

Sharyn K. Freyermuth, Ph.D.

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EDUCATION

- Ph.D. **Duke University**, Durham, North Carolina (May 1991)
Biochemistry and Genetics, Thesis Advisor: Robert E. Webster, Ph.D.
Dissertation title: *Studies on the TolA and TolB proteins: components of a multistep translocation system in Escherichia coli.*
- B.S. **University of Georgia**, Athens, Georgia (1984)
Major: Genetics, *Summa Cum Laude*; Member of University Honors Program; National Merit Scholar; Phi Beta Kappa
Undergraduate Research: *Restriction map analysis and sequencing of a soybean actin gene* with Richard B. Meagher, Ph.D.; Department of Genetics, University of Georgia

PROFESSIONAL EXPERIENCE

- Assistant Dean of Academic Programs**, University of Missouri *June 2009-present*
- College of Agriculture, Food & Natural Resources
- Courses taught include *Foundations for College Success*, a 1 hour seminar course for second semester freshmen in academic difficulty. Duties include advising chair of the Agriculture major, helping with recruitment and career services in the college, faculty enrichment workshops, advising students in academic distress, Summer Welcome advising for entering freshmen and overseeing the CAFNR research internship program.
- Interim Assistant Dean of Academic Programs**, University of Missouri *July 2008-May 2009*
- College of Agriculture, Food & Natural Resources
- Associate Teaching Professor**, University of Missouri *Sept 2010 - present*
- Biochemistry Department, College of Agriculture, Food and Natural Resources
- Courses taught include *Introduction to Biochemistry*, a 3 hour lecture class for entering freshmen; *Biotechnology in Society*, a 3 hour lecture/discussion class for non-majors; *Introduction to Biochemistry Laboratory*, a 2 hour lab course for entering freshmen; facilitation of the Discovering Sciences Freshman Interest Group.
- Advisor Chair, Biochemistry Department**, University of Missouri *July 2011 - present*
- Oversee advising of all biochemistry undergraduate majors, including assignment of advisors, maintenance of databases of current students, departmental honors, graduation plans; coordinate Summer Welcome advising for entering freshmen majors, deal with problems and answer questions regarding academic plans of undergraduates, meet with prospective students, faculty advisor for undergraduate Biochemistry Club.

Teaching Assistant Professor, University of Missouri

Sept 2004 – Aug 2010

- Biochemistry Department, College of Agriculture, Food and Natural Resources
Courses taught include *Biotechnology in Society*, a 3 hour lecture/discussion class for non-majors; *Molecular Biology Laboratory* a 3 hour writing intensive laboratory class for majors; *Exploring Bioethics through Fact and Fiction*, a 1 hour seminar course targeted to pre-med, honors students; *Foundations for College Success*, a 1 hour seminar course for freshmen; *Senior Seminar in Biochemistry* a 1 hour capstone course for majors to present their research. Additional duties include co-facilitating the Biochemistry Freshman Interest Group, advising majors and assisting with Summer Welcome advising for entering freshmen majors.

Resident Instruction Resident Instructor, University of Missouri

Aug 1998 – Aug 2004

- Biochemistry Department, College of Agriculture, Food and Natural Resources (100% teaching)

Postdoctoral Fellow, University of Missouri

Aug 1992 – July 1998

- Biochemistry Department, College of Agriculture, Food and Natural Resources
Postdoctoral research with Joseph C. Polacco, Ph.D.; Biochemistry Department, University of Missouri; NSF Postdoctoral Fellowship in Plant Biology (1993-1996); Research area: *Molecular and genetic studies of soybean urease activation*.

Postdoctoral Fellow, University of Colorado – Boulder

Aug 1991 – July 1992

- Department of Molecular, Cellular and Developmental Biology
Postdoctoral research with L. Andrew Staehelin, Ph.D.; Department of Molecular, Cellular and Developmental Biology, University of Colorado. Research area: *Functional and structural studies on the plant cell wall polysaccharide xyloglucan*.

