

## Refereed Publications:

1. P. Hu, R. J. Whitener, E. Boder, J. Chen, and L. Zhao. Effects of Parabens on Adipocyte Differentiation. *Toxicol. Sci.* (in press).
2. E.T. Boder. Protein engineering: Tighter ties that bind. *Nature* **484**:463–464 (2012) -- invited News and Views article. doi:10.1038/484463a
3. E.T. Boder, M. Raeeszadeh-Sarmazdeh, and J.V. Price. Engineering Antibodies by Yeast Display. *Arch. Bioch. Biophys.* **526**:99-106 (2012), <http://dx.doi.org/10.1016/j.abb.2012.03.009> -- invited review.
4. J. Haun, L. Pepper, E. Boder, and D. Hammer. Using Engineered Single-Chain Antibodies to Correlate Molecular Binding Properties and Nanoparticle Adhesion Dynamics. *Langmuir* **27**(22):13701-13712 (2011).
5. E.T. Boder and W. Jiang. Engineering antibodies for cancer therapy. *Ann. Rev. Chem. Biomol. Eng.* **2**:53-75 (2011) -- invited review.
6. D.A. Levary, R. Parthasarathy, E.T. Boder, and M.E. Ackerman. Protein-Protein Fusion Catalyzed by Sortase A. *PLoS ONE* **6**(4): e18342 (2011).
7. M. Shpilman, L. Niv-Spector, M. Katz, C. Varol, G. Solomon, M. Ayalon-Soffer, E. Boder, Z. Halpern, E. Elinav, and A. Gertler. Development and characterization of high-affinity leptins and leptin antagonists, *J. Biol. Chem.* **286**:4429-4442 (2011).
8. T.J. Schuit, S. Narasimhan, S. Daffre, K. DePonte, J.W.R. Hovius, C. vant Veer, T. van der Poll, K. Bakhtiari, J.C. Meijers, E.T. Boder, A.P. van Dam, and E. Fikrig. Identification of Ixodes scapularis antigens that elicit tick immunity using yeast surface display *PLoS ONE* **6**(1): e15926 (2011).
9. W. Jiang and E.T. Boder. High-throughput engineering and analysis of peptide binding to class II MHC. *Proc. Natl. Acad. Sci. USA*, **107**:13258-13263 (2010).
10. S. Park, S. Zilvia, E.T. Boder, G. Van Duyne, and J.G. Saven. Structural coupling between FKBP12 and buried water. *Proteins*, **74**:603-611 (2009).
11. L.R. Pepper, Y.K. Cho, E.T. Boder, and E.V. Shusta. A decade of yeast surface display technology: Where are we now? *Comb. Chem. High Throughput Screen.* **11**:127-34 (2008) -- invited review.
12. R. Parthasarathy, S. Subramanian, and E.T. Boder. Sortase A as a novel molecular “stapler” for sequence-specific protein conjugation. *Bioconj. Chem.*, **18**:469-476 (2007). Cover article.
13. S. Subramanian, E.T. Boder, and D.E. Discher. Phylogenetic Divergence in Human SIRP $\alpha$ -CD47 Interactions Reveals Locus of Species-specificity: Implications for the Binding Site. *J. Biol. Chem.*, **282**:1805-1818 (2007).
14. J.H. Lee, M. Goulian, and E.T. Boder. Autocatalytic Activation of Influenza Hemagglutinin. *J. Mol. Biol.*, **364**:275-282 (2006).
15. L.R. Pepper, D.A. Hammer, and E.T. Boder. Rolling Adhesion of  $\alpha_L$  I Domain Mutants Decorrelated from Binding Affinity. *J. Mol. Biol.*, **360**:37-44 (2006).
16. S. Park, Y. Xu, X.F. Stowell, F. Gai, J.G. Saven, and E.T. Boder. Limitations of yeast surface display in engineering proteins of high thermostability. *Prot. Eng. Des. Sel.*, **19**:211-217 (2006).
17. S. Subramanian, R. Parthasarathy, E.T. Boder, and D.E. Discher. Species-specific adhesive interactions between CD47 and human SIRP $\alpha$ . *Blood*, **107**:2548-2556 (2006).
18. P. Derr, E. Boder, and M. Goulian. Changing the specificity of a bacterial chemoreceptor. *J. Mol. Biol.*, **355**:923-932 (2006).
19. R. Parthasarathy, S. Subramanian, E.T. Boder, and D.E. Discher. Post-translational regulation of expression and conformation of an immunoglobulin domain in yeast surface display. *Biotechnol. Bioeng.*, **93**:159-168 (2005).

