Curriculum vitae **March 2017**

JONATHAN S. DORDICK, PH.D.
Vice President for Research
Howard P. Isermann Professor of Chemical and Biological Engineering, Biomedical Engineering, Materials Science and Engineering, and Biology
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Education

Ph.D. Massachusetts Institute of Technology
1986 Biochemical Engineering

M.S. Massachusetts Institute of Technology
1983 Biochemical Engineering

B.A. Brandeis University
1980 Biochemistry and Chemistry

Professional Experience

Vice President for Research, Rensselaer Polytechnic Institute, Troy, NY, 2012-present.

Howard P. Isermann Professor, Department of Chemical and Biological Engineering, Rensselaer Polytechnic Institute, Troy, NY, 1998-present.

Guest Faculty Investigator, Rockefeller University, New York, NY, 2016-present.

Adjunct Professor, Icahn School of Medicine at Mount Sinai, New York, NY, 2014-present

Director, Center for Biotechnology & Interdisciplinary Studies, Rensselaer Polytechnic Institute, Troy, NY, 2008-2012.

Joint Appointments in Departments of Biomedical Engineering, Materials Science and Engineering, and Biological Sciences

Visiting Research Scientist, Wadsworth Center, New York State Department of Health, 2007-2013.

Chairman, Department of Chemical and Biological Engineering, Rensselaer Polytechnic Institute, Troy, NY, 1998-2002.

Professor and Chairman, Department of Chemical and Biochemical Engineering, University of Iowa, Iowa City, IA, 1995-1998. Joint appointment in the Department of Medicinal and Natural Products Chemistry, College of Pharmacy, University of Iowa, Iowa City, IA, 1996-1998.

Professor, Department of Chemical and Biochemical Engineering, University of Iowa, Iowa City, IA, 1994-1995.

Associate Director, Center for Biocatalysis and Bioprocessing, University of Iowa, Iowa City, IA, 1990-1998.

Associate Professor, Department of Chemical and Biochemical Engineering, University of Iowa, Iowa City, IA, 1991-1994.

Assistant Professor, Department of Chemical and Biochemical Engineering, University of Iowa, Iowa City, IA, 1987-1991.

Postdoctoral Research Fellow, Tate & Lyle Group Research and Development, Reading, U.K., 1986-1987

Honors, Awards, and Lectureships

2016 Robert Pigford Memorial Lecture, University of Delaware
2015 Food, Pharmaceutical and Bioengineering Award, American Institute of Chemical Engineers
2015 Elected to the National Academy of Inventors
2011 Inaugural Mylan Lecture, University of West Virginia
2011 Merck Lecture, University of Virginia
2010 Elected Fellow, American Chemical Society
2009 Outstanding Scientific Achievement Award, Defense Threat Reduction Agency
2007 Marvin J. Johnson Award, American Chemical Society Division of Biochemical Technology
2007 Elmer Gaden Award, John Wiley & Sons and American Chemical Society Division of Biochemical Technology
2007 Trustees Lecture, Rensselaer Polytechnic Institute
2007 School of Engineering Research Award, Rensselaer Polytechnic Institute
2004 Elected Fellow, American Association for the Advancement of Science
2003 International Enzyme Engineering Award
2003 School of Engineering Research Award, Rensselaer Polytechnic Institute
2000 Alan Berman Research Publications Award, U.S. Department of Defense
1998 Howard P. Isermann Professorship, Department of Chemical Engineering, Rensselaer Polytechnic Institute
1998 American Chemical Society Iowa Section Award
1998 Who's Who in America
1997 Trapp Lecture in Biotechnology, Departments of Chemistry and Food Science and Engineering, Iowa State University
1996 Elected Fellow, American Institute of Medical and Biological Engineers
1996 Who's who in Science and Engineering
1993 Leo Rettger Society Lecturer, American Society of Microbiology, Connecticut Chapter
1992 Chairman, Division of Biochemical Technology, American Chemical Society
1991 Observer for National Academy of Sciences for IUPAC Meeting in Hamburg
1991 U.S. Delegate for U.S. - Korea Joint Seminar on Bioprocess Technology, Seoul
1989 Presidential Young Investigator Award, National Science Foundation
1989 Faculty Scholars Award, University of Iowa
1989 NASA Technical Innovation Brief
1988 Old Gold Summer Faculty Fellowship, University of Iowa

1983 Interox Predoctoral Fellowship, MIT

Plenary and Keynote Addresses

2016 Plenary Address for Korean Society of Biotechnology and Bioengineering, Gyeong-Ju, Korea
2014 Plenary Address for DECHEMA Annual Meeting, Aachen, Germany
2012 Keynote Opening Lecture, Biocat2012, Hamburg, Germany
2011 Plenary Address for the BioTrans Meeting, Giardina Naxos, Sicily, Italy
2010 Plenary Address for the AIChE National Meeting, Division 22, Salt Lake City, UT
2007 Keynote Address for the 12th Mexican Biotechnology and Bioengineering Conference, Morelia, Mexico
2006 Plenary Address for the Eastern Mediterranean Chemical Engineering Conference, Dead Sea, Israel
2005 Plenary Address for Enzyme Engineering XVIII, Geong-Ju, Korea
2005 Plenary Address for Biochemical Engineering XIV, Harrison Hot Springs, BC
2004 Plenary Address for the American Institute of Chemical Engineers, Austin, TX
2001 Plenary Address for the 6th Biochemical Engineering Conference, Taipei, Taiwan
1998 Plenary Address for Division 15 for the American Institute of Chemical Engineers, Miami, FL
1996 Plenary Address for the Division of Polymer and Materials Science and Engineering, ACS, New Orleans, LA
1995 Keynote Address for the Colorcon Symposium on Controlled Release, Princeton, NJ
1995 Keynote Address for the Carbohydrate Bioengineering Meeting, Helsingor, Denmark
1994 Plenary Address for the 4th International Workshop on Oligo- and Polysaccharides, Aussois, France
1994 Plenary Address for the Biodegradable Polymers Symposium, Boston, MA.
1993 Plenary Address for the International Congress on Chemicals from Biotechnology, Hannover, Germany.
1993 Plenary Address for the European Symposium on Biocatalysis, Graz, Austria.

Editorial Activities

Associate Editor, *Biotechnology and Bioengineering* (1995-present)
Associate Editor for *Biocatalysis* (1992-1995)
Editor, Patents and Literature, *Applied Biochemistry and Biotechnology* (1989-1993).
Serving on the Following Editorial Boards: *Enzyme and Microbial Technology, Applied Biochemistry and Biotechnology, Biocatalysis and Biotransformations, Metabolic Engineering*

Professional Activities

Member of the White House-Led Technology Working Group for the Advanced Manufacturing (AMP2.0) Partnership (2013-2014)
Member of NIGMS BRT-B Study Section (NIH), 2011-2012
Participant, NIGMS Training Taskforce (NIH), 2011
Member, President's Council of Advisors for Science and Technology (PCAST) Working Group on Advanced Manufacturing, 2010

NIH College of Reviewers, 2010-2012

Member of U.S. Council on Competitiveness Working Committee for Innovation Frontiers, 2004

NIH Bioanalytical and Engineering Study Section, 2003

Program Chairman, Biotechnology Secretariat, American Chemical Society, Boston, August, 1998

Chairman, Enzyme Engineering XIII, Engineering Foundation Conference, San Diego, CA, October, 1995

Chairman, Division of Biochemical Technology, American Chemical Society, 1992.

Executive Committee, Division of Biochemical Technology, American Chemical Society, 1989-1993.

Program Chairman, American Chemical Society, Division of Microbial and Biochemical Technology, National Meeting, Dallas, TX, April, 1989.

Program Chairman, American Chemical Society, Division of Biochemical Technology, National Meeting, Washington, D.C., August, 1990.

Executive Committee, Midwest Biotechnology Symposia (1989-1992).

Executive Committee, Byproducts from Biotechnology Consortium, Iowa City (1989-98).

NIH Biotechnology Training Grant Study Section, 1996.

Membership in: American Chemical Society, American Institute of Chemical Engineers, American Institute of Medical and Biological Engineers, American Association for the Advancement of Science.

Consulting Activities and Scientific Advisory Boards

Consulted for the following companies: Mead Corp., Merck, Kraft General Foods, Enzon, Enzyme Organics, DuPont, Olin Corp., Tate & Lyle Group R & D, Celgene, National Oats, Amoco, Degussa, Procter and Gamble, Genencor International, Syntex, Yukong, Mallinckrodt, Clorox, Neogene, Abbott Laboratories, Hercules, Engelhard Corp., Dow Chemical, A.E. Staley, General Electric, Schenectady International, YCTA, Grace-Davison, Codexis, Diversa, BASF, Biocatalytics, FMC Corp, Rohm & Haas, Wrigley, Bioformix, and Akermin.

Co-founder and Director, Solidus Biosciences, Inc. (2002-2016).

Co-founder, The Paper Battery Company (2009).

