, CA, Apr. 2012). [award for excellent poster in session]

H. Majidi, Thinh P. Le, Glenn W. Guglietta, and J.B. Baxter. "CdSe/ZnO Core-Shell Nanowires for Extremely Thin Absorber Solar Cells," *58th International AVS Symposium,* (Nashville, TN, Oct. 2011).

K.M. McPeak, H.P. Bui, T.P. Beebe, M.A. Becker, B.A. Bunker, T. Shibata, S. Chattopadhyay, T. Bolin, D.-K. Ko, and J.B. Baxter. "Combinatorial CdZnS Thin Films Deposited with a Continuous Flow Microreactor," *Annual Meeting of the American Institute of Chemical Engineers,* (Minneapolis, MN, Oct. 2011).

J.B. Baxter and C.A. Schmuttenmaer. "Carrier Dynamics in Bulk ZnO Measured by Time-Resolved Terahertz Spectroscopy," *International Workshop on Optical Terahertz Science and Technology*, (Santa Barbara, CA, March 2011).

H. Majidi, T.P. Le, G.W. Guglietta, and J.B. Baxter. "Solar Cells Based on Sensitized Nanowire Arrays" (poster), *Gordon Research Conference: Chemical Reactions at Surfaces,* (Ventura, CA, Feb. 2011).

H. Majidi, T.P. Le, G.W. Guglietta, and J.B. Baxter. "CdSe-coated ZnO Nanowires for Extremely Thin Absorber Solar Cells," *European Materials Research Society / Joint MRS-EMRS Energy Conference*, (Nice, France, May 2011).

J.B. Baxter, "Microreactor for High-Yield Solution Deposition of Thin Films and Nanowire" (poster). *NSF CMMI Grantees Meeting*, (Atlanta GA, Jan. 2011).

K.M. McPeak, H.P. Bui, T.P. Beebe, M.A. Becker, B.A. Bunker, T. Shibata, S. Chattopadhyay, T. Bolin, D.-K. Ko, and J.B. Baxter. "Combinatorial CdZnS Thin Films Deposited with a Continuous Flow Microreactor," *57th International AVS Symposium,* (Albuquerque, NM, Oct. 2010).

H. Majidi and J.B. Baxter. "CdSe/ZnO Core-Shell Nanowires for Extremely Thin Absorber Solar Cells," *57th International AVS Symposium,* (Albuquerque, NM, Oct. 2010).

K.M. McPeak and J.B. Baxter. "*In Situ* XANES of ZnO Nanowire Growth During Chemical Bath Deposition," *57th International AVS Symposium,* (Albuquerque, NM, Oct. 2010).

K.M. McPeak, M. Becker, B.A. Bunker, and J.B. Baxter. "*In Situ* XANES of ZnO Nanowire Growth During Chemical Bath Deposition," *North American Core Shell Spectroscopy Conference*, (Denver, CO, Aug. 2010).

K.M. McPeak and J.B. Baxter. "Chemical Bath Deposition of ZnO Nanowires in a Continuous Flow Microreactor," *Annual Meeting of the American Institute of Chemical Engineers,* (Nashville, TN, Nov. 2009).

K.M. McPeak and J.B. Baxter. "Chemical Bath Deposition of ZnO Nanowires in a Continuous Flow Microreactor," *56th International AVS Symposium,* (San Jose, CA, Nov. 2009).

J.B. Baxter and C.A. Schmuttenmaer. "Carrier Dynamics in Bulk ZnO Measured by Time-Resolved Terahertz Spectroscopy," *Annual Meeting of the Materials Research Society*, (Boston, MA, Dec. 2009).

K.M. McPeak and J.B. Baxter, "Chemical Bath Deposition of ZnO Nanowires in a Continuous Flow Microreactor," *Annual Meeting of the Materials Research Society*, (Boston, MA, Dec. 2009).

H. Majidi and J.B. Baxter. "CdSe/ZnO Core-Shell Nanowires for Extremely Thin Absorber Solar Cells" (poster), *Annual Meeting of the Materials Research Society*, (Boston, MA, Dec. 2009).

H. Majidi and J. B. Baxter. "Charge Transport in ZnO Nanowire Dye Sensitized Solar Cells" (poster), *Univ. of Pennsylvania Solar Energy Symposium,* (Philadelphia, PA, Feb. 2009).

