

BENJAMIN A. WILHITE, DuPont Young Professor and
Assistant Professor of Chemical Engineering,
Chemical, Materials and Biomolecular Engineering Department (CMBE)
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Education:

Massachusetts Institute of Technology,	Microchemical Systems	2002-2005
University of Notre Dame	Ph.D., Chemical Engineering	2003
North Carolina State University	B.S., Chemical Engineering	1997

Appointments:

CMBE Department, University of Connecticut Assistant Professor		2005-present
Connecticut Global Fuel Cell Center (CGFCC), University of Connecticut Assistant Professor		2005-present
Department of Chemical Engineering, M.I.T. Research Scientist		2004-2005
	Postdoctoral Research Associate	2002-2004
Department of Chemical Engineering, University of Notre Dame Graduate Instructor		2001-2002
	Arthur J. Schmitt Research Fellow	1997-2001

Honors and Recognitions:

<i>Recipient, FY2007 Office of Naval Research Young Investigator Award</i>		2007
<i>Recipient, DuPont Young Faculty Grant</i>		2007
<i>Recipient, Univ. of Conn. Junior Faculty Summer Fellowship,</i>		2007
<i>Invited Keynote Speaker,</i> Robert M. Langer Graduate Student Symposium, Yale University		2006
<i>Research Highlighted in Nature News and Reviews,</i> R. Masel, "Hydrogen Quick and Clean," <i>Nature</i> , 442 , 521-522		2006
<i>Inductee, Sigma Xi Scientific Research Society,</i> Massachusetts Institute of Technology Chapter,		2004
<i>Outstanding Graduate Student Teacher Award,</i> University of Notre Dame,		2002
<i>Arthur J. Schmitt Research Fellowship,</i> University of Notre Dame		1997-2001

University Service:

<i>Honors Undergraduate Advisor, Chemical Engineering Program</i>		2006-present
<i>Member, University Scholars Committee</i>		2006-present
<i>Member, Office of Undergraduate Research Advisory Board</i>		2006-present
<i>Member, Undergraduate Committee, Chemical Engineering</i>		2006-present

Professional Service:

- **American Institute of Chemical Engineers (AIChE)**
 - Planning Chair, Division 20b, Fall 2008 Annual Meeting, Philadelphia, PA.
 - Planning Vice-Chair, Division 20b, Fall 2007 Annual Meeting, Salt Lake City, UT.
 - Chair, Fuel Cells: Fuel Processing, AIChE 2007 Annual Meeting, Salt Lake City, UT.
 - Member, Scientific Committee, 21st International Symposium on Chemical Reaction Engineering (ISCRE-21), Philadelphia, PA 2010.
- **American Chemical Society (ACS)**
 - **Organizer**, Symposium on Hydrogen Reforming, *ACS 2007 Fall Meeting, Boston, MA*.
 - Co-Chair, Perspectives on Hydrogen Generation
 - Chair, Small-Scale Hydrogen Generation: Status and Future Challenges
- **American Society of Mechanical Engineers (ASME)**
 - **Track Chair**, Fuel Cell Systems: Integration and Implementation, 5th Fuel Cell Science, Engineering and Technology Conference, New York, NY, June 18th-21st, 2007.

Editorial Service:

- **Guest Editor**, “Fuel Processing for Hydrogen Production,” *Catalysis Today*, planned Spring 2008. (8 submissions)
- **Guest Editor**, “5th Fuel Cell Science, Engineering and Technology Conference,” *Journal of Fuel Cell Science and Technology*, special edition planned Spring 2008. (75 submissions)

Past and Present Funded Research Projects:

- “Ammonia Borane Pyrolysis – Analysis and Characterization”, PI: Trent Molter, co-PI: Ugur Pasaogulari, Benjamin A. Wilhite. Ensign-Bickford Aerospace and Defense. Award Amount, \$195,822. Award Period: 11/01/06 – 07/31/07.
- “Heat-Integrated Hydrogen Production from Liquid Fuels,” PI: Benjamin A. Wilhite. Office of Naval Research Young Investigator Program (ONR-YIP). Award Amount, \$299,905. Award Period: 06/01/07 – 05/31/10.
- “Hydrogen from Ethanol via Integrated Ceramic Microchannel Membrane Networks,” PI: Benjamin A. Wilhite. National Science Foundation, Chemical and Transport Science Division. Award Amount, \$239,000. Award Period: 06/01/07 – 05/31/10.
- “Integrated Fuel Reformers for Hydrogen Production from Green Resources,” P.I: Benjamin A. Wilhite. DuPont de Nemours Cooperation, Young Professor Grant. Award Amount, \$75,000. Award Period: 09/01/07 – 08/30/10.
- “Analysis of Hydrogen Purification Membranes for Use in Fuel Cell-Based Naval Power Systems,” P.I.: Benjamin A. Wilhite. Office of Naval Research. Award Amount, \$97,055. Award Period: 01/01/08 – 12/31/08.
- “Biofuels Curriculum Development for Continuing Education,” PI: R. Parnas, Co-PI: B.A. Wilhite, Center for Continuing Studies, University of Connecticut, Award Amount, \$50,000. Award Period: 06/01/07 – 05/31/09.

Teaching Responsibilities:

A. Thesis Advisor and Postgraduate-Scholar Sponsor

Ph.D. Students: Daijin Kim; Angela Moreno; Aravind Suresh; Ayorinde Awonusi
M.S. Students: Philip Baker (co-advised); Matthew Boucher (co-advised)
B.S. Students: Alex Kellogg, Eric Livaich, Gregory Honda, Benjamin Webb
Career: Ph.D. Students (4), M.S. Students (2), Honors Thesis (2).

B. Undergraduate Advising: 20 Honors Students (as of 4/01/08)

C. Courses Taught:

Spring 2006. CHEG 251: Process Kinetics. Enrollment: 38. Average Evaluation Score: 8.6/10.

- Fogler, H.S. Elements of Chemical Reaction Engineering, 4th Edition. Prentice-Hall, 2006.

Fall 2006. CHEG 312: Transport Processes I (Grad). Enrollment: 15. Average Evaluation Score: 8.1/10.

- Bird, Stewart and Lightfoot. Transport Phenomena, 2nd Edition. (2005).
- Leal. Laminar Flow and Convective Transport Processes. (1992).

Spring 2007. CHEG 251: Process Kinetics. Enrollment: 42. Average Evaluation Score: 8.6/10.

- Fogler, H.S. Elements of Chemical Reaction Engineering, 4th Edition. (2006).

Fall 2007. CHEG 321: Chemical Reaction Engineering (Grad). Enrollment: 10. Average Score: 9.0/10.

- Lectures primarily based upon instructors notes developed from J.J. Carberry and Arvind Varma.
- Levenspiel, O. Chemical Reaction Engineering, 3rd Edition (1999).
- Masel, R.I.. Chemical Kinetics and Catalysis. (2001).
- Carberry, J.J. Chemical and Catalytic Reaction Engineering. (1976).
- Schmidt, L.D. The Engineering of Chemical Reactions (2005).

Invited Talks

1. "Alternative Energy Systems and Sources: Fueling Research at the University of Connecticut," *Keynote Speech, 4th Annual Langer Graduate Symposium, Yale University*, December 1st, 2006.
2. "Bridging the Gap between Green Fuels and Clean Fuel Cells", *Biofuels Symposium: Policy, Opportunity and Science, University of Connecticut*, January 11th, 2007.
3. "Alternative Energy Systems and Sources: Bridging the Gap between Green Fuels and Clean Fuel Cells," *Department of Chemical and Biomolecular Engineering, Tufts University*, February 12th, 2007.
4. "Microchemical Systems for Portable Biofuels Reforming: Revisiting and Rethinking Chemical Reaction Engineering Analysis," *to be presented in Honor of Arvind Varma's 60th Birthday at the 2007 annual meeting of the AIChE, November 5th*, 2007.
5. "Microchemical Systems for Portable Biofuels Reforming," *presented at Department of Chemical Engineering, West Virginia University*, February 22nd, 2008.
6. "Fuel Cells: Powering a Sustainable Future," presented at the University of Connecticut Sustainable Energy Symposium, March 31st, 2008.