Co-founder and Director, EnzyMed, Inc. (1994-1999); EnzyMed, Inc. was acquired in 1999 by Albany Molecular Research, Inc. (Nasdaq: AMRI).

Member, Scientific Advisory Boards: Acera Biosciences (2002-2007); Bioformix (2012-2014); Burrill & Co. Life Science Advisory Board (2006-2012); DNANO (2011-2013); Dow Chemical Biotechnology Advisory Board (1998-2003); EnzyMed, Inc. (1994-1999); Enzymol International (1993-1997); Solidus Biosciences, Inc. (2002-2016).

Member, Academic Scientific Advisory Boards: Singapore University of Technology and Design (2011-2015); IIT-Bombay (2015-present).

Publications (h-Index = 73; Number of Citations = 22,256)

1. J.S. Dordick, A.M. Klibanov, and M.A. Marletta (1986). "Horseradish Peroxidase-Catalyzed Hydroxylations: Mechanistic Studies", *Biochemistry* **25**, 2946-2951.

2. J.S. Dordick, M.A. Marletta, and A.M. Klibanov (1986). "Peroxidases Depolymerize Lignin in Organic Media but not in Water", *Proc. Natl. Acad. Sci. USA* **83**, 6255-6257.

3. R.Z. Kazandjian, J.S. Dordick, and A.M. Klibanov (1986). "Enzymatic Analyses in Organic Media", *Biotechnol. Bioeng.* **28**, 417-421.

4. C.G. Boeriu, J.S. Dordick and A.M. Klibanov (1986). "Enzymatic Reactions in Liquid and Solid Paraffins: Application for Enzyme-Based Temperature Abuse Sensors", *Bio/Technology* **4**, 997-999.

5. J.S. Dordick, M.A. Marletta and A.M. Klibanov (1987). "Polymerization of Phenols Catalyzed by Peroxidase in Non-Aqueous Media", *Biotechnol. Bioeng.* **30**, 31-36.

6. J.S. Dordick (1988). "Peroxidase Catalysis in Organic Media", *Proc. Biotech 87*, Santa Clara, CA, pp. 99-109.

7. J.S. Dordick (1987). "Production of Phenolic Polymers Catalyzed by Horseradish Peroxidase in Organic Solvents", *Proc. Materials Biotechnology Symp.,* pp. 225-239.

8. J.S. Dordick (1988). "Biocatalysis in Non-Aqueous Media, Patents and Literature", *Appl. Biochem. Biotechnol.*, **19**, 103-112.

9. J.S. Dordick (1988). "Monoclonal Antibodies for Clinical Application, Patents and Literature", *Appl. Biochem. Biotechnol.*, **19**, 271-296.

10. J.S. Dordick (1989). "Enzymatic Catalysis in Monophasic Organic Solvents", *Enzyme Microb. Technol.*, **11**, 194-211.

11. K. Ryu, D.R. Stafford, and J.S. Dordick (1989). "Peroxidase-Catalyzed Polymerization of Phenols: Kinetics of p-Cresol Oxidation in Organic Media", *ACS Symposium Series* **389**, 141-157.

12. K. Ryu and J.S. Dordick (1989). "Kinetics of Peroxidase-Catalysis in Water-Miscible Organic Solvents" in Proc. of Bioprocessing of Coals Workshop-III, Washington, D.C., pp. 73-83.

13. K. Ryu and J. S. Dordick (1989). "Free Energy Relationships of Substrate and Solvent Hydrophobicities on Enzymatic Catalysis in Organic Media", *J. Am. Chem. Soc.* **111**, 8026-8027.

14. M. W. Schmall, L. S. Gorman, and J. S. Dordick (1989), "Ligninase-Catalyzed Hydroxylation of Phenols", *Biochim. Biophys. Acta,* **999**, 267-272.

15. J. S. Dordick (1989), "Selective Biotransformations, Patents and Literature", *Appl. Biochem. Biotechnol.*, **22**, 361-373.

16. D. G. Rethwisch, A. Subramanian, G. Yi, and J. S. Dordick (1990). "Enzyme-Facilitated Transport and Separation of Organic Acids Through Liquid Membranes", *J. Am. Chem. Soc.* **112**, 1649-1650.

17. K. Ryu and J.S. Dordick (1990). "Kinetic Behavior and Substrate Specificity of Horseradish Peroxidase in Water-Miscible Organic Solvents" *Resources, Conservation and Recycling* **3**, 177-185.

18. J. S. Dordick (1990), "Protein Engineering and Site-Directed Mutagenesis, Patents and Literature", *Appl. Biochem. Biotechnol.* **26**, 107-113.

19. J. S. Dordick (1990). "Principles and Applications of Nonaqueous Enzymology", in Applied Biocatalysis, Vol. 1, D. S. Clark and H. W. Blanch, eds., Marcel Dekker: New York, pp. 1-51.

20. J. S. Dordick (1990). "The Use of Enzymes in Organic Solvents to Overcome Common Catalytic Constraints" in Industrial Use of Enzymes, B. Wolnak and M. Scher, Eds., B. Wolnak and Assoc: Chicago, pp. 136-163.

21. J. S. Dordick (1991). "Biocatalysts for Industry", Plenum Publishing Corp: New York.

22. J. S. Dordick, K. Ryu, and J. P. McEldoon (1991). "Enzymatic Catalysis on Coal-Related Compounds in Organic Media: Kinetics and Potential Commercial Applications", *Resources, Conservation and Recycling* **5**, 195-209.

23. D. R. Patil, D. G. Rethwisch, and J. S. Dordick (1991). "Enzymatic Synthesis of a Sucrose-Containing Linear Polyester in Organic Media" *Biotechnol. Bioeng.* **37**, 639-646.

24. S. Parida and J. S. Dordick (1991). "Substrate Structure and Solvent Hydrophobicity Control Lipase Catalysis in Organic Media", *J. Am. Chem. Soc.* **113**, 2253-2259.

25. J. S. Dordick (1991). "Introduction to Industrial Biocatalysis", in Biocatalysts for Industry, J. S. Dordick, ed., Plenum Press: New York, pp. 3-19.

26. D. R. Patil, J. S. Dordick, and D. G. Rethwisch (1991). "Chemoenzymatic Synthesis of Novel Sucrose-Containing Polymers", *Macromolecules* **24**, 3462-3463.

27. D. G. Rethwisch and J. S. Dordick (1991). "Enzyme Facilitated Transport and Separation with Liquid Membranes', in Biocatalysts for Industry, J. S. Dordick, ed., Plenum Press: New York, pp. 312-323.

28. J. S. Dordick, D. R. Patil, S. Parida, K. Ryu, and D. G. Rethwisch (1991), in Catalysis of Organic Reactions, W. Pascoe, ed., Marcel Dekker: New York, pp. 267-292.

29. J. S. Dordick (1991). "Recent Developments in Nonaqueous Enzymology", *Curr. Opin. Biotechnol.* **2**, 401-407.

30. J. P. McEldoon and J. S. Dordick (1991). "Thiol and Mn^{2+}-Mediated Oxidation of Veratryl Alcohol Catalyzed by Horseradish Peroxidase", *J. Biol. Chem.* **266**, 14288-14293.

31. V. M. Paradkar and J. S. Dordick (1991). "Purification of Glycoproteins by Selective Transport Using Concanavalin A-Mediated, Reverse-Micellar Extraction", *Biotechnol. Prog.* **7**, 330-334.

32. J. L. Popp, T. K. Kirk, and J. S. Dordick (1991). "Enzymic Modification of Lignin for Use as a Phenolic Resin", *Enzyme Microb. Technol* **13**, 964-968.

33. L. S. Gorman and J. S. Dordick (1992), "Organic Solvents Strip Water Off Enzymes", *Biotechnol. Bioeng.* **39**, 392-397.

34. C. Bennett, J. S. Dordick, A. J. Hacking, and P. S. J. Cheetham (1992), "Biocatalytic Synthesis of Disaccharide High-Intensity Sweetener Sucralose via a Tetrachlororaffinose Intermediate", *Biotechnol. Bioeng.* **39**, 211-217.

35. R. Affleck, Z.-F. Xu, V. Suzawa, K. Focht, D. S. Clark, and J. S. Dordick (1992). "Enzymatic Catalysis and Dynamics in Low-Water Environments", *Proc. Natl. Acad. Sci. USA* **89**, 1100-1104.

36. K. Ryu and J. S. Dordick (1992), "How do Organic Solvents Affect Peroxidase Structure and Function?", *Biochemistry* **31**, 2588-2598.

37. S. Parida, R. Datta, and J. S. Dordick (1992), "Supported Aqueous-Phase Enzymatic Catalysis in Organic Media", *Appl. Biochem. Biotechnol.* **33**, 1-14.

38. J. S. Dordick (1992), "Designing Enzymes for Use in Organic Solvents", *Biotechnol. Prog.* **8**, 259-267.

39. J. S. Dordick (1992), "Enzymatic and Chemoenzymatic Approaches to Polymer Synthesis and Modification", *Ann. N. Y. Acad. Sci.* **672**, 352-362.