20. R. Parthasarathy, J. Bajaj, and E.T. Boder. Immobilized biotin ligase via surface display of *E. coli* BirA on *Saccharomyces cerevisiae*. *Biotechnol. Prog.*, **21**:1627-1631 (2005).
21. E.T. Boder, J.R. Bill, A.W. Nields, P.C. Marrack, and J.W. Kappler. Yeast surface display of a noncovalent MHC class II heterodimer complexed with antigenic peptide. *Biotechnol. Bioeng.*, **92**:485-491 (2005).
22. S. Park, E.T. Boder, and J.G. Saven. Modulating the DNA affinity of Elk-1 with computationally selected mutations. *J. Mol. Biol.*, **348**:75-83 (2005).
23. S.J. Park, H. Kono, W. Wang, E.T. Boder, and J.G. Saven. Progress in the development and application of computational methods for probabilistic protein design. *Computers Chem. Eng.*, **29**:407-21 (2005).
24. E.T. Boder and K.D. Wittrup. Yeast Surface Display for Directed Evolution of Protein Expression, Affinity, and Stability. *Methods Enzymol.*, **328**:430-44 (2000).
25. E.T. Boder, K.S. Midelfort, and K.D. Wittrup. Directed Evolution of Antibody Fragments with Monovalent Femtomolar Antigen-binding Affinity. *Proc. Natl. Acad. Sci. USA*, **97**:10701-5 (2000).
26. M.C. Kieke, E.V. Shusta, E.T. Boder, L. Teyton, K.D. Wittrup, and D.M. Kranz. Selection of functional T cell receptor mutants from a yeast surface-display library. *Proc. Natl. Acad. Sci. USA*, **96**:5651-5656 (1999).
27. B.K. Cho, M.C. Kieke, E.T. Boder, K.D. Wittrup, and D.M. Kranz. A Yeast Surface Display System for the Discovery of Ligands that Trigger Cell Activation. *J. Immunol. Methods*, **220**:179-88 (1998).
28. E.T. Boder and K.D. Wittrup. Optimal Screening of Surface Displayed Polypeptide Libraries. *Biotechnol. Prog.*, **14**:55-62 (1998).
29. M.C. Kieke, B.K. Cho, E.T. Boder, D.M. Kranz, and K.D. Wittrup. Isolation of Anti-T Cell Receptor scFv Mutants by Yeast Surface Display. *Protein Eng.*, **10**:1303-1310 (1997).
30. E.T. Boder and K.D. Wittrup. Yeast Surface Display for Screening Combinatorial Polypeptide Libraries. *Nature Biotechnol.*, **15**:553-557 (1997).
31. E. Boder, G. Taylor, L. Akard, J. Jansen, and D. English. Identification of Type-2 Phosphatidic Acid Phosphohydrolase (PAPH-2) in Neutrophil Plasma Membranes. *Cellular Signalling*, **6**:933-941 (1994).

#### **Articles Submitted or in Preparation:**

1. L.R. Pepper, R. Parthasarathy, N. Dang, D.A. Hammer, and E.T. Boder. Structure-function analysis of I-domain-mediated adhesion by directed evolution (in prep).
2. L.R. Pepper, R. Parthasarathy, D.A. Hammer, and E.T. Boder. Engineering an allosteric adhesive switch from integrin I-domain (in prep).
3. R. Parthasarathy, S.T. Retterer, M.J. Doktycz, and E.T. Boder. Sortase A-mediated microcontact patterning of protein on surfaces (in prep).
4. A.W. Nields, R. Whitener, S. Fawaz, J. Reynolds, J. Buchkovich, and E.T. Boder. Incomplete quality control of yeast-secreted fusion proteins (in prep).