Publications in Review

1. **Wilhite, B.A.** "Chapter 4: Heat Management," in Microfabricated Power Generation Devices, A. Mitsos and P.I. Barton, Editors, *submitted for publication by Wiley*.
2. M. B. Boucher, C. Weed, S.-Y. Li, J. D. Stuart, R. S. Parnas, and **B. A. Wilhite**, "Kinetics of Potassium Hydroxide-Catalyzed Soybean Oil Transesterification: Influence of Temperature, Catalyst Loading and Methanol:Oil Ratio," *Industrial and Engineering Chemistry Research, in review*.

3. M.B. Boucher, C. Weed, N.E. Leadbeater, B.A. Wilhite, J.D. Stuart, B.A. Wilhite and R.S. Parnas, "Pilot Scale Two-Phase Continuous Flow Biodiesel Production via Laminar Flow Reactor-Separator with No Moving Parts," *Bioresources Technology*, *in review*.
4. M.B. Boucher, S. Unker, K.R. Hawley, B.A. Wilhite, J.D. Stuart and R.S Parnas, "Free Fatty Acid Esterification in the Presence of Soybean Triglycerides via Reaction with Methanol and a Homogeneous Acid Catalyst: Catalyst Recoverability and Reusability," *Green Chemistry*, *in review*.
5. S.E. Weiss, **B.A. Wilhite**, K. F. Jensen and J.Y. Ying, "Nanocrystalline Perovskites for Oxidative Steam Reforming of Methanol," *Applied Catalysis B: Environmental*, *in review*.