40. Z.-F. Xu, K. Focht, and J. S. Dordick (1992), "Engineering Subtilisin for Use in Organic Solvents", *Ann. N. Y. Acad. Sci.* **672**, 94-99.

41. J. S. Dordick (1992), "Enzymatic and Chemoenzymatic Approaches to Polymer Synthesis", *Trends Biotechnol.* **10**, 287-293.

42. A. M. Blinkovsky, B. D. Martin, and J. S. Dordick (1992), "Enzymology in Monophasic Organic Media" *Current Opinion in Biotechnology* **3**, 124-129.

43. S. Bornemann, J. M. Cassells, J. S. Dordick, and A. J. Hacking (1992), "The Use of Enzymes to Regioselectively Deacylate Sucrose Esters", *Biocatalysis* **7**, 1-12.

44. K. Ryu and J. S. Dordick (1992), "Quantitative and Predictive Correlations for Peroxidase Catalysis in Organic Media", *Biotechnol. Techniques.* **6**, 277-282.

45. B. D. Martin, S. Ampofo, R. J. Linhardt, and J. S. Dordick (1992), "Biocatalytic Synthesis of Sugar-Containing Poly(Acrylate)-Based Hydrogels", *Macromolecules* **25**, 7081-7085.

46. A. M. Blinkovsky and J. S. Dordick (1993), "Enzymatic Derivatization of Saccharides and their Chemical Polymerization" *Tetrahedron: Asymmetry* **4**, 1221-1228.

47. V. M. Paradkar and J. S. Dordick (1993), "ARMES (Affinity-based Reverse Micellar Extraction and Separation) as a Novel Method to Purify Glycoproteins: Purification of Peroxidase from Soybean Hulls", *Biotechnol Prog*. **9**, 199-203.

48. L. Li, M. A. Arnold, and J. S. Dordick (1993), "Mathematical Model for the Luminol Chemiluminescence Reaction Catalyzed by Peroxidase", *Biotechnol. Bioeng*. **41**, 1112-1120.

49. A. M. Blinkovsky and J. S. Dordick (1993), "Peroxidase-Catalyzed Synthesis of Lignin-Phenol Copolymers", *J. Polym. Sci: Part A: Polym. Chem*. **31**, 1839-1846.

50. S. Parida and J. S. Dordick (1993), "Tailoring Lipase Specificity by Solvent and Substrate Chemistries", *J. Org. Chem*. **58**, 3238-3244.

51. J. Kim and J. S. Dordick (1993), "Pressure Affects Enzyme Function in Organic Media", *Biotechnol. Bioeng*. **42**, 772-776.

52. K. Ryu, J. P. McEldoon, A. R. Pokora, W. Cyrus, and J. S. Dordick (1993), "Numerical and Monte Carlo Simulations of Phenolic Polymerizations Catalyzed by Peroxidase", *Biotechnol. Bioeng*. **42**, 807-814.

53. K. Ryu, J. Kim, and J. S. Dordick (1993), "Catalytic Properties and Potential of an Extracellular Protease from an Extreme Halophile", *Enzyme Microb. Technol*. **16**, 266-275.

54. Z.-F. Xu, R. Affleck, P. Wangikar, V. Suzawa, J. S. Dordick, and D. S. Clark (1993), "Transition State Stabilization of Subtilisins in Organic Media", *Biotechnol. Bioeng*. **43**, 515-520.

55. P. P. Wangikar, T. P., Graycar, D. A. Estell, D. S. Clark, and J. S. Dordick (1993), "Protein and Solvent Engineering of Subtilisin BPN' in Nearly Anhydrous Organic Media", *J. Am. Chem. Soc*. **115**, 12231-12237.

56. V. M. Paradkar and J. S. Dordick (1994), "Extraction and Solubilization of Chymotrypsin into Isooctane in the Presence of Low Concentrations of Aerosol OT in the Absence of Reverse Micelles", *Biotechnol. Bioeng*. **43**, 529-540.

57. J. S. Dordick, R. J. Linhardt, and D. G. Rethwisch (1994), "Enzymatic and Chemoenzymatic Preparation of Hydrophilic Polymers and Gels", *Chemtech* **24**, 33-39.

58. Yu. L. Khmelnitsky, S. H. Welch, D. S. Clark, and J. S. Dordick (1994), "Salts Dramatically Enhance Activity of Enzymes Suspended in Organic Solvents", *J. Am. Chem. Soc.* **116**, 2647-2648.

59. A. M. Blinkovsky, Yu. L. Khmelnitsky, and J. S. Dordick (1994), "Organosoluble Enzyme-Polymer Complexes: A Novel Type of Biocatalyst for Nonaqueous Media", *Biotechnol. Techniques* **8**, 33-38.

60. V. M. Paradkar and J. S. Dordick (1994), "Aqueous-Like Activity of α-Chymotrypsin Dissolved in Nearly Anhydrous Organic Solvents", *J. Am. Chem. Soc.* **116**, 5009-5010.

61. X. Chen, A. Johnson, J. S. Dordick, and D. G. Rethwisch (1994), "Chemoenzymatic Synthesis of Linear Poly(Sucrose Acrylate): Optimization of Enzyme Activity and Polymerization Conditions", *Macromol. Chem. Phys.* **195**, 3567-3578.

62. A. M. Blinkovsky, J. P. McEldoon, J. M. Arnold, and J. S. Dordick (1994), "Peroxidase-Catalyzed Polymerization and Depolymerization of Coal in Organic Solvents", *Appl. Biochem. Biotechnol.* **49**, 153-164.

63. D. G. Rethwisch, X. Chen, B. D. Martin, and J. S. Dordick (1994), "Chemoenzymatic Preparation of Sugar-Based Hydrogels", *Mat. Res. Soc. Symp.* **330**.

64. D. G. Rethwisch, S. Parida, G. Yi, and J. S. Dordick (1994), "Use of Alcohols as Cosolvents in Enzyme-Facilitated Transport of Organic Acids Through a Liquid Membrane", *J. Membr. Sci.* **95**, 83-91.

65. S. F. Oppenheim, G. E. Buettner, J. S. Dordick, and V. G. J. Rodgers (1994), "Appling Electron Paramagnetic Resonance Spectroscopy to the Study of Fouling in Protein Ultrafiltration", *J. Membr. Sci.* **96**, 289-297.

66. H. G. Park, H. N. Chang, and J. S. Dordick (1994), "Enzymatic Synthesis of Various Polyesters in Anhydrous Organic Solvents", *Biocatalysis*, **11**, 263-271.

67. J. P. McEldoon, A. R. Pokora, and J. S. Dordick (1995), "Soybean Peroxidase Has Lignin Peroxidase-Type Activity", *Enzyme Microb.Technol.* **17**, 359-365.

68. J. O. Rich, B. A. Bedell, and J. S. Dordick (1995), "Controlling Enzyme-Catalyzed Regioselectivity in Sugar Ester Synthesis", *Biotechnol. Bioeng.* **45**, 426-434.

69. X. Chen, D. G. Rethwisch, and J. S. Dordick (1994), "Chemoenzymatic Synthesis and Characterization of Poly(α-Methylgalactoside Acrylate) Hydrogels", *Macromolecules* **28**, 6014-6019.

70. P. P. Wangikar, J. O. Rich, D. S. Clark, and J. S. Dordick (1994), "Probing Enzymic Transition State Hydrophobicities ", *Biochemistry* **34**, 12302-12310.

71. D. G. Rethwisch, B. D. Martin, X. Chen, R, J. Linhardt, and J. S. Dordick (1995), "Enzymatic and Chemoenzymatic Approaches to Synthesis of Sugar-Based Polymers and Hydrogels", *Carbohydrate Polymers* **28**, 15-21.

72. V. M. Suzawa, Yu. L. Khmelnitsky, L. Giarto, J. S. Dordick, and D. S. Clark (1995), "Suspended and Immobilized Chymotrypsin in Organic Media: Structure-Function Relationships Revealed by ESR Spectroscopy", *J. Am. Chem. Soc.* **117**, 8435-8440.

73. H. G. Park, H. N. Chang, and J. S. Dordick (1995), "Enzymatic Polytransesterification of Aromatic Diols in Organic Solvents", *Biotechnol. Lett.* 17: 1085-1090.

74. K. Ryu, J. P. McEldoon, and J. S. Dordick (1995), "Kinetic Characterization of a Fungal Peroxidase from *Coprinus cinereus* in Aqueous and Organic Media", *Biocatalysis* **13**, 53-63.

75. A. Matschiner, J. S. Dordick, and D. W. Murhammer (1995), "Isolation of Virally-Infected Insect Cells from a Population Containing Infected and Uninfected Cells", *Biotechnol. Techniques* **9**, 897-900.

76. P. Wang, B. D. Martin, B. Bedell, D. G Rethwisch, and J. S. Dordick (1995), "Multienzymic Synthesis of Poly(hydroquinone) for use as a Redox Polymer", *J. Am. Chem. Soc.* **117**, 12885-12886.