#### **Contributed Presentations:**

1. M. Raeeszadeh-Sarmazdeh, R. Parthasarathy, and E.T. Boder. Protein immobilization on the surface using Sortase-mediated ligation. 6<sup>th</sup> International Conference on Bioengineering and Nanotechnology, Berkeley, CA, June, 2012 (poster).
2. L.R. Pepper, R. Parthasarathy, G.P. Robbins, N. Dang, D.A. Hammer, and E.T. Boder. Engineering Integrin I-domain Interactions. Biochemical and Molecular Engineering XVII, Seattle, WA, June, 2011 (poster).

3. J. Boock, E.T. Boder, M.P. DeLisa. Specific and Covalent Cross-Linking of Proteins In Vivo Using the SortaseA Enzyme. 3<sup>rd</sup> International Conference on Biomolecular Engineering, San Francisco, CA, January, 2011 (poster).
4. I.J. Iwuchukwu, E.T. Boder, B.D. Bruce, P. Frymier. Protein Engineering for Enhanced Photo-Production of Hydrogen. AIChE Annual Meeting, Salt Lake City, UT, November, 2010.
5. J. Reynolds, J. Buchkovich, A.N. Nields, E.T. Boder. Evidence of Reversible ERAD During Quality Control of Yeast-Secreted Fusion Proteins. AIChE Annual Meeting, Salt Lake City, UT, November, 2010 (poster).
6. W. Jiang and E.T. Boder. Engineering peptide recognition by class II MHC. 239<sup>th</sup> ACS National Meeting, San Francisco, CA, March 22, 2010.
7. J.T. Boock, E.T. Boder, and M.P. DeLisa. Specific and covalent cross-linking of proteins in vivo using the Sortase A enzyme. 239<sup>th</sup> ACS National Meeting, San Francisco, CA, March 22, 2010.
8. M.E. Ackerman, D. Levary, R. Parthasarathy, E.T. Boder, and K.D. Wittrup. Sortassembly: In Vitro Assembly of Complex Bifunctional Proteins. 2nd International Conference on Biomolecular Engineering, Santa Barbara, CA, January 19, 2009 (poster).
9. L.R. Pepper, D.A. Hammer, and E.T. Boder. Engineering Integrin I-domain: Development of an Allosteric Adhesive Switch and Structure-Function Analysis. 2nd International Conference on Biomolecular Engineering, Santa Barbara, CA, January 19, 2009 (poster).
10. W. Jiang and E.T. Boder. Characterization and Engineering of MHC-Peptide Binding by Yeast Display. 2nd International Conference on Biomolecular Engineering, Santa Barbara, CA, January 19, 2009 (poster).
11. W. Jiang and E.T. Boder. Characterization and Engineering of Peptide Binding to Class II MHC by Yeast Co-Expression. AIChE Annual Meeting, Philadelphia, PA, November 21, 2008.
12. R. Parthasarathy, S. Retterer, M.J. Doktycz, and E.T. Boder. Protein Patterning Through Microcontact Printing with Sortase. AIChE Annual Meeting, Philadelphia, PA, November 20, 2008.
13. A.W. Nields and E.T. Boder. Incomplete Quality Control of Yeast-Secreted Multidomain Proteins. AIChE Annual Meeting, Philadelphia, PA, November 19, 2008.
14. L.R. Pepper, D.A. Hammer, and E.T. Boder. Engineering Adhesive Ligands Based on Integrin I-domain. AIChE Annual Meeting, Philadelphia, PA, November 18, 2008.
15. L.R. Pepper, D.A. Hammer, and E.T. Boder. Engineering  $\alpha$ L I Domain to Modulate Adhesive Behavior using Yeast Display. BMES Annual Meeting, Los Angeles, CA, September, 2007.
16. J.H. Lee, M. Goulian, and E.T. Boder. Autocatalytic Activation of a Viral Fusion Protein. International Conference on Biomolecular Engineering, San Diego, CA, January 15, 2007 (poster). J.H. Lee, M. Goulian, and E.T. Boder. Autocatalytic Activation of a Viral Fusion Protein. AIChE Annual Meeting, San Francisco, CA, November 17, 2006
17. S. Park, E.T. Boder, and J.G. Saven. Modulating the DNA Affinity of Elk-1 with Computationally Selected Mutations. AIChE Annual Meeting, San Francisco, CA, November 16, 2006.
18. S. Park, S. Szep, E.T. Boder, G. Van Duyne, and J.G. Saven. An Interior Water is Essential for Maintaining the Structure of Fkbp12. AIChE Annual Meeting, San Francisco, CA, November 16, 2006
19. L.R. Pepper, D.A. Hammer, and E.T. Boder. Rolling Adhesion Mediated by  $\alpha$ L I Domain Mutants. AIChE Annual Meeting, San Francisco, CA, November 15, 2006 (poster).
20. L.R. Pepper and E.T. Boder. Identification of T Cell Antigens Using Surface Display. AIChE Annual Meeting, San Francisco, CA, November 15, 2006 (poster).
21. L.R. Pepper, D.A. Hammer, and E.T. Boder. Rolling Adhesion of Yeast Displaying LFA-1 I Domain. Annual Meeting of the Protein Society, San Diego, CA, August 8, 2006 (poster).