K. M. McPeak and J. B. Baxter. "Microreactor for High-Yield Solution Deposition of ZnO Nanowires" (poster), *Univ. of Pennsylvania Solar Energy Symposium*, (Philadelphia, PA, Feb. 2009).

K. M. McPeak and J. B. Baxter. "Microreactor for High-Yield Solution Deposition of ZnO Nanowires" (poster, Honorable Mention Best Poster), *Annual Meeting of the Materials Research Society*, (Boston, MA, Dec. 2008).

H. Majidi and J. B. Baxter. "Electrochemical Impedance Spectroscopy of ZnO Nanowire and Nanoparticle Dye Sensitized Solar Cells," *Annual Meeting of the American Institute of Chemical Engineers*, (Philadelphia, PA, Nov. 2008).

K. M. McPeak and J. B. Baxter. "High yield solution synthesis of ZnO nanowire arrays using a novel reactor design," *Annual Meeting of the American Institute of Chemical Engineers*, (Philadelphia, PA, Nov. 2008).

J. B. Baxter, *et al*., and C. A. Schmuttenmaer. "Studies of charge injection into nanocrystalline ZnO, TiO_2, and their composites using time resolved THz spectroscopy," *Annual Meeting of the American Chemical Society*, (Philadelphia, PA, Aug. 2008).

K. M. McPeak and J. B. Baxter. "High Yield Solution Synthesis of ZnO Nanowire Arrays Using a Microreactor," *Annual Meeting of the American Chemical Society*, (Philadelphia, PA, Aug. 2008).

J. B. Baxter, "ZnO Nanowire Dye Sensitized Solar Cells," *DOE Workshop on Efficient Conversion of Solar Energy*, (Boulder, CO, Aug. 2008).

J. B. Baxter, R. C. Snoeberger, V. S. Batista, and C. A. Schmuttenmaer, "Interfacial Electron Transfer in Dye Sensitized Solar Cells Measured by Time-Resolved Terahertz Spectroscopy," *American Institute of Chemical Engineers Annual Meeting*, (Salt Lake City, UT, Nov. 2007).

J. B. Baxter and C. A. Schmuttenmaer, "Carrier Dynamics in ZnO Nanowires and Films Measured by Time-Resolved Terahertz Spectroscopy," *American Institute of Chemical Engineers Annual Meeting*, (San Francisco, CA, Nov. 2006).

J. B. Baxter, S. G. Abuabara, C. W. Cady, G. W. Brudvig, R. H. Crabtree, V. S. Batista, and C. A. Schmuttenmaer, "Toward Photocatalytic Water Splitting Using TiO_2 Nanoparticles Functionalized with High-Valent Oxomanganese Complexes," *American Institute of Chemical Engineers Annual Meeting*, (San Francisco, CA, Nov. 2006).

J. B. Baxter and C. A. Schmuttenmaer, "Carrier Dynamics in ZnO Nanowires and Films Measured by Time-Resolved Terahertz Spectroscopy," *15th International Conference on Ultrafast Phenomena*, (Pacific Grove, CA, July, 2006).

J. B. Baxter and E. S. Aydil, "ZnO Nanowire Dye Sensitized Solar Cells," *Materials Research Society Spring Meeting*, (San Francisco, CA, Apr. 2005).

J. B. Baxter, A. M. Walker, K. van Ommering, and E. S. Aydil, "Solution Synthesis of ZnO Nanowires for Use in Dye Sensitized Solar Cells," *Materials Research Society Spring Meeting*, (San Francisco, CA, Apr. 2005).

J.B. Baxter, M. Reichman, and E. S. Aydil, "ZnO Nanowire Based Dye Sensitized Solar Cells," *American Institute of Chemical Engineers Annual Meeting*, (Austin, TX, Nov. 2004).

J. B. Baxter, M. Reichman, and E. S. Aydil, "ZnO Nanowire Based Dye Sensitized Solar Cells," *51st International AVS Symposium*, (Anaheim, CA, Nov. 2004).

J. B. Baxter and E. S. Aydil, "Growth and Characterization of ZnO Nanowires," *50th International AVS Symposium* (Baltimore, MD, Nov. 2003).