77. P. P. Wangikar, D. Carmichael, D. S. Clark, and J. S. Dordick (1995), "Active Site Titration of Serine Proteases in Organic Solvents", *Biotechnol. Bioeng.* **50**, 329-335.

78. F. F. Bruno, J. A. Akkara, M. Ayyagari, D. L. Kaplan, R. Gross, G. Swift, and J. S. Dordick (1995), "Enzymatic Modification of Insoluble Polysaccharides in Organic Solvents", *Macromolecules* **28**, 8881-8883.

79. J. P. McEldoon and J. S. Dordick (1996), "Extraordinary Thermal Stability of Soybean Peroxidase", *Biotechnol. Prog.* **12**, 555-558.

80. Yu. L. Khmelnitsky, P. C. Michels, J. S. Dordick, and D. S. Clark (1996), "Generation of Solution-Phase Libraries of Organic Molecules by Combinatorial Biocatalysis", in Molecular Diversity and Combinatorial Chemistry, I. M. Chaiken and K. D. Janda, eds., American Chemical Society Symposium Series, pp. 144-157.

81. S.-W. Tsai and J. S. Dordick (1996), "Extraordinary Enantioselectivity of Lipase Catalysis in Organic Media Induced by Purification and Catalyst Engineering", *Biotechnol. Bioeng.* **52**, 296-300.

82. J. O. Rich, P. Wang, B. D. Martin, N. Patil, M. V. Sergeeva, and J. S. Dordick (1996), "Biocatalysis in Organic Solvents for the Production of Fine Chemicals and Specialty Polymers", *Chimia*, **50**, 428-429.

83. N. S. Patil, J. S. Dordick, and D. G. Rethwisch (1996), "Macroporous Poly(Sucrose Acrylate) Hydrogel for Controlled Release of Macromolecules", *Biomaterials* **17**, 2343-2350.

84. H. G. Park, H. N. Chang, and J. S. Dordick (1996), "Enzymatic Regioselective Transesterification of Sugar Alcohols and Aromatic Esters in Organic Solvents", *Ann. N. Y. Acad. Sci.*, **799**, 595-600.

85. J. O. Rich and J. S. Dordick (1996), "Controlling Regioselectivity in Enzyme-Catalyzed Acylation of Polyhydroxy Compounds", *Ann. N. Y. Acad. Sci.*, **799**, 226-230.

86. P. P. Wangikar, P. C. Michels, D. S. Clark, and J. S. Dordick (1997), "Structure and Function of Subtilisin BPN' Solubilized in Organic Solvents", *J. Am. Chem. Soc.* **119**, 70-76.

87. M. V. Sergeeva, V. M. Paradkar, and J. S. Dordick (1997), "Peptide Synthesis Using Proteases Dissolved in Organic Solvents", *Enzyme Microb. Technol.* **20**, 623-628.

88. J. O. Rich and J. S. Dordick (1997), "Controlling Subtilisin Activity and Selectivity in Organic Media by Imprinting with Nucleophilic Substrates", *J. Am. Chem. Soc.* **119**, 3245-3252.

89. Dordick, J. S. and Russell, A. J. (Eds.), *Enzyme Engineering XIII, Annals of the New York Academy of Sciences*, New York, 1996.

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39. J.S. Dordick, R.S. Kane, P. Asuri, S.S. Karajanagi, A.A. Vertegel, and R.W. Siegel (2016), "Enhanced Stability of Proteins Immobilized on Nanoparticles," U.S. Patent 9,360,475.

40. X. Qian, J.E. Gagner, J.S. Dordick, and R.W. Siegel (2016), "Internalization of Proteins into Hollowed Gold Nanostructures," U.S. Patent 9,562,225.

Invited Academic Seminars

"Exploiting the Interface of Biomolecular Engineering and Materials Science to Generate New Therapeutic Outcomes", IIT-Bombay, Mumbai, India, February 2017.

Robert Pigford Memorial Lecture: "Exploiting the Interface of Biomolecular Engineering and Nanotechnology to Generate New Therapeutic Outcomes", University of Delaware, Newark, DE, October 2016.

"Exploiting the Interface of Biomolecular Engineering and Nanotechnology to Generate New Therapeutic Outcomes", Shanghai Jiao Tong University, Shanghai, China, June 2016.

"Exploiting the Interface of Biomolecular Engineering and Nanotechnology to Generate New Therapeutic Outcomes", Beijing University of Chemical Technology, Beijing, China, June 2016.

"Molecular Bioprocessing as an Emerging Paradigm for Advancing Medicine", Bollum Symposium, University of Minnesota, Minneapolis, MN, May 2016.

"Molecular Bioprocessing as an Emerging Paradigm for Advancing Medicine", University of Iowa, Iowa City, IA, October 2015.

"Biocatalytic Nanocomposites: Engineering Form, Function, and Protection from Disease", SUNY Binghamton, New York, September 2015.

"Biocatalytic Nanocomposites: Marrying Biomolecular Science and Advanced Materials to Provide Form, Function, and Protection from Disease", Department of Chemical Engineering, Arizona State University, Tempe, AZ, November 2012.

"High-Throughput 3D Cell Cultures for Drug Discovery and Human Toxicology", Department of Chemical Engineering, Michigan State University, E. Lansing, MI, November 2012.

"High-Throughput 3D Cell Cultures for Drug Discovery and Human Toxicology", Polytechnic University, Milan, Italy, July 2012.

"Enzyme-Based Nanocomposites: Using Nature to Ward off Emerging Diseases", Department of Chemical and Biomolecular Engineering, University of Colorado, Boulder, CO, December 2011.

Mylan Lecture: "Enzyme-Based Nanocomposites: From Topological Stabilization to Self-Decontaminating Surfaces", Department of Chemical Engineering, University of West Virginia, Morgantown, WV, November 2011.

'Enzyme-Based Nanocomposites: Using Nature to Ward off Emerging Diseases", Department of Chemistry, CCNY, New York, NY, November 2011.

"Enzyme-Based Nanocomposites: From Topological Stabilization to Self-Decontaminating Surfaces", Department of Chemical Engineering, University of Houston, April 2011.

Merck Lecture: "High-Throughput 3D Cell Cultures for Drug Discovery and Human Toxicology", Department of Chemical Engineering, University of Virginia, Charlottesville, VA, April 2011.

"Enzyme-Containing Paints and Coatings for Decontaminating Materials", Polytechnic University of NYU, New York, NY, March 2011.

"Enzyme-Based Nanocomposites: From Topological Stabilization to Self-Decontaminating Surfaces", Department of Chemical Engineering, Ohio State University, Columbus, OH, April 2011.

"Exploiting Molecular Bioprocessing to Overcome Fundamental Bottlenecks in Drug Discovery", Department of Chemical Engineering, Columbia University, New York, NY, March 2009.

"Directed Assembly of Functional Biomolecular and Nanoscale Architectures", California NanoSystems Institute, University of California, Los Angeles, November 2007.

"Molecular Bioprocessing as a New Paradigm in Drug Discovery", Institute of Biotechnology, ETH-Zurich, June 2007.

"Molecular Bioprocessing as a New Paradigm in Drug Discovery", Department of Chemical and Biomolecular Engineering, Tufts University, Medford, MA January 2007.

"Molecular Bioprocessing as a New Paradigm in Drug Discovery", Center for Systems Biology, Georgia Institute of Technology, Atlanta, GA, January 2007.

"Controlling Protein-Surface Interactions: From Nanoscale Architectures to Drug Discovery Platforms", Department of Chemical and Biomolecular Engineering, Pennsylvania State University, State College, PA, October 2006.

"Controlling Protein-Surface Interactions: From Nanoscale Architectures to Drug Discovery Platforms", Department of Chemical Engineering and Materials Science, University of Minnesota, Minneapolis, MN, October 2006.

"High-Throughput Biocatalysis for New Compound Discovery", University of Hawaii, Manoa, HI, February 2006.

"Enzyme structure and Function in Nonaqueous Media", Bennington College, Bennington, VT, December 2005.

"Controlling Protein-Surface Interactions: From Nanoscale Architectures to Drug Discovery Platforms", Department of Chemical Engineering, Georgia Institute of Technology, Atlanta, GA, November 2005.

"Biocatalysis: From Fundamental Science to Industrial Biotechnology", 20th Anniversary of the Bioprocess Technology Institute, University of Minnesota, Minneapolis, MN, October 2005.

"Controlling Protein-Surface Interactions: From Nanoscale Architectures to Drug Discovery Platforms", Department of Chemical Engineering, University of California, Santa Barbara, CA, September 2005.

"Biologically-Enabled and Inspired Design of Hierarchically-Organized Functional and Responsive Materials", Department of Chemical Engineering, University of California, Riverside, CA, May 2005.

"High Throughput Biocatalysis for Drug Discovery and the Synthesis of Functional Materials", Department of Chemical Engineering, University of Toronto, Toronto, Canada, February 2005.