22. S. Park, S. Szep, E.T. Boder, G.D. Van Duyne, and J.G. Saven. Atomic Resolution Structures of FKBP12 Wild Type and Mutants Show the Existence of a Coupled Network of Amino Acids and a Structural Water in the Protein Core. Annual Meeting of the Protein Society, San Diego, CA, August 7, 2006 (poster).
23. J.H. Lee, M.D. Goulian, and E.T. Boder. Autocatalytic Refolding of Fowl Plague Virus Hemagglutinin. Annual Meeting of the Protein Society, San Diego, CA, August 7, 2006 (poster).
24. S. Subramanian, E.T. Boder, and D.E. Discher. Pleiotropic responses mediated by CD47-SIRP $\alpha$  binding: Adhesion as a common link. AIChE Annual Meeting, Cincinnati, OH, November 2, 2005.
25. S. Subramanian, E.T. Boder, and D.E. Discher. Regulation of CD47-SIRP $\alpha$  interactions by post-translational modifications. AIChE Annual Meeting, Cincinnati, OH, November 2, 2005.
26. J.H. Lee, M.D. Goulian, and E.T. Boder. Global intertrimer communication of influenza hemagglutinin conformational change. AIChE Annual Meeting, Cincinnati, OH, October 31, 2005.
27. J. Haun, E.T. Boder, and D.A. Hammer. Evolution of artificial nano-sized delivery carriers for targeting cardiovascular disease. BMES 2005 Annual Meeting, Baltimore, MD, September, 2005.
28. S. Subramanian, E.T. Boder, and D.E. Discher. CD47-SIRP $\alpha$  mediated cell adhesion and signaling: A fluorescent protein study. BMES 2005 Annual Meeting, Baltimore, MD, September, 2005.
29. L.R. Pepper, D.A. Hammer, and E.T. Boder. Rolling Adhesion of Yeast Displaying LFA-1 I Domain. BMES 2005 Annual Meeting, Baltimore, MD, September, 2005.
30. L.R. Pepper and E.T. Boder. Identification of T cell antigens using surface display. Annual Meeting of the Protein Society, Boston, MA, July, 2005 (poster).
31. Protein engineering of biosensors and membrane fusogens. Biochemical Engineering XIV conference, Harrison Hot Springs, BC, Canada, July 13, 2005.
32. R. Parthasarathy, S. Subramanian, E.T. Boder, and D.E. Discher. Glycosylation & core disulfide effects in yeast display of an Ig domain. ACS National Meeting, San Diego, CA, March, 2005.
33. P. Derr, J. Lee, M. Goulian, and E.T. Boder. Membrane protein engineering for biosensor development. AIChE National Meeting, Austin, TX, November 2004.
34. S. Subramanian, R. Parthasarathy, E.T. Boder, and D. Discher. Species-restricted adhesion of red cells to human SIRP- $\alpha$ . AIChE Annual Meeting, Austin, TX, November 2004.
35. R. Parthasarathy, J. Bajaj, and E.T. Boder. Characterization of yeast surface displayed biotin ligase. AIChE Annual Meeting, Austin, TX, November 2004.
36. S. Subramanian, R. Parthasarathy, E.T. Boder, and D. Discher. Species-restricted adhesive interactions between CD47 and Human SIRP- $\alpha$ . BMES 2004 Annual Fall Meeting, Philadelphia, PA, October, 2004 (poster).
37. J.H. Lee and E.T. Boder. Engineering of Novel Chimeric Membrane Receptors. BMES 2004 Annual Fall Meeting, Philadelphia, PA, October, 2004 (poster).
38. R. Parthasarathy, J. Bajaj, and E.T. Boder. Toward engineering a versatile and specific biotinyllating enzyme using yeast surface display. BMES 2004 Annual Fall Meeting, Philadelphia, PA, October, 2004 (poster).
39. S. Park, E.T. Boder, and J.G. Saven. Computationally selected entropy-reducing mutations in Elk-1 enhance its DNA binding. BMES 2004 Annual Fall Meeting, Philadelphia, PA, October, 2004.
40. A.W. Nields, S. Park, and E.T. Boder. Heterogeneous Truncation of Yeast-Secreted Heterologous Proteins. BMES 2004 Annual Fall Meeting, Philadelphia, PA, October, 2004