J.B. Baxter and E. S. Aydil, "Growth and Characterization of ZnO Nanowires," *American Institute of Chemical Engineers Annual Meeting*, (San Francisco, CA, November 2003).

J. B. Baxter, F. Wu, and E. S. Aydil, "Growth and Characterization of ZnO Nanowires and Columns," *Materials Research Society Spring Meeting,* (San Francisco, CA, Apr. 2003).

J. B. Baxter, F. Wu, and E. S. Aydil, "Zinc Oxide Nanowires Grown by Plasma Assisted Chemical Vapor Deposition," *49th International AVS Symposium*, (Denver, CO, Nov. 2002).

J. B. Baxter, F. Wu, and E. S. Aydil, "Growth and Characterization of ZnO Nanowires and Columns," *Southern California Chapter of AVS Annual Symposium*, (Anaheim, CA, Oct. 2002).

J. B. Baxter, F. Wu, and E. S. Aydil, "Growth and Characterization of ZnO Nanowires and Columns," (poster), *Materials Research Society 2nd International Workshop on Zinc Oxide*, (Dayton, OH, Oct. 2002).

GRADUATE STUDENTS SUPERVISED

PhD:
Siming Li (began 2013)
Sergey Smolin (began 2012)
Michael Edley (began 2011)
Borirak Opasanont, PhD 2015, now at Alta Devices
Glenn Guglietta (began 2009), ABD
Hasti Majidi, PhD 2012, now postdoc at UC- Davis
Kevin M. McPeak, PhD 2010, now assistant professor at Louisiana State University

MS (with thesis):
Treavor Jones, MS, 2014, Green Mountain Energy
Leah Spangler, BS/MS, 2013, PhD student at Lehigh
Tyler Perlenfein, BS/MS, 2012, PhD student at Wisconsin
Thinh Le, BS/MS 2011, PhD student at Pennsylvania State University
Ishai Padawer, BS/MS 2009, Merck

UNDERGRADUATE/VISITOR/NON-THESIS MS RESEARCH PROJECTS SUPERVISED

Drexel Undergraduates (not including MS with thesis)
Jason Conley, STAR 2015
Maris Kurcina, 2015-present
Hoang Tran, 2014-present
Thomas Boran, 2014-present
Anthony Abel, 2012-present (STAR 2013, Goldwater Scholar 2015)
Evan Louderback, 2013-present (STAR 2013)
Anjli Patel, 2012-present (STAR 2012, Goldwater Scholar 2015)
Austin Kuba, 2011-present (STAR 2012)
Jose Jurado, BS/MS 2014-2015
Daniel McPherson, BS/MS, 2011-2015 (STAR 2011)
Khoa Van, BS/MS, 2011-2014, Avo Photonics
Hanh Nguyen, 2011-2012
Huy Thuong, 2011
Paul Lachaud, STAR 2011
Samuel Hardy, STAR 2011
Mrugesh Patel, 2010
Melisa Aslan, 2009-2010
Nathan Britton, 2009-2010
Caitlin McRae, STAR (Drexel freshmen summer experience), 2009
Paul Henderson, 2009
Anthony Kotula, 2008, PhD student at Carnegie Mellon

Visiting Scholars
Eric Bressler, Johns Hopkins University, visiting undergraduate researcher, 2011, REU 2012
Scott Glover, Arkansas School for Technology and Arts, Summer Mentorship, 2010
Germain Rey, Grenoble Institut National Polytechnique (France), visiting PhD student, 2009
Haley Dillon, Iowa State University, Research Experience for Undergraduates (REU), 2009
Lucas Janes, Swarthmore College, Research Experience for Undergraduates (REU), 2008

Michelle Cook, New Media Technology Charter School, Research Experience for Teachers (RET), 2008

TEACHING EXPERIENCE

CHE 513 Advanced Thermodynamics: F2010, F2011
CHE 431/531 Fundamentals of Solar Cells: W2012, W2013, W2014, S2015
CHE 424 Kinetics and Reactor Design: F2013, F2014, F2015
CHE 335 Statistics and Design of Experiments: W2015
CHE 303 Process Heat Transfer: F2007, S2008, F2008, S2009, F2009, S2010
CHE 302 Process Fluid Mechanics: W2009, W2010, W2011
CHE 201 Process Materials Balances: S2012, F2012, S2013
ENGR 103 Freshman Design Laboratory: S2014