"Controlling Protein Surface Interactions: From Nanoscale Architectures to Drug Discovery Platforms", Department of Chemical Engineering and Life Science Institute, University of Michigan, Ann Arbor, MI, January 2005.

"Directed Assembly of Functional Biomolecular Architectures", Departments of Chemical Technology and Biotechnology, Delft University, The Netherlands, January 2005.

"Directed Assembly of Functional Biomolecular Architectures", Department of Chemical Engineering, University of Massachusetts, Amherst, MA, November 2004.

"Biocatalysis Spanning the Micro- and Nanoscales: Opportunities for Drug Discovery and Functional Architectures", Department of Chemistry, University of South Florida, Tampa, FL, April 2004

"Directed Assembly of Biocatalytic Materials and Nanocomposites as Novel Surface Active Architectures", Departments of Materials Science and Chemistry, Florida State University, Tallahassee, FL, January 2004.

"Protein- and DNA-Containing Nanomaterials: A Unique Intersection of Biology and Materials Science", Department of Chemical Engineering, Columbia University, New York, NY, October 2003.

"Biocatalysis at the Interface of Biology and Materials Science", McGowan Institute of Regenerative Medicine, University of Pittsburgh, Pittsburgh, PA, February 2003.

"Biocatalysis in a Materials World", Department of Chemical Engineering, University of Illinois, Urbana, IL, October 2002.

"High-Throughput Bioprocessing for New Compound Discovery and Synthesis", Department of Chemical Engineering, University of Nebraska, Lincoln, NE, October 2002.

"New Opportunities for Biochemical Engineering in Discovery-Based Research", Department of Chemical Engineering, Wageningen Univ., Wageningen, The Netherlands, March 2002.

"New Opportunities for Biochemical Engineering in Discovery-Based Research", Department of Chemical Engineering, University of Coimbra, Portugal March 2002.

"Biocatalysis at the Micro- and Nanoscale for New Process and Reaction Discovery", Department of Bioengineering, Massachusetts Institute of Technology, Cambridge, MA, December 2001.

"Bioprocessing at the Micro- and Nanoscales", Department of Chemical Engineering, North Carolina State, Raleigh, November 2001.

"Biocatalysis at the Microscale: Opportunities for Biochemical Engineers in New Compound and New Enzyme Discovery", Tainan University, Tainan, Taiwan, June 2001

"Computational and Microscale Tools for Biocatalysis: Enabling Discovery of New Molecules and Processes", Department of Chemical Engineering, University of Akron, April 2001.

"Computational and Microscale Tools for Biocatalysis: Enabling Discovery of New Molecules and Processes", Department of Chemical Engineering, University of Texas-Austin, March 2001.

"High-Throughput Biocatalysis", Bioprocess Technology Institute, University of Minnesota, Minneapolis, MN, February 2001.

"Microscale Biocatalysis: A New Paradigm for Discovery", Department of Chemical Engineering, University of Pennsylvania, Philadelphia, PA, October 2000.

"Emergence of Biocatalysis as a Tool for Chemical Engineers", Department of Chemical Engineering, University of Connecticut, Storrs, CT, April 1999.

"Biocatalysis: A Natural Way to Make Polymers", Department of Chemistry, Rensselaer Polytechnic Institute, Troy, NY, November 1998.

"The Marriage of Enzyme and Polymer Technologies", Department of Chemical Engineering and Membrane Center, University of Kentucky, Lexington, KY, March, 1998.

"Engineering Nature for the Generation of New Materials", Trapp Lecture, Departments of Chemistry and Food Science and Engineering, Iowa State University, Ames, IA, December, 1997

"Enzymatic Catalysis in Novel Media for the New Millennium", Department of Chemical Engineering, Rensselaer Polytechnic Institute, Troy, NY, September, 1997

"Engineering Nature for the Generation of New Materials", Department of Chemical Engineering, Carnegie-Mellon University, Pittsburgh, PA, September, 1997

"Enzyme Engineering for New Materials", Department of Chemical Engineering, Cornell University, Ithaca, NY, March, 1997

"Enzyme Engineering for Biotransformations and New Materials Synthesis", Department of Chemical Engineering, University of Wisconsin, Madison, WI, February, 1997.

"Enzyme Engineering for Biotransformations and Drug Discovery", Department of Chemical Engineering, The Ohio State University, Columbus, OH, February, 1997.

"Enzymatic Catalysis in Organic Solvents", Department of Microbiology and Chemical Technology, Nankai University, Beijing, May, 1996.

"Preparation of Polymeric Structures from Complex Monomers", Department of Chemical Engineering, Seoul National University, Seoul, May, 1996.

"Enzymes Masquerading as Chemical Catalysts", Department of Chemical Engineering, University of Texas, Austin, TX, March, 1995

"Enzyme Design for Nonaqueous Solvents", Department of Biochemistry, Iowa State University, Ames, IA, November, 1994

"Enzyme Design for Organic Solvents", Department of Chemical Engineering, University of Virginia, Charlottesville, VA, October, 1994.

"Chemoenzymatic Synthesis of Polymers and Gels", Department of Chemistry, Central Michigan University, Mt. Pleasant, MI, April, 1994.

"Enzyme Design and Application in Extreme Environments", Department of Chemical Engineering, University of Tulsa, Tulsa, March, 1994.

"Biocatalysis in Organic Media", Department of Chemical Engineering, Northwestern University, Evanston, IL, March, 1994.

"Designing Enzymes for Use in Nonaqueous Media", Department of Chemical Engineering, University of Illinois, Champaign, IL, November, 1993.

"Mechanistic and Kinetic Evaluations of Subtilisins in Dehydrated Environments", Department of Biochemistry, Imperial College, London, England, October, 1993.

"Rational Approaches to Enzyme Design for Nonaqueous Biocatalysis", Department of Chemical Engineering, University of California, Davis, May, 1992.

"Biorecognition in Bioseparations", Departments of Molecular and Cell Biology, and Chemical Engineering, and Center for Biotechnology, University of Connecticut, Storrs, CT, January, 1992.

"Biochemical Engineering of Nonaqueous Enzymology", Department of Chemical Engineering, Purdue University, West Lafayette, IN, January, 1992.

"Understanding Nonaqueous Enzymology: From Basic Principles to Commercially Important Catalysts", Department of Chemical Engineering, Yale University, New Haven, CT, May, 1991.

"Integrating Enzyme Technology with Chemical and Biochemical Processing", Department of Chemical Engineering, University of California, Berkeley, CA, February, 1991.

"Principles and Selected Applications of Nonaqueous Enzymology", Department of Chemical Engineering, University of Wisconsin, Madison, WI, February, 1991.

"Protein Design for Nonaqueous Media", Center for Biophysics, Rensselaer Polytechnic Institute, Troy, NY, March, 1990.

"Enzymatic Catalysis in Organic Media", Department of Chemical Engineering, Iowa State University, Ames, IA, February, 1990.

"Principles and Selected Applications of Nonaqueous Enzymology", Department of Chemical Engineering, University of Pittsburgh, Pittsburgh, PA, February, 1990.

"Applications of Enzyme Technology", Department of Civil and Environmental Engineering, University of Iowa, Iowa City, IA, October, 1989.

"Overview of Enzymatic Catalysis in Organic Media: Fundamentals and Applications", Departments of Bioengineering and Chemical Engineering, University of Washington, Seattle, August, 1989.

"Peroxidases in Organic Media for Lignin Modification", Forest Products Laboratory, USDA, Madison, WI, July, 1988.

"Overview of Unusual Catalytic Properties of Peroxidases", College of Pharmacy, University of Iowa, Iowa City, IA, September, 1987.

"Enzymatic Catalysis in Non-Aqueous Media", Department of Chemistry, Strathclyde University, Glasgow, Scotland, May, 1987.

Invited Lectures and Panels

"Pandemics and Big Data: Disrupting Transmissible Diseases", World Economic Forum, Tianjin, China, June 2016.

"Molecular Bioprocessing as an Emerging Paradigm for Advancing Medicine", Plenary Award Talk at the Korean Society for Biotechnology & Bioengineering, Gyeong-Ju, Korea, April 2016.

Food, Pharmaceutical and Bioengineering Award Address: "Molecular Bioprocessing as an Emerging Paradigm for Advancing Medicine", AIChE Annual Meeting, Salt Lake City, UT, November 2015.

"Enzymes to the Rescue: Battling Infectious Disease Using Enzyme Technology", Enzyme Engineering XXIII, St. Petersburg, FL, September 2015.

"Biocatalytic Nanocomposites: Engineering Form, Function, and Protection from Disease", Nano Korea, Seoul, Korea, July 2015.

"Exploiting Protein-Based Nanocomposites for Therapeutic Applications", DECHEMA Annual Meeting, Aachen, Germany, October 2014.

"Fostering our Future Healthcare Researchers", Partnering for Cures Conference, New York, NY, November 2013.

"High-Throughput 3D Cell Culture for Drug Discovery and Human Toxicology", CHI 3D Cell Culture Conference, Cambridge, MA, October 2013.