(poster).

41. P. Derr, J. Lee, M. Goulian, and E.T. Boder. Membrane protein engineering for biosensor development. BMES 2004 Annual Fall Meeting, Philadelphia, PA, October, 2004.
42. A.W. Nields, S. Park, and E.T. Boder. Heterogeneous truncation of yeast-secreted heterologous proteins. Annual Meeting of the Protein Society, San Diego, CA, August, 2004 (poster).
43. J. Lee and E.T. Boder. Rapid detection of pH-induced molecular rearrangement of a viral fusion protein. Annual Meeting of the Protein Society, San Diego, CA, August, 2004 (poster).
44. S. Subramanian, R. Parthasarathy, E.T. Boder, and D. Discher. Cross-Species Reactivity of Human SIRPa1 to CD47 on RBCs: Implications for Protein Engineering. American Society for Cell Biology Annual Meeting, San Francisco, CA, December, 2003 (poster).
45. E.T. Boder, M. Goulian, J. Saven, and W. DeGrado. Combinatorial engineering of nanomachines: Building novel membrane proteins via de novo design and directed evolution. NSF Nanoscale Science and Engineering Grantees Conference, Arlington, VA, December, 2003.
46. J. Lee and E.T. Boder. Chimeric fusion protein platform for expression and engineering of oligomerization-dependent receptors. AIChE Annual National Meeting, San Francisco, CA, November, 2003.
47. P.J. Photos, K.N. Dahl, R. Parthasarathy, S. Subramanian, E.T. Boder, and D.E. Discher. Molecular basis of biocompatibility: Cellular engineering analysis. AIChE Annual National Meeting, San Francisco, CA, November, 2003.
48. S.J. Park, X. Fu, Y. Xu, M. Jonikas, A.W. Nields, J.G. Saven, F. Gai, and E.T. Boder. Analysis of synthetic protein folding and assembly via yeast expression of of designed combinatorial libraries. AIChE Annual National Meeting, San Francisco, CA, November, 2003.
49. S.J. Park, X. Fu, Y. Xu, M. Jonikas, A.W. Nields, J.G. Saven, F. Gai, and E.T. Boder. Synthetic protein folding and self-assembly: Computational library design and yeast expression screening. ACS National Meeting, New York, NY, September, 2003 (poster).
50. A.W. Nields and E.T. Boder. Protein Engineering of Human Class II MHC for Enhanced Microbial Expression and Surface Display on Yeast. Annual Meeting of The Protein Society, Boston, MA, July, 2003 (poster).
51. A.W. Nields and E.T. Boder. Yeast Expression of a Recombinant Peptide-Major Histocompatibility Complex Single-chain Fragment. AIChE Annual National Meeting, Indianapolis, IN, November, 2002.
52. P.J. Photos, R. Parthasarathy, E.T. Boder, and D.E. Discher. Proactive biomimetics and the 'marker of self': Putting more stealth into stealth vesicles. AIChE Annual National Meeting, Indianapolis, IN, November, 2002.
53. K.N. Dahl, P.J. Photos, R. Parthasarathy, C.M. Westhoff, E.T. Boder, and D.E. Discher. "Marker of self" CD47: From erythrocyte to drug delivery. BMES annual meeting, Houston, TX, October, 2002.
54. Protein Engineering of Human Class II MHC and Surface Display on Yeast. Annual Meeting of The Protein Society, San Diego, CA, August, 2002 (poster).
55. Peptide Antigen Presentation by Yeast. AIChE Annual National Meeting, Reno, NV, November, 2001.
56. M.C. Kieke, E.T. Boder, E.V. Shusta, L. Teyton, K.D. Wittrup, and D.M. Kranz: Engineering a T Cell Receptor Using Yeast Cell Surface Display. Cell and Molecular Biology/Molecular Biophysics Training Grant Symposium, Urbana, IL, October, 1998 (poster).
57. K.S. Midelfort, E.T. Boder, M.C. Kieke, E.V. Shusta, J. Van Antwerp, D.M. Kranz, and K.D. Wittrup: Directed Evolution of Protein Binding, Stability, and Expression Properties by Yeast Surface Display. Molecular Interaction Technologies, San Francisco, CA, October, 1998