LEADERSHIP IN PROFESSIONAL ORGANIZATIONS

Symposium Organization:

Program Chair: "Energy Frontiers Focus Topic," 62nd Meeting of the American Vacuum Society (San Jose, CA, Oct. 2015)
Program Chair: "Energy Harvesting and Storage," Pacific Rim Symposium on Surfaces, Coatings, and Interfaces (Kohala Coast, HI, Dec. 2014)
Program co-chair: "Nanomaterials for Energy" Topical Area 5, American Institute of Chemical Engineers Annual Meeting (2011, 2012).
Program Committee: "Energy Frontiers Focus Topic," 58th International AVS Symposium, (Nashville, TN, Oct. 2011).

Session chair / discussion leader for:

"Nano-Based Approaches for Photovoltaics," Pacific Rim Symposium on Surfaces, Coatings & Interfaces (Kohala Coast, HI, Dec. 2014).
"Nanomaterials for Photovoltaics I, II, and III" AICHE Annual Meeting, Oct. 2012.
Optical Terahertz Science and Technology Conference, (Santa Barbara, CA, March 2011).
"Interfacial Chemistry in Photovoltaics," Gordon Research Conference: Chemical Reactions at Surfaces, (Ventura, CA, Feb. 2011).
"Excitonic and Third Generation Solar Cells," 57th International AVS Symposium, (Albuquerque, NM, Oct. 2010).
"Nanomaterials for Photovoltaics," AICHE Annual Meeting, (Nashville, TN, Nov. 2009).
"Nanowires III: Applications to Photovoltaics or Renewable Energy," AICHE Annual Meeting, (Nashville, TN, Nov. 2009).
University of Pennsylvania Solar Energy Symposium, Philadelphia, PA, Feb. 7, 2009.
"Nanowires III: Photovoltaics and Renewable Energy," AICHE Annual Meeting (Philadelphia, PA, Nov. 2008).
"Photovoltaics II: Nanomaterials for Photovoltaics," AICHE Annual Meeting (Philadelphia, PA, Nov. 2008).
"Inorganic-Organic Interfaces session," AICHE Annual Meeting (Salt Lake City, UT, Nov. 2007).
"Nanowires I: Synthesis session," AICHE Annual Meeting (San Francisco, CA, Nov. 2006).

OTHER SERVICE ACTIVITIES

University:

Drexel Program Alignment and Review, Standing Committee, 2015-present

Drexel Liberty Scholars Mentor, 2012-2015
Drexel Nano Research Infrastructure Task Force 2011-2012
Drexel Centralized Research Facility, Advisory Board, 2009-2011

College:
COE Freshman/Sophomore Task Force, 2015-present
COE Undergraduate Curriculum Committee, 2013-present
Dean's Junior Faculty Advisory Committee, 2009-2012

Department:
CBE Undergraduate Committee Chair, 2013-present
CBE Undergraduate Affairs Committee 2012-present
CBE Faculty Search Committee, 2012-2013
CBE Strategic Planning Committee, 2012-2013
Department Seminar Series Coordinator, 2010-2012
Graduate Admissions Advisor, 2008-2010, 2012-2014
CBE Graduate Affairs Committee, 2008-present
Advisor, Drexel Undergraduate AIChE Chapter, 2008-2010

External:
Proposal reviewer: NSF, DOE, ACS PRF, Israel Science Foundation
Manuscript reviewer: Nature Comm., Nano Letters, ACS Nano, Advanced Materials, Advanced Energy Materials, ACS Applied Materials & Interfaces, J. Physical Chemistry C, Chemistry of Materials, Applied Physics Letters, Physical Chemistry Chemical Physics, J. of the Electrochemical Society, Physical Review B, J. of Vacuum Science and Technology A, Langmuir, Electrochimica Acta, J. of Photochemistry and Photobiology A, J. of Materials Chemistry, Crystal Growth & Design, J. of Materials Science, Chemical Engineering Education, Current Opinion in Chemical Engineering

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