Research Publications

1. Moreno, A., K. Murphy and **B.A. Wilhite**, "Influence of Solid-Phase Thermal Conduction in the Design of Heat-Integrated Microreactors," *accepted for publication in Industrial and Engineering Chemistry Research*.
2. **B.A. Wilhite**, T.F. Hill, L.F. Velasquez-Garcia, A.H. Epstein, K.F. Jensen and C. Livermore, "Design of a Silicon Based Microscale Trickle-Bed System for Singlet-Oxygen Production," *accepted for publication in AIChE Journal*.
3. L.F. Velasquez-Garcia, T.F. Hill, **B.A. Wilhite**, W.T. Rawlins, S. Lee, K.F. Jensen, A.H. Epstein and C. Livermore, "A MEMS Singlet-Oxygen Generator – Part I: Device Fabrication and Proof of Concept Demonstration," *Journal of Microelectromechanical Systems*, *16(6)*, 1482-1491 (2007).
4. T.F. Hill, L.F. Velasquez-Garcia, **B.A. Wilhite**, W.T. Rawlins, S. Lee, K.F. Jensen, A.H. Epstein and C. Livermore, "A MEMS Singlet-Oxygen Generator – Part II: Experimental Exploration of the Performance Space," *Journal of Microelectromechanical Systems*, *16(6)*, 1492-1505 (2007).
5. C. Livermore, T.F. Hill, L. Velasquez-Garcia, **B.A. Wilhite**, A.H. Epstein, K.F. Jensen, W. Terry Rawlins, S. Lee and S. Davis, "Singlet-Oxygen Generation on a Chip for MEMS-based COIL," *Proceedings of International Society for Optical Engineering (SPIE), Photonics Conference, Jan. 20 – 25th, 2007, Vol. 6454*.
6. T.M. Barnard, N.E. Leadbeater, , M.J. Boucher, L.M. Stencel and **B.A. Wilhite**, "Continuous-Flow Preparation of Biodiesel Using Microwave Heating," *Energy and Fuels*, **21(3)**, 1777-178 (2007).
7. Boucher, M., Li, S.-Y., C. Weed, **B.A. Wilhite**, J.D. Stuart and R. Parnas, "Kinetics for Soybean Oil Transesterification in a Batch System," *ACS Fuels Division Preprints, 234th ACS National Meeting, Boston, MA, FUEL 032 (2007)*,
8. **B.A. Wilhite**, S.E. Weiss, J.Y. Ying, M.A. Schmidt and K.F. Jensen, "Demonstration of 23wt% Ag-Pd Micromembrane Employing 8:1 LaNi_{0.95}Co_{0.05}O₃/Al₂O₃ Catalyst for High-Purity Hydrogen Generation," *Advanced Materials*, **18**, 1701 (2006).
9. **B.A. Wilhite**, B. Blackwell, J. Kacmar, A. Varma and M.J. McCready, "Origins of Pulsing Regime in Cocurrent Packed Beds," *Ind. Eng. Chem. Res.*, **44**, 6056 (2005).
10. **B.A. Wilhite**, M.A. Schmidt and K.F. Jensen, "Palladium-Based Micromembranes for Hydrogen Separation: Device Performance and Chemical Stability," *Ind. Eng. Chem. Res.*, **43**, 7083 (2004).
11. **B.A. Wilhite**, C. Livermore, Y. Gong, A. Epstein and K.F. Jensen, "Design of a MEMS-Based Chemical Oxygen-Iodine Laser (COIL) System," *IEEE J. of Quantum. Electron.*, **40**, 1041 (2004).
12. **B.A. Wilhite**, X. Huang, M.J. McCready and A. Varma, "Effects of Induced-Pulsing Flow on Trickle-Bed Reactor Performance," *Ind. Eng. Chem. Res.*, **42**, 2139 (2003).
13. X. Huang, **B.A. Wilhite**, M.J. McCready and A. Varma, "Phenylacetylene Hydrogenation in a Three-Phase Catalytic Packed-Bed Reactor: Experiments and Model," *Chem. Eng. Sci.*, **58**, 3465 (2003).
14. **B.A. Wilhite**, M.J. McCready and A. Varma, "Kinetics of Phenylacetylene Hydrogenation over Pt/g-Al₂O₃ Catalyst," *Ind. Eng. Chem. Res.*, **41**, 3445 (2002).
15. **B.A. Wilhite**, R. Wu, X. Huang, M.J. McCready and A. Varma, "Enhancing Performance of Three-Phase Catalytic Packed-Bed Reactors," *AIChE Journal*, **47**, 2548 (2001).
16. C. Norman, **B.A. Wilhite**, D. Pham, P.A. Brown and P.K. Lim, "Biphasic Synthesis of 2-Phenylpropionic Acid and Ester by Interfacial Carbonylation of □-Methylbenzyl Bromide," *Org. Proc. Res. Dev.*, **4**, 2 (1998).