(poster).

58. J.J. Van Antwerp, E.T. Boder, and K.D. Wittrup: Antibody Engineering by Yeast Surface Display. 216th ACS National Meeting, Boston, MA, August, 1998 (poster).
59. Evolutionary Engineering of a Single-chain Fv Antibody Fragment by Yeast Surface Display. AIChE National Meeting, Los Angeles, CA, November, 1997.
60. E.T. Boder and K.D. Wittrup: Affinity Maturation of an Anti-Hapten scFv by Yeast Surface Display. 11th Annual Gibbs Conference on Biothermodynamics, Carbondale, IL, October, 1997 (poster).
61. E.T. Boder and K.D. Wittrup: Surface Display of a Functional scFv in *Saccharomyces cerevisiae*. Seventh Annual International Conference on Antibody Engineering, Coronado, CA, December, 1996 (poster).
62. Yeast Cell Surface Display of Antibodies for Protein Engineering. AIChE National Meeting, Chicago, IL, November, 1996.
63. E.T. Boder and K.D. Wittrup: Yeast Surface Display of Antibodies for Protein Engineering. Pfizer Inc.-Beckman Institute Symposium, Urbana, IL, June, 1996 (poster).
64. E.T. Boder and K.D. Wittrup: Yeast Surface Display System for Antibody Engineering. Keystone Symposium on Molecular and Cellular Biology, Taos, NM, February, 1996 (poster).
65. Yeast Display System for *In Vitro* Affinity Maturation of Antibodies. AIChE National Meeting, Miami Beach, FL, November, 1995.
66. E.T. Boder and K.D. Wittrup: A Yeast Surface Display System for *in Vitro* Affinity Maturation of Antibodies. Pfizer Inc.-Beckman Institute Symposium, Urbana, IL, June, 1995 (poster).