"Biocatalytic Nanocomposites: Engineering Form, Function, and Protection from Disease", Enzyme Engineering XXII, Toyama, Japan, September 2013.

"Pharma's New World: Mimicking the Human Body for Rapid Discovery of Safe and Effective Drugs", Renaissance Weekend, Charleston, SC, December 2012.

"Nanobiocatalysis for Sustainable Bioprocessing", Lipid Resource and Process Technology Symposium, Aarhus, Denmark, October 2012.

"Biocatalytic Nanocomposites: Painting a Brighter Future in Healthcare and Bioprocessing", International Biotechnology Symposium, Daegu, Korea, September 2012.

"Biocatalytic Nanocomposites: Marrying Biomolecular Science and Advanced Materials to Provide Form, Function, and Protection from Disease", Biocat2012, Hamburg, Germany, September 2012.

"Biocatalytic Nanocomposites: Painting a Brighter Future", Biocatalysis Gordon Conference, Smithfield, RI, July 2012.

"Integrating Nature and Nano to Form Safe and Responsive Materials", World Economic Forum, Davos, Switzerland, January 2012.

"Enzyme-Based Nanocomposites: Using Nature to Ward off Emerging Diseases", AIChE Annual Meeting, Minneapolis, MN, October 2011.

"Functionally Organized Hierarchical Nanobiomaterials", AIChE Plenary Lecture, Section 22, AIChE Annual Meeting, Salt Lake City, UT, November 2010.

"The Impact of Molecular Bioprocessing on Realizing the Potential of Functional Nanobiomaterials", MRS Functionalizd Nanobiomaterials for Medical Applications Meeting, Denver, CO, October 2010.

"High-Throughput 3D Cell Cultures for Drug Discovery and Human Toxicology", Visiongain Symposium, London, UK, September 2010.

"Drivers to Our Sustainable Future", World Economic Forum, Tianjin, China, September 2010.

"Catalytic Stimulus: Putting Enzymes to Work in Organic Solvents", Symposium in Honor of Fred Heineken, American Chemical Society, San Francisco, CA, March 2010.

"Designing and Optimizing Cellular and Biomolecular Processes on High-Throughput Microscale Devices", EMCC-6 Meeting, Antalya, Turkey, March 2010.

"Molecular Bioprocessing: High-Throughput Chemical and Cellular Biology on a Chip", Riken Institute, Wako, Japan, February 2010.

"Enzyme-Nanomaterial Based Coatings and Paints for Self-Decontaminating Surfaces", Riken Conference on Soft Materials & Interfaces, Harima, Japan, January 2010.

"Biocatalysis: A Natural Marriage of Life Science and Nanotechnology", Nanobiotechnology Meeting, Rensselaer Polytechnic Institute, Troy, NY, October, 2009.

"High-Throughput Cell- and Enzyme-Based Microarrays for Predictive Human Toxicology", Biopolis, Singapore, September 2009.

"Molecular Bioprocessing: Exploiting Nature's Diversity to Tackle Therapeutic Bottlenecks", Biochemical Engineering meeting, Burlington, VT, July 2009.

"Three-Dimensional Human Cellular and Metabolizing Enzyme Microarrays for High-Throughput Toxicity Screening, Society of Toxicology Annual Meeting, Baltimore, MD, March, 2009.

"Three-Dimensional Cell Culture Microarrays as a High-Throughput Approach to Study Stem Cell Fate", 4th International Meeting of the Portuguese Society for Stem Cells and Cell Therapy, Lisbon, Portugal, April, 2009.

"Enzyme Stabilization Promoted on Highly Curved Nanoscale Materials", Army Research Office Workshop on Enzyme Stabilization, Key West, FL, December 2008.

"The MetaChip Platform as a High-Throughput Technology for Rapid Assessment of Human Toxicity of Drug Candidates and Environmental Chemicals", National Toxicology Program on High-Throughput Methods for In Vitro Toxicity Testing, NIEHS, Research Triangle Park, NC, September 2008.

"Functionally Organized Protein-Nanomaterial Interfaces", Gordon Research Conference, Aussois, France, September 2008.

"High-Throughput Molecular Bioprocessing: A New Addition to Biochemical Engineering Science", **Plenary Address**, European Society for Biochemical Engineering Science, Faro, Portugal, September 2008.

"The MetaChip Platform for High-Throughput CYP450 Inhibition and Cytotoxicity Analysis", CHI World Congress on Drug Discovery, Philadelphia, PA, May 2008.

"Molecular Bioprocessing for Healthcare Applications", EMCC5, Calabria, Italy, May 2008.

"High-Throughput Metabolism and Toxicology: A Vision for Tomorrow's Drug Discovery", Metabolism and Drug Oxidation Meeting, Saratoga, NY, July 2008.

"A High-Throughput 3D Cell Microarray to Study Stem Cell Fate", Society of Biological Engineers Stem Cell Conference, San Diego, CA, January 2008.

Marvin J. Johnson Award Address: "Molecular Bioprocessing: From Design to Discovery to Dreams", American Chemical Society Annual Meeting, Boston, MA August 2007.

Elmer Gaden Award Address: "Directing the Assembly of Multifunctional Biomolecular Architectures", American Chemical Society Annual Meeting, Boston, MA August 2007.

"Enzyme-Nanomaterial Conjugates: Opportunities for Functionally Organized Materials", 12th Mexican Biotechnology and Bioengineering Meeting, Morelia, Mexico, June 2007.

"Role of Water on Enzymatic Catalysis in Organic Media", 12th Mexican Biotechnology and Bioengineering Meeting, Morelia, Mexico, June 2007.

"High-Throughput Biocatalysis for Drug Discovery and Development", AIChE National Meeting Topical Symposium, San Francisco, CA, November 2006.

"High-Throughput Biocatalysis for Drug Discovery and Human Toxicology", Trends in Organic Chemistry Symposium, Stockholm, Sweden, September 2006.

"Biologically-Enabled and Inspired Design of Hierarchically-Organized and Functional Materials", ACS National Meeting, San Francisco, September 2006.

"Biocatalytic Materials: From Fundamental Underpinnings to New Surface Active Agents", ACS National Meeting, San Francisco, September 2006.

"Biocatalysis as a Tool for Discovery and Sustainability", 30th Anniversary of KRICT (Korean Research Institute for Chemical Technology), Daejeon, Korea, August 2006.

"Rational Improvement of Enzymes for Synthetic Utility", Society for Industrial Microbiology, Baltimore, MD, July 2006.

"Biomolecule-Driven Directed Assembly of Functional Nanomaterials", CIMTEC, Acireale, Sicily, Italy, June 2006.

"High-throughput Biocatalysis for Drug Discovery and Development", CNR - Istituto di chimica del riconoscimento molecolare", Milan, Italy, June 2006.

"(Nano)Biocatalysis for Drug Discovery", PACRIM Meeting, Honolulu, HI, January 2006.

"Metabolizing Enzyme Toxicology Assay Chip (MetaChip) for High-Throughput Microscale Toxicity Analysis", Lab Automation 2006, Palm Springs, CA, January 2006.

"Controlling Protein-Surface Interactions: From Nanoscale Architectures to Drug Discovery Platforms", EMCC4, Dead Sea, Israel, January 2006.

"High-Throughput Biocatalysis for New Compound Discovery", Enzyme Engineering XVIII, Geong-Ju, Korea, October 2005.

"Biocatalytically-Enabled Assembly of Functional and Responsive Carbohydrate-Based Nanostructures", 12th European Congress of Biotechnology, Copenhagen, Denmark, August 2005.

"High-Throughput Biocatalysis for New Compound Discovery", Biochemical Engineering, Harrison Hot Springs, British Columbia, July 2005.

"Biologically-Enabled and Inspired Design of Hierarchically-Organized Functional and Responsive Materials", BIO World Congress, Orlando, FL, April 2005.

"Enzymes in Unnatural Environments: From Nonaqueous Biocatalysis to Functional Nanoscale Architectures", Workshop on Biocatalysis in Nonconventional Media, Manchester, UK, April 2005.

"High Throughput Biocatalysis for New Compound Discovery", ACS National Meeting, San Diego, CA, March 2005.

"High Throughput Biocatalysis for New Compound Discovery", NIOK/NRSCC Biocatalysis Symposium, Noordwijkerhout, The Netherlands, January 2005.

"Directed Assembly of Biocatalytic Nanocomposites to Yield Surface Active Architectures", AIChE National Meeting, Plenary Address", Austin, TX, November 2004.

"Biocatalysis Spanning the Nano- and Microscales: Opportunities for Environmentally-Beneficial Functional Materials", Center for Biocatalysis and Bioprocessing, University of Iowa, Iowa City, IA, October 2004.

"Biocatalysis at the Nano- and Microscales for Drug Discovery and Functional Materials", ACS-BIO Conference, Orlando, FL, May 2004.

"High-Throughput Biocatalysis for Drug and Materials Discovery", Gordon Conference on Facilitated Synthesis, Ventura, CA, March 2004.