SELECTED HONORS/AWARDS

- **Excellence in Advising Award** for in the Faculty category, 2016. Region 7 of NACADA (The National Academic Advising Association) includes the states of Arkansas, Kansas, Louisiana, Missouri, Oklahoma, and Texas.
- **Faculty Advisor Award**, MACADA (Missouri Academic Advising Association), 2015
- **Excellence in Advising Faculty Award**, University of Missouri, 2015
- **Biochemistry Faculty Fellowship for Advising** Division of Biochemistry, College of Agriculture, Food and Natural Resources, University of Missouri, 2014-2015
- **Outstanding Undergraduate Advisor**, College of Agriculture, Food & Natural Resources, University of Missouri, 2013
- **Excellence in Advising Nominee**, Advisors Forum, University of Missouri, 2013, 2011 and 2008
- **Outstanding Senior Teaching Award**, College of Agriculture, Food and Natural Resources, University of Missouri, 2007
- **Food and Agricultural Sciences Excellence in College and University Teaching Award Nominee**, National Association of State Universities and Land-Grant Colleges, 2007
- **Biochemistry Faculty Fellowship for Teaching**, Division of Biochemistry, College of Agriculture, Food and Natural Resources, University of Missouri, 2007-2008
- **Teaching Scholars III**, College of Agriculture, Food and Natural Resources, University of Missouri, 2003-2006
- **Outstanding Instructor in Biochemistry**, College of Agriculture, Food and Natural Resources, University of Missouri, 2002
- **Outstanding Teacher Nominee**, College of Agriculture, Food and Natural Resources, University of Missouri, 2001
- **Advisor of the Month Award**, National Residence Hall Honorary, University of Missouri Chapter, October 2005

HISTORY of GRANTS AND FELLOWSHIPS

- Co-advisor with Mario Pennella, Mizzou Advantage Grant: *Building biological systems that operate in living cells*, (\$21,000) – Summer and Fall 2014. Funds for iGEM team: funded 11 students and 4 faculty. iGEM funding also included:
 - MU Ag 100 Endowment - \$500 for iGEM
 - Integrated DNA Technologies (IDT) - \$300 credit for oligonucleotides and gene synthesis
 - New England Biolabs (NEB) - \$200 of supplies (DNA ladder, cloning kit, competent cells)
- PI on USDA Higher Education Challenge Grant: *Searching the deep sea for clues to enhance agricultural carbon fixation* (\$265,621) – 9/2008-8/2011. Collaboration between MU, UCLA and University of South Florida. Development of curricular materials to allow students to isolate and characterize novel autotrophic microbes.
- PI on USDA Higher Education Challenge Grant: *Sequence and Consequence: A Hand-on Approach to Bioinformatics Research for Undergraduates* (\$278,268) – 9/2005-8/2007. Collaboration between MU, UCLA and University of South Florida. Objective of the grant is to develop and implement use of genome assembly and annotation curricular materials in major's lab classes.
- PI on USDA Higher Education Challenge Grant: *Genomics-based Biotechnology Education* (\$249,970) – 9/2003-8/2006: Collaboration between MU, UCLA and Salisbury University. Objective of the grant is to develop genomics-based biotechnology education materials for life science majors.
- PI on USDA Higher Education Challenge Grant: *Enhancing Biotechnology Education* (\$185,561) – 9/2001-8/2004: Collaboration between MU, UCLA and University of Maryland-Eastern Shore. Objective of the grant is to develop new curricula for teaching biotechnology to undergraduate non-life science majors. *Completed – CD with curricular materials is available for distribution.*
- Co – PI on NSF CCLI Grant: *Addressing the Assessment Gap in Undergraduate Science: Development of Innovative Assessments for Learning in Biotechnology (DIAL-B)* (\$149,980) – 1/2009-12/2010. Designing, testing, and dissemination of innovative assessments for biotechnology.
- Co – PI on USDA Grant: MU Multicultural Scholars Program - Passport to Success (\$144,000) - 12/1/2006-6/1/2010. Four year scholarships for 6 minority students.
- Co PI on Learning, Teaching, & Curriculum Department Interdisciplinary Planning Grant, PI: Siegel, Title: "Stems II," 5/2008-5/2009, \$5,000
- Co PI on Learning, Teaching, & Curriculum Department Interdisciplinary Planning Grant, PI: Siegel, Title: "Stems," 5/2007-5/2008, \$5,000.

COMMITTEES/SERVICE/PROFESSIONAL ORGANIZATIONS

- Biochemistry Undergraduate Education Committee
- Advisor Chair, Agriculture major and Biochemistry major
- Faculty Advisor, Biochem Club (undergraduate)
- Biochemistry Endowments
- Biochemistry Awards Committee
- CAFNR Courses and Curricula Committee

Freyermuth, S.