#### **Invited Presentations:**

1. Analyzing and Engineering Proteins by Yeast Display. f-star Biotech, Internal Technology Meeting, Cambridge, UK, May 12, 2012.
2. Analyzing and Engineering MHC Class II Peptide Binding by Yeast Display. 8<sup>th</sup> Annual Protein Engineering Summit, Cambridge Healthtech Institute, Boston, MA, May 1, 2012.
3. Understanding and Controlling Proteins by Directed Evolution. Cain Department of Chemical Engineering, Louisiana State University, Baton Rouge, LA, October 28, 2011.
4. Protein Engineering of Membrane Fusion and Cell Adhesion Proteins. Comparative and Experimental Medicine Program, College of Veterinary Medicine, University of Tennessee, Knoxville, TN, October 5, 2008.
5. Engineering Proteins as Molecular Sensing, Switching, and Actuating Devices. Department of Chemical and Biomolecular Engineering, Vanderbilt University, Nashville, TN, September 27, 2008.
6. QC Issues in Recombinant Protein Expression in Yeast. BioProcess R&D Academic Speaker Program, Merck Research Labs, Rahway, NJ, October 30, 2007.
7. Protein Engineering Applications in Viral Fusion, Cell Adhesion, and Sequence-specific Immobilization. Department of Biochemistry, Cellular, and Molecular Biology, University of Tennessee, Knoxville, TN, September 19, 2007.
8. Protein Engineering Applications in Viral Fusion, Cell Adhesion, and Site-specific Immobilization. Oak Ridge National Lab, Oak Ridge, TN, February 22, 2007.
9. Protein Engineering Applications in Viral Fusion, Cell Adhesion, and Site-specific Immobilization. Protein Dynamics Club, Stokes Research Institute, Children's Hospital of Philadelphia and University of Pennsylvania, Philadelphia, PA, February 7, 2007.
10. Protein Engineering Applications in Viral Fusion, Cell Adhesion, and Site-specific Immobilization.

Microbiology Program, Yale Univ. School of Medicine, New Haven, CT, January 25, 2007.

11. Protein Engineering Applications in Viral Fusion, Cell Adhesion, and Site-specific Immobilization. Department of Chemical Engineering, University of Tennessee, Knoxville, TN, October 24, 2006.
12. Engineering and analysis of protein switches: Influenza hemagglutinin and integrin I domain. Department of Chemical Engineering, Columbia University, New York, NY, January 31, 2006.
13. Engineering and analysis of protein switches: Influenza hemagglutinin and integrin I domain. Department of Chemical and Biomolecular Engineering, University of Illinois, Urbana, IL, November 29, 2005.
14. Engineering and analysis of protein switches: Influenza hemagglutinin and integrin I domain. Biotechnology Institute and Department of Chemical Engineering and Materials Science (co-sponsored), University of Minnesota, Minneapolis, MN, November 10, 2005.
15. Engineering and analysis of protein switches: Influenza hemagglutinin and integrin I domain. Department of Chemical and Biological Engineering, University of Wisconsin, Madison, WI, October 25, 2005.
16. Engineering and analysis of influenza virus fusion machinery. Department of Chemical and Biomolecular Engineering, Cornell University, Ithaca, NY, September 26, 2005.
17. Engineering protein-based biosensors by directed evolution. Bioprocess R&D Lecture Series, Merck Research Labs, West Point, PA, June 29, 2005.
18. Protein directed evolution for biosensors and membrane fusogens. Department of Biology, Ursinus College, Colleville, PA, April 6, 2005.
19. Membrane Protein Engineering by Directed Evolution. Engineering in Biology Seminar Series, Department of Chemical Engineering, Princeton University, Princeton, NJ, December 9, 2004.
20. Protein Engineering and Analysis by Yeast Surface Display. Department of Chemical Engineering, University of Massachusetts, Amherst, MA, December 5, 2003.
21. Engineering and Analysis of Immunological Proteins by Yeast Surface Display. 1st Annual Bioprocess Engineering Symposium, Merck Vaccine Bioprocess Engineering Group, West Point, PA, March 2003.
22. Analysis and Engineering of Immunological Proteins by Yeast Surface Display. Biophysics Group, NEC Research Institute, Princeton, NJ, December 2002.
23. Specific Peptide Antigen Presentation by Yeast. Department of Bioengineering and Institute for Medicine and Engineering, University of Pennsylvania, October 2000.
24. Engineering Macromolecular Recognition by Yeast Display. Current Topics in Gene Expression Systems conference, San Diego, CA, March 1999.
25. Engineering Macromolecular Recognition by Yeast Display. Department of Chemical Engineering, Stanford University, March 1998.