"Functional Biocatalytic Materials at the Nanoscale", Biotechnology Industry Organization CEO-Investor Conference, New York, NY, February 2004.

"Biocatalysis in Dehydrated Media", Novartis Foundation Symposium on Enzymes Organic Media", London, December 2003.

"Micro- and Nanoscale Biocatalysis: From *in Vitro* Pathway Engineering to Drug Discovery and Development", IBC Enzyme Technology Meeting, Boston, October 2003.

"High-Throughput Biocatalysis for New Compound Discovery". Scientific Update Conference, Boston, September 2003.

"Enzymatic Conversion of Abundant Raw Materials into Therapeutically Valuable Products", American Chemical Society National Meeting, New Orleans, March 2003

"Diverse Biomaterials from Simple Sugars and Polysaccharides", American Chemical Society National Meeting, New Orleans, March 2003

"Opportunities for Nanobiotechnology in Biocatalysis and Drug Discovery", BIO "Third Wave Meeting", New York, January 2003.

"High-Throughput Microscale Biocatalysis and Metabolic Pathway Engineering for New Compound Discovery", AIChE Annual Meeting, Indianapolis, IN, November 2002.

"High-Throughput Peroxidase Catalysis at the Micro- and Nanoscales for the Synthesis of Biologically Active Polyphenolics", CIFAR Conference, Davis, CA, October 2002.

"*In Vitro* Reconstruction of Biochemical Pathways on the Micro- and Nanoscales", Metabolic Engineering IV, Barga, Italy, October 2002.

"High-Throughput Microscale Biocatalysis for Drug Discovery", Biocatalysis 2002, Hamburg, Germany, July 2002.

"The Future of Biochemical Engineering, NSF Workshop on Biochemical Engineering", Washington, DC, November 2001.

"Enabling High-Throughput Biotransformations", Applied Catalysis Meeting, Amsterdam, The Netherlands, November 2001.

"Biocatalysis at the Nano/Micro Interface", Recent Advances in Fermentation Technology, Long Beach, CA, November 2001.

"Biocatalysis for New Process Discovery at the Micro- and Nanoscale", Cambridge Healthtech Institute, Cambridge, MA, October 2001.

"High-Throughput Biocatalysis for Synthetic Transformations", American Society of Microbiology Biotransformation Meeting, San Juan, PR, October 2001.

"Biocatalysis at the Micro- and Nanoscale for Reaction and Process Discovery", BioTrans, Darmstadt, Germany, September 2001.

"Biocatalysis at the Microscale: Opportunities for Biochemical Engineers in New Compound and New Enzyme Discovery", Plenary Lecture, 6th Biochemical Engineering Conference, Taipei, Taiwan, June 2001

"Biochemical Engineering for New Process Discovery", Development Center for Biotechnology, Taipei, Taiwan, June 2001

"High-Throughput Biocatalysis for Pharmaceutical Discovery", Biotechnology Industry Organization (BIO), San Diego, June 2001. **"**Bioprocessing at the Micro- and Nanoscales, Biochemical Engineering XII, Sonoma, CA, June 2001.

"Biotechnological Entrepreneurship: Opportunities for Malaysia in the New Century", Joint U.S.-Malaysia Business Development Conference, Kuala Lumpur, Malaysia, April 2001.

"*In Vitro* Metabolic Pathway Engineering for New Compound Discovery", Cambridge Healthtech Institute, Cambridge, MA, April, 2001

"Combinatorial Biocatalysis for New Compound and New Process Discovery", Royal Society of General Microbiology, Edinburgh, Scotland, March 2001.

"*In Vitro* Metabolic Engineering for Functional Genomics and New Pathway Discovery", Metabolic Engineering III, Colorado Springs, October 2000.

"Combinatorial Approaches for Biotransformations", European Society for Biochemical Engineering Meeting, Copenhagen, September 2000.

"Environmentally-Friendly Polymer Libraries Generated by Combinatorial Biocatalysis", ACS National Meeting, Washington, DC, August 2000.

"Combinatorial Biocatalysis for the Pharmaceutical Industry", InBio, Amsterdam, March 2000.

"Biocatalysis is a Natural and Sustainable Way to Break with Tradition", Institute of Biology Symposium on Sustainability, London, March 2000

"Biocatalysis in Drug Discovery", Informex 2000, New Orleans, February 2000.

"Biocatalytic Upgrading of Agricultural Materials", CIFAR Conference, Davis, CA, December, 1999

"Combinatorial Biocatalysis for Natural Products Drug Discovery", Society of Industrial Microbiology Annual Meeting, Arlington, VA, August, 1999.

"Biocatalytic Materials", Gordon Conference on Reactive Polymers, Henniker, NH, July, 1999.

"Activated Biocatalysts for Commercial Applications", Bernard Wolnak Conference, Chicago, IL, May, 1999.

"New Opportunities for Biotechnology", The Highlands Forum, Carmel Valley, CA April, 1999.

"Enzymes in Polymer Synthesis and Modification", Gordon Research Conference on Biodegradable Polymers, Ventura, CA, March, 1999.

"Life in a Combinatorial World", Plenary Address for Division 15 for the American Institute of Chemical Engineers Annual Meeting, Miami Beach, FL, November, 1998.

"Peroxidases for use in Metal Sensing", ONR Workshop, Coolfont, WV, November, 1998.

"Impact of Enzyme Catalysis on Polymer Technologies from Renewable Resources", CIFAR Conference, Davis, CA, October, 1998

"Engineered Biocatalysts: The Interface of Directed Evolution and Enzyme Technology", IBC Meeting on Directed Evolution, San Diego, September, 1998

"Making Enzymes Work for Synthetic Chemistry", American Chemical Society National Meeting, Boston, MA, August, 1998.

"Biocatalysis for Drug Discovery", Award Address for American Chemical Society - Iowa Section, Amana, IA, June, 1998.

"Combinatorial Biocatalysis for Lead Optimization", IBC Conference on Enzyme Technology", San Diego, CA, March, 1998.

"Making Enzymes Work for Synthetic Chemistry", North American Chemical Congress, Cancun, Mexico, November, 1997.

"Biocatalysis and Biorecognition in Nonaqueous Media", Enzyme Engineering XIV, Beijing, China, October, 1997.

"Biocatalysis in Polymer Synthesis: A Natural Alternative", Biodegradable and Environmental Polymer Society Annual Meeting, San Diego, September, 1997.

"It's Only Natural: Expanding Structural Diversity Through Combinatorial Biocatalysis", CHI Conference on High Throughput Screening for Drug Discovery, Arlington, VA, June, 1997.

"Biocatalysis for Environmentally-Friendly Polymer Synthesis", Green Chemistry Conference, Washington, DC, June, 1997.

"Biocatalytic Materials - Unique Enzyme-Carbohydrate Composites", Carbohydrate Bioengineering, La Rochelle, France, April, 1997.

"Biocatalytic Plastics: A Unique Marriage of Enzyme Technology and Polymer Chemistry", American Chemical Society National Meeting, San Francisco, April, 1997.

"Combinatorial Biocatalysis: A New Approach to Drug Discovery", Random and Rational Conference on Drug Discovery, Geneva, Switzerland, October, 1996.

"Biocatalysis in Organic Solvents for the Production of Fine Chemicals and Specialty Polymers", International Conference on Biotechnology for the Production of Fine Chemicals, Zermatt, Switzerland, September, 1996.

"Combinatorial Biocatalysis for the Optimization of Lead Compounds for Drug Discovery", Lead Optimization SRI Conference, Princeton, NJ, September, 1996.

"Biocatalysis and Biorecognition in Nonaqueous Media", Gordon Research Conference on Biorecognition and Immobilization, Colby-Sawyer, NH, August, 1996.

"Combinatorial Biocatalysis for Drug Discovery", American Chemical Society National Meeting, New Orleans, March, 1996.

"Enzyme-Derived Polymers: New Materials for the 21st Century", Plenary Lecture for the Division of Polymer and Materials Science and Engineering, American Chemical Society National Meeting, New Orleans, March, 1996.

"Biocatalysis in High Salt and Solvent Environments", Pacifichem, Honolulu, December, 1995.

"Biocatalysis in Organic Solvents", Recent Advances in Fermentation Technology, San Diego, CA, November, 1995.

"Sugar-Based Biodegradable Polymers for Drug Delivery", Plenary Lecture, Colorcon Symposium on Controlled Release", Princeton, NJ, October, 1995.

"Enzyme Activation in Organic Solvents", Biochemical Engineering IX, Davos, Switzerland, May, 1995.

"Enzyme Activation in Dehydrated Media", Army Research Office Workshop, Cashiers, NC, May, 1995.

"Chemoenzymatic Preparation of Carbohydrate-Based Biomaterials", Plenary Lecture, Carbohydrate Bioengineering Meeting, Helsingor, Denmark, April, 1995.

"Enzymes in Polymer Synthesis", Gordon Conference on Biodegradable Polymers, Oxnard, CA, February, 1995.