- CAFNR Scholarship & Awards Committee
- CAFNR Advising, Learning and Teaching Enhancement Committee (Ex-officio)
- MU Honors College Council & Curriculum sub-committee, Honors College
- MU Pre-Health Professions Interview Committee
- MU Undergraduate Course and Curriculum Committee
- MU Fellowships Advisory Board
- North American Colleges and Teachers of Agriculture, member
- National Science Teachers Association, member
- Science Teachers of Missouri, member
- Sigma Xi, The Scientific Research Society, member
- The Phi Beta Kappa Society, Secretary-Treasurer for Alpha of Missouri

RESEARCH PUBLICATIONS/CURRICULUM

- Wisch, J.K., Farrell, E., Siegel, M.A., **Freyermuth, S.K.** (in prep) Identification of Common Student Misconceptions on topics in Biotechnology. *Life Sciences Education*.
- Roberts, T.M., Siegel, M.A. & **Freyermuth, S.K.** (in prep). Collaborative Group Testing: Collaboration and the Perceptions of Students in a Biotechnology Course for Non-Majors. *Research in Science Education*.
- Siegel, M.A., Roberts, T.M., **Freyermuth, S.K.**, Witzig, S.B., & Izci, K. (2015). Aligning assessment to instruction: Collaborative group testing in large enrollment science classes. *Journal of College Science Teaching*, 44 (6), 75-82.
- Witzig, S. B., Rebello, C. M., Siegel, M. A., **Freyermuth, S. K.**, Izci, K., & McClure, B. A. (2014). Building the BIKE: Development and testing of the Biotechnology Instrument for Knowledge Elicitation (BIKE). *Research in Science Education*, 44, 675-698.
- Witzig, S. B., **Freyermuth, S. K.**, Siegel, M. A., Izci, K., & Pires, J. C. (2012). Is DNA alive? A study of conceptual change through targeted instruction. *Research in Science Education*, 43, 1361-1375.
- Rebello C.M., Siegel M.A., Witzig S.B., **Freyermuth S.K.**, & McClure B.A. (2012). Epistemic beliefs and conceptual understanding in biotechnology: A case study. *Research in Science Education* 42 (2), 353-371.
- Rebello, C.M., Siegel, M.A., **Freyermuth S.K.**, Witzig S.B., & Izci, K. (2012). Development of embedded assessments for learning in biotechnology: Results and design process for dissemination. *Biochemistry and Molecular Biology Education*. 40 (2) 82–88.
- Rebello, C.M., Witzig, S.B., Siegel, M.A., & **Freyermuth, S.K.** (2011). Assessment practices for understanding science-related attitudes. In I.M. Saleh & M.S. Khine (Eds.), *Attitude Research in Science Education: Classic and Contemporary Measurements*. Charlotte, NC: Information Age Press, 199-219.
- Witzig, S.B., Halverson, K.L., Siegel, M.A., & **Freyermuth, S.K.** (2011). The interface of opinion, understanding, and evaluation while learning about a socioscientific issue. *International Journal of Science Education*. Online, DOI: 10.1080/09500693.2011.600351.
- Siegel, M.A., Halverson, K.L., **Freyermuth, S.K.**, & Clark, C.G. (2011). Beyond grading: Rubrics for science learning. *The Science Teacher*, 78 (1), 28-33.

