

BARBARA LYNN KNUTSON, Ph.D.

PROFESSIONAL PREPARATION

Princeton University	Postdoctoral Fellow, Chemical Engineering	1994 - 1995
Georgia Institute of Technology	Chemical Engineering	Ph.D., 1994
Georgia Institute of Technology	Chemical Engineering	B.S., 1989

PROFESSIONAL APPOINTMENTS

- Professor, Chemical & Materials Engineering, University of Kentucky, 2007 - present.
- Director of Undergraduate Studies, Chemical Engineering, 2014 - present.
- Director/Co-Director of Graduate Studies, Chemical & Materials Engineering, 2003 - 2009.
- Associate Professor, Chemical & Materials Engineering, University of Kentucky, 2001 - 2007.
- Faculty Associate, Center of Membrane Sciences, University of Kentucky, 1996 - present.
- Assistant Professor, Chemical & Materials Engineering, University of Kentucky, 1995 - 2001.

RELEVANT PRODUCTS (OF 87 PUBLICATIONS)

My research expertise is in the field of applied molecular thermodynamics and interfacial engineering with an emphasis on separations and bioseparations applications.

1. Zhou, S., D.M. Schlipf, E. Guilfoil, S.E. Rankin, and B.L. Knutson, "Lipid Pore-Filled Silica Thin Film Membranes for Biomimetic Recovery of Dilute Carbohydrates," *Langmuir* Vol. 33, pp. 14156-14166 (2018).
2. Darkwah, K., Nokes, S.E., J.R. Seay and B.L. Knutson, "Mechanistic Simulation of Batch Acetone-Butanol-Ethanol (ABE) Fermentation with in situ Gas Stripping using Aspen Plus." *Bioprocess and Biosystems Engineering*, 41(9), pp. 1283-1294 (2018).
3. Darkwah, K., Knutson, B.L. and J.R. Seay, "A Perspective on the Challenges and Prospects for Applying Process Systems Engineering Tools to Fermentation-Based Biorefineries." *ACS Sustainable Chemistry & Engineering*, 6(3), pp. 2829-2844 (2018).
4. Nagpure, S., Zhang, Q., Khan, M.A., Islam, S.Z., Xu, J., Strzalka, J., Cheng, Y.-T., Knutson, B.L., and S.E. Rankin, "Layer-by-layer Synthesis of Thick Mesoporous TiO₂ Films with Vertically Oriented Accessible Nanopores and Their Application for Lithium Ion Battery Negative Electrodes," *Advanced Functional Materials*, Vol. 28, article 1801849 (2018).
5. Das, S., Oldham, E.D., Lehmler, H.-J., Knutson, B.L., and S.E. Rankin, "Tuning the Position of Head Groups by Surfactant Design in Mixed Micelles of Cationic and Carbohydrate Surfactants," *Journal of Colloid and Interface Science* Vol. 512, pp. 428-438 (2018).
6. Zhou, S., Li, H.-F., Garlapalli, R. Nokes, S.E., Flythe, M.D., Rankin, S.E. and B.L. Knutson, "Hydrolysis of Model Cellulose Films by *Clostridium thermocellum*: Extension of Quartz Crystal Microbalance Techniques to Cellulosomes," *J. Biotechnology*, Vol. 241, pp. 42-49 (2017).
7. Wooten, M.K.C., Koganti, V.R., Zhou, S., Rankin, S.E. and B.L. Knutson, "Synthesis and Nanofiltration Membrane Performance of Oriented Mesoporous Silica Thin Films on Macroporous Supports," *ACS Applied Materials and Interfaces*, Vol. 8, pp. 21806-21815 (2016).
8. Schlipf, D.M., Rankin, S.E., and B.L. Knutson, "Selective External Surface Functionalization of Large Pored Silica Materials Capable of Protein Loading," *Microporous and Mesoporous Materials*, Vol. 4, pp. 1601103 (2017).
9. Schlipf, D.M., Jones, C. A. Armbruster, M. E., Rushing, E.S., Wooten, K.M., Rankin, S.E. and B. L. Knutson. "Flavonoid Adsorption and Stability on Titania-functionalized Silica Nanoparticles." *Colloids and Surfaces A: Physicochemical and Engineering Aspects* 478:15-21. (2015).
10. Das, S., W. Xu, H.-J. Lehmler, A.-F. Miller, B.L. Knutson and S.E. Rankin, "Inverted Micelle-in-Micelle Configuration in Simple Mixed Cationic/Carbohydrate Surfactant Systems," *ChemPhysChem* Vol. 18, pp. 79-86 (2017).

SYNERGISTIC ACTIVITIES

- Faculty participant in cross-cutting research efforts at the University of Kentucky as a member of the Center of Membrane Sciences (1996- present) and the Advanced Science and Technology Commercialization Center (ASTECC; 1995-present). The Center of Membrane Sciences brings together researchers across the campus with expertise in biological and synthetic membranes and their interface. ASTeCC houses emerging technology-based companies and academic research with commercialization potential.
- Developed intellectual property through interdisciplinary and industrial collaborations:
 - Nokes, S.E., Lynn, B.C., Rankin, S.E., Knutson, B.L., Montross, M.D., and M.D. Flythe. "On-Farm Integrated High-Solids Processing System for Biomass. Inventors: U.S. Letters Patent 9,376,697 Issued 6/28/2016.
 - Littleton, J., Knutson, B., Bradley, L., Rankin, S., Smalle, J. and J. Kurepa. "Method and System for Selectively Harvesting Products from Plant Cells in Culture," Provisional Patent serial number 62/537,249 (2017)
- Developed an interdisciplinary undergraduate "Bioseparations" elective, graduate "Colloids and Interfaces" elective, and "Introduction to Research" course for first year graduate students in engineering
- Outreach activities: Represented the Chemical and Materials Engineering undergraduate programs in outreach activities including UK's Freshman Program, UK College of Engineering E-Day (with approximately 2000 visitors annually), and the UK Office of Minority Affairs. Developed Chemical Engineering workshops as part of the UK College of Engineering Women in Engineering Summer Workshop for high school juniors and seniors.
- Undergraduate and high school student mentoring: Mentored over 60 undergraduate research projects (for research credit or through REU programs), 14 high school researchers from three local high schools (Paul Laurence Dunbar High School Math, Science and Technology magnet program, Lafayette High School pre-engineering program, and Henry Clay Liberal Arts Academy mentoring program) and one national summer internship program for high schoolers (Pinhead Institute, Telluride, CO).

HONORS, AWARDS AND AFFILIATIONS

Faculty Associate, Center of Membrane Sciences, University of Kentucky, 1996 – present
Faculty Associate, Advanced Science and Commercialization Center (ASTECC), University of Kentucky, 1996-present

Outstanding Chemical Engineering Teacher Award, University of Kentucky, 1998, 2001

Advisory Board Member, Center for Applied Energy Research, Lexington, KY 2000-2008

Georgia Institute of Technology, College of Engineering Outstanding Young Alumni Council, Inducted 2001

Advisory Board Member, Dept. of Chemical Engineering, Tennessee Tech, 2013-present.

Most Outstanding Engineering Professor, University of Kentucky Chapter of Tau Beta Pi, 2014