Research Presentations

1. *A. Moreno and **B.A. Wilhite**, "Modeling of a Micro-Scale Heat Exchanger Reactor for Portable Hydrogen Production," *presented at American Institute of Chemical Engineers (AIChE) Annual Meeting, Salt Lake City, UT, 37a* (2007).
2. *M. Boucher, C. Weed, S.-Y. Li, **B.A. Wilhite**, J.D. Stuart and R.S. Parnas, "Kinetics of Soybean Oil Transesterification in a Batch System," *presented at the 234th ACS National Meeting, Boston, MA, FUEL 032* (2007)
3. *C. Livermore, T.F. Hill, L. Velasquez-Garcia, **B.A. Wilhite**, A.H. Epstein, K.F. Jensen, W. Terry Rawlins, S. Lee and S. Davis, "Singlet-Oxygen Generation on a Chip for MEMS-based COIL," *presented at the International Society for Optical Engineering (SPIE) Photonics Conference, Jan. 20 – 25th, 2007.*
4. *L.F. Velasquez-Garcia, T.F. Hill, **B.A. Wilhite**, K.F. Jensen, A.H. Epstein and C. Livermore, "A MEMS Singlet Oxygen Generator for a MEMS Chemical Oxygen Iodine Laser," *poster presentation at PowerMEMS Conference, Berkeley, CA* (2006).
5. ***Wilhite, B.A.**, "Chemical Reaction Engineering – Fuel for Thought," *presented at AIChE Annual Meeting, San Francisco, CA, 367c* (2006).
6. ***Wilhite, B.A.**, T.F. Hill, L.F. Valasquez-Garcia, A.Epstein, K.F. Jensen and C. Livermore, "Singlet-Oxygen Generation via Microscale Trickle-Bed Reactor Array: Experiments and Modeling," *presented at AIChE Annual Meeting, San Francisco, CA, 664f* (2006).
7. *Hill, T., **B. Wilhite**, L. Velasquez-Garcia, A. Epstein, K. Jensen and C. Livermore, "A MEMS Singlet-Oxygen Generator," *presented at Hilton Head 2006: A Solid State Sensor, Actuator and Microsystems Workshop* (2006).
8. *Deshpande, K.T., **B.A. Wilhite**, M.A. Schmidt and K.F. Jensen, "Integrated Partial Oxidation and Purification Microsystems for Autothermal Production of Hydrogen from Methanol," *presented at 2005 AIChE Annual Meeting, Cincinnati, OH, 36a* (2005).
9. ***B.A. Wilhite**, S.E. Weiss, J.Y. Ying, M.A. Schmidt and K.F. Jensen, "Microchemical Systems for Portable Hydrogen Generation," *presented at the 19th North American Catalysis Society Meeting, poster session 16, Philadelphia, PA* (2005).
10. **B.A. Wilhite**, *B.S. Blackwell, K. Cheung, K.F. Jensen, L. Arana, M.A. Schmidt and Ole Nielson, "Micro Reaction Technology for Energy Conversion," *presented at IMRET 8, hosted by AIChE Spring Meeting, Atlanta, GA* (2005).
11. ***B.A. Wilhite**, O.M. Nielsen, S.E. Weiss, J.Y. Ying, M.A. Schmidt and K.F. Jensen, "Microchemical Systems for Hydrogen Generation: Portable Power Applications," *presented at AIChE 2004 Annual Meeting, Austin TX* (2004).
12. ***B.A. Wilhite**, A.M. Mehta, D.J. Quinn, J.L. Hertz, M.S. Spearing, H.L. Tuller, M.A. Schmidt and K.F. Jensen, "Development of a Membrane-Based Solid-Oxide Fuel Cell: Microfabrication and Performance Analysis," *presented at 2004 MRS Fall Meeting, M5.22, Boston, MA* (2004).
13. ***B.A. Wilhite**, A.M. Mehta, D.J. Quinn, J.L. Hertz, M.S. Spearing, H.L. Tuller, M.A. Schmidt and K.F. Jensen, "Development of a Membrane-Based Solid-Oxide Fuel Cell," *presented at AIChE 2004 Annual Meeting, Austin, TX* (2004).
14. ***B.A. Wilhite**, M.A. Schmidt and K.F. Jensen, "Palladium-Based Micromembranes for Hydrogen Purification: Influence of Material Selection upon Performance," *presented at AIChE 2003 Annual Meeting, San Francisco, CA* (2003).
15. ***B.A. Wilhite**, X. Huang, M.J. McCready and A. Varma, "Effects of Induced-Pulsing Flow on Trickle-Bed Reactor Performance," *presented at the 4th International Conference on Unsteady-State Processes in Catalysis (USPC-4), Montreal, Quebec* (2003).
16. **B.A. Wilhite**, B. Blackwell, J. Kacmar, A. Varma and *M.J. McCready, "Mechanistic Origins of the Pulsing Regime in Cocurrent Gas-Liquid Packed Bed Flow," *presented at 2002 AIChE Annual Meeting, Indianapolis, IN* (2002).
17. *X. Huang, **B.A. Wilhite**, M.J. McCready and A. Varma, "Phenylacetylene Hydrogenation in a Three-Phase Catalytic Packed-Bed Reactor: Experiments and Model," *poster presented at ISCRE-17, Hong Kong* (2002).

18. ***B.A. Wilhite**, M.J. McCready and A. Varma, "Phenylacetylene Hydrogenation over Pt/g-Al₂O₃ Catalyst: Kinetics, Modeling and Reactor Performance," *presented at 2001 AIChE Annual Meeting, Reno, NV* (2001).

**denotes speaker.*