- Ditty, Jayna L., Kvaal, Christopher A., Goodner, Brad, **Freyermuth, Sharyn K.**, Bailey, Cheryl, Britton, Robert A., Gordon, Stuart G., Heinhorst, Sabine, Reed, Kelynn, Xu, Zhaohui, Sanders-Lorenz, Erin R., Axen, Seth, Kim, Edwin, Johns, Mitrick, Scott, Kathleen, Kerfeld, Cheryl A. (2010) Incorporating Genomics and Bioinformatics across the Life Sciences Curriculum. *PLoS Biology*, Volume 8 (August 2010). <http://www.plosbiology.org/article/info%3Adoi%2F10.1371%2Fjournal.pbio.1000448>
- Halverson, K.H., **Freyermuth, S.K.**, Siegel, M.A., & Clark, C.G. (2010). What Undergraduates Misunderstand about Stem Cell Research. *International Journal of Science Education*. **32**: 2253-2272.
- Concannon, J., Siegel, M.A., Halverson, K.L., & **Freyermuth, S.K.** (2010). College students' conceptions of stem cells, stem cell research, and cloning. *Journal of Science Education and Technology*, *19* (2), 177-186. <http://www.springerlink.com/content/h4858t3h17243312/fulltext.pdf>
- Halverson, K.L., Siegel, M.A., & **Freyermuth, S.K.** (2010). Non-Science majors' critical evaluation of websites in a biotechnology course. *Journal of Science Education and Technology*, *19* (6), 612-623. <http://www.springerlink.com/content/12r1h88181gj0474/fulltext.pdf>
- Rebello C.M., Siegel M.A., Witzig S.B., **Freyermuth S.K.**, & McClure B.A. (2010). Epistemic beliefs and conceptual understanding in biotechnology: A case study. *Research in Science Education*, *Online First*, 26 November 2010 <http://www.springerlink.com/content/565367u77w7t8224/fulltext.html>
- Halverson, K., Siegel, M.A., & **Freyermuth, S.** (2009). Lenses for framing decisions: Undergraduates' decision making about stem cell research. *International Journal of Science Education*. Vol. 31, No. 9, 1 June 2009, pp. 1249–1268. [Role: helped with data collection and interpretation; edited manuscript] <http://www.informaworld.com/smpp/content~db=all~content=a904477398~frm=titlelink>
- Kathleen M. Scott*, Stefan Sievert, Fereniki N. Abril, Lois A. Ball, Chantell J. Barrett, Rodrigo A. Blake, Amanda J. Boller, Patrick S. Chain, Justine A. Clark, Carisa R. Davis, Chris Detter, Kimberly F. Do, Kimberly P. Dobrinski, Brandon I. Faza, Kelly A. Fitzpatrick, **Sharyn K. Freyermuth**, Tara L. Harmer, Loren J. Hauser, Cheryl A. Kerfeld, William W. Kong, Miriam Land, Alla Lapidus, Frank W. Larimer, Dana L. Longo, Susan Lucas, Stephanie A. Malfatti, Steven E. Massey, Darlene D. Martin, Zoe McCuddin, Folker Meyer, Jessica L. Moore, Luis H. Ocampo, John H. Paul, Ian T. Paulsen, Douglas K. Reep, Rachel L. Ross, Priscila Y. Sato, Phaedra Thomas, Lance E. Tinkham, and Gary T. Zeruth. (2006). *The genome of Deep-sea Vent Chemolithoautotroph Thiomicrospira crunogena XCL-2*. *PLoS Biol* 4(12): e383. doi:10.1371/journal.pbio.0040383 <http://www.plosbiology.org/article/info%3Adoi%2F10.1371%2Fjournal.pbio.0040383>
- **Freyermuth, Shari**, Bruce McClure, Gerald Hazelbauer, Cheryl Kerfeld, and Niki Whitley (2005) *Biotechnology Education Activities CD*.
- **Freyermuth, Sharyn K.**, Methode Bacanamwo, and Joe C. Polacco (2000) The soybean *Eu3* gene encodes an Ni-binding protein necessary for urease activity. *The Plant J*. **21**:53-60.
- Gerendás J., J.C Polacco, **S.K. Freyermuth**, and B. Sattelmacher (1999) Significance of nickel for plant growth and metabolism. *J. Plant Nutr. Soil Sci*. **162**:241-256.
- Polacco, J.C., **S.K. Freyermuth**, J. Gerendás, and S.R. Cianzio (1999) Soybean genes involved in nickel insertion into urease. *J Exp Botany* **50**:1149-1156.
- **Freyermuth, S.K.**, B.G. Forde, and J.C. Polacco (1999) Nucleotide Sequence of a cDNA Encoding an *Arabidopsis* Urease Accessory Protein (Accession No. AF109374). (PGR99-012). *Plant Physiol* **119**:364.

Freyermuth, S.

- Gerendás, J., J.C. Polacco, **S. K. Freyermuth**, and B. Sattelmacher (1998) Co does not replace Ni with respect to urease activity in zucchini (*Cucurbita pepo* convar. *giromontina*) and soybean (*Glycine max*). Plant and Soil **203**:127-135.
- Krumpelman, P.M., **S.K. Freyermuth**, J.F. Cannon, G.R. Fink, and J.C. Polacco (1995) Nucleotide sequence of *Arabidopsis thaliana* arginase expressed in yeast. Plant Physiol **107**:1479-1480.
- **Levengood-Freyermuth, Sharyn K.**, Eva-Marie Click, and Robert E. Webster (1993) Role of the carboxyl-terminal domain of TolA in protein import and integrity of the outer membrane. J Bacteriol **175**:222-228.
- **Levengood, Sharyn K.**, Wayne F. Beyer, Jr., and Robert E. Webster (1991) TolA: a membrane protein involved in colicin uptake contains an extended helical region. Proc Natl Acad Sci USA **88**:5939-5943.
- **Levengood, Sharyn K.** and Robert E. Webster (1989) Nucleotide sequences of the *tolA* and *tolB* genes and localization of their products, components of a multistep translocation system in *Escherichia coli*. J Bacteriol **171**:6600-6609.

Book chapters:

Freyermuth, S.K., R.L.G. Long, S. Mathur, M.A. Holland, T.P. Holtsford, N.E. Stebbins, R.O. Morris, and J.C. Polacco (1996) Metabolic aspects of plant interaction with commensal methylotrophs. In M. E. Lidstrom and R.F. Tabita (eds.), Microbial Growth on C₁ Compounds. Kluwer Academic Publishers.

Webster, R.E. and **S.K. Levengood** (1991) TolA: structure, location, and role in the uptake of colicins. In R. James, C. Lazdunski, and F. Pattus (eds.), Bacteriocins, Microsins, and Lantibiotics. NATO ASI Series, Springer-Verlag.