"Enzymes in Pharmaceutical Synthesis and Delivery", Keystone Meeting on Drug Delivery, Hilton Head Island, SC, January, 1995.

"Chemoenzymatic Synthesis of Novel Sugar-Based Materials", Plenary Lecture, 4th International Workshop on Oligo- and Polysaccharides, Aussois, France, September, 1994.

"Enzyme-Derived Polymers: New Materials for the 21st Century", Plenary Lecture, Biodegradable Polymers Symposium, Boston, June, 1994.

"Engineering Nature to Produce Materials for the Next Century", Tripartite Symposium, Pittsburgh, May, 1994.

"Enzymes in High Salt and Solvent Environments", NSF Workshop on Extremozymes, Washington, DC, May, 1994.

"Enzymatic Synthesis of Composite Polymers", Plenary Lecture, International Congress on Chemicals from Biotechnology", Hannover, Germany, October, 1993.

"The Chemistry of Nonaqueous Biocatalysis", Plenary Lecture, European Symposium on Biocatalysis", Graz, Austria, September, 1993.

"Biocatalysis in the Production of Sugar-Based Linear Polymers and Hydrogels", Enzyme Engineering XII, Deauville, France, September, 1993.

"Chemoenzymatic Routes to the Synthesis of Sugar-Based, Biodegradable Water Absorbents", ACS, Chicago, August, 1993.

"Enzymes from the Salt of the Earth: Biocatalysis of an Extremely Halophlic Enzyme", Biochemical Engineering VIII, Princeton, NJ, July, 1993.

"Biocatalysis in Extreme Environments", Gordon Research Conference on Applied and Environmental Microbiology", Colby-Sawyer, NH, July, 1993.

"Commercial Potential of Nonaqueous Enzymology", Bernard Wolnak Conference on Opportunities with Industrial Enzymes, Chicago, June, 1993.

"Enzymes in Atypical Environments", CNRC-National Research Council of Canada, Montreal, May, 1993.

"Enzyme Design for Nonaqueous Media", Army Research Office Workshop, Cashiers, NC, May, 1993

"Biocatalysis in Unconventional Media", Plenary Lecture for the Leo Rettger Society, ASM Connecticut Region, Groton, CT, April, 1993.

"Catalytic Potential of Enzymes from Extreme Halophiles", ACS, Denver, March, 1993.

"Synthesis of Novel Materials Using Nonaqueous-Based Biocatalysis", 9th International Biotechnology Symposium, Washington, DC, August, 1992.

"Chemoenzymatic Synthesis of Novel Polymeric Materials", BioJapan '92, Yokohama, Japan, August, 1992.

"Protein Engineering of Subtilisin for Use in Dehydrated Media", International Symposium on Subtilisin Enzymes, Hamburg, Germany, September, 1992.

"Nonaqueous Biocatalysis: From Fundamentals to Novel Synthetic Strategies", Gordon Research Conference on Biocatalysis, Kimball Union, NH, July, 1992.

"Enzyme Design for Nonaqueous Media: The Use of Free Energy Relationships and Protein Engineering to Optimize Catalytic Function", Fundamentals of Biocatalysis in Nonconventional Media -- European Working Party on Applied Biocatalysis, Noordwijkerhout, The Netherlands, April, 1992.

"Enzymes in Nonaqueous Media", Second U.S. - Korea Joint Seminar on Bioprocess Technology, Seoul, December, 1991.

"Commercial Potential of Nonaqueous Enzymology in the Synthesis of Specialty Polymers and Chiral Intermediates", Bernard Wolnak Conference on Opportunities With Industrial Enzymes, Chicago, October, 1991.

"Biocatalysis and Biorecognition in Nonaqueous Media for Reaction and Separation", Enzyme Engineering Conference, Kona, Hawaii, September, 1991.

"The Effects of Water on Enzyme Structure and Function in Nonaqueous Media", Society for Industrial Microbiology Annual Meeting, Philadelphia, August, 1991.

"The How and Why of Nonaqueous Enzymology", American Chemical Society National Meeting, New York, August, 1991.

"Structure-Function Relationships of Enzymatic Catalysis in Nonaqueous Media", The Industrial Applications of Natural, Modified, and Artificial Enzymes, Pisa, Italy, September, 1990.

"Peroxidases in Both Aqueous and Nonaqueous Media", Society for Industrial Microbiology Annual Meeting, Orlando, August, 1990.

"Novel Oxidase Activity of Peroxidases", Gordon Research Conference on Fungal Metabolism, Proctor Academy, NH, July, 1990.

"Kinetics and Thermodynamics of Enzymatic Catalysis in Nonaqueous Media", Gordon Research Conference on Biocatalysis, Plymouth State College, NH, June, 1990.

"Synthetic Reactions Catalyzed by Hydrolases in Novel Media", American Society for Microbiology, Biotechnology Meeting, Chicago, June, 1990.

"The Use of Enzymes in Organic Media to Overcome Common Catalytic Constraints", Bernard Wolnak Symposium on Industrial Use of Enzymes: Technical and Economic Barriers, Chicago, May, 1990.

"Enzymatic Catalysis in Organic Media: Prospects for the Chemical Industry", The Organic Reactions Catalysis Society, Boca Raton, FL, May, 1990.

"Enzymatic Catalysis in Monophasic Organic Solvents: An Applications Perspective", Society for Industrial Microbiology Annual Meeting, Seattle, August, 1989.

"Opportunities for Enzyme-Based Coal Bioprocessing", Workshop on the Bioprocessing of Fossil Fuels, Department of Energy, Washington, D.C., August, 1989.

"Biocatalysis in Organic Media", Midwest Biotechnology Symposium, Minneapolis, June, 1989.

"Prospects of Enzymatic Catalysis in Non-Aqueous Media for Space Sciences", NASA Conference on Gravity and the Cell, Washington, D.C., December, 1988.

"Kinetics of Peroxidase Catalysis in Water-Miscible Organic Solvents", Workshop on the Bioprocessing of Coals, Department of Energy, Washington, DC, August, 1988.

"Novel Industrial Uses of Peroxidase", Biotech '87 USA, Santa Clara, CA, November, 1987.

"Peroxidase-Catalyzed Polymerization of Phenols in Non-Aqueous Media", AiChE Summer Meeting, Boston, August, 1986.

"Hydroxylation of Aromatic Compounds Catalyzed by Horseradish Peroxidase", ACS National Meeting, Philadelphia, August, 1984.

Invited Industrial Seminars and Short-Courses

"Enzyme-Based Nanocomposites: Using Nature to Ward off Emerging Diseases", Genencor, Palo Alto, CA, July 2011.

"Enzyme-Based Paints and Coatings for Self-Cleaning and –Decontaminating Surfaces", External Speaker for Arch Chemicals Corporate Retreat, Norwalk, CT, March 2011.

"Enzyme-Based Nanocomposites: A New Opportunity to Exploit Biocatalysis", Wrigley Co., Chicago, IL, February 2011.

"Molecular Bioprocessing: From Synthetic Heparin to High-Throughput Cell Culture Platforms", Merck Research Labs, West Point, PA, November 2010.

"Establishing a Bioengineered Heparin as a Generic Pharmaceutical", Sandoz, Kundl, Austria, December 2009.

"Bioengineered Heparin", Otsuka Pharmaceuticals, Naruto, Japan, September 2009.

"The MetaChip: A High-Throughput Biocatalysis and Cell Culture Platform for the Rapid Screening of Chemical, Drug, and Cosmetic Toxicity", General Electric R&D, Niskayuna, NY, January 2008.

"The MetaChip: A High-Throughput Biocatalysis and Cell Culture Platform for the Rapid Screening of Metabolic Activation and Toxicity of Chemicals", BASF, Ludwigshafen, Germany, September 2007.

"Biologically-Driven Synthesis and Assembly of Functional Nanomaterials", FMC Corporation, Princeton, NJ, December 2006.

"High-Throughput Biocatalysis for New Compound Discovery", Codexis, Redwood City, CA, March 2006.

"The Green State of Biocatalysis", Kodak, Rochester, NY, July 2005.

"High-Throughput Biocatalysis for New Compound Discovery", Biocatalysis Workshop, University College, London, April 2005.

"Biomolecular Assemblies for Functional Surfaces", Ciba Specialty Chemicals, Basel, December 2003.

"Biocatalysis in the Materials World", 3M, St. Paul, MN, March 2003.

"Biocatalysis as a Tool for Drug Discovery", Diversa Corp., San Diego, CA, October 2002.

"Biotechnology at the Micro- and Nanoscales", BASF, Ludwigshafen, Germany, August 2002.

"Engineering a Biology-Materials Interface", GE Silicones, Waterford, NY, May 2002.

“Enzyme Technology for a Materials Company”, Short-Course on industrial biotechnology given to W.R. Grace (Davison Division), Columbia, MD, April 2001.

“Biocatalytic Materials: Opportunities for New Catalytically Active Systems”, Toray, Kyoto, Japan, July 2001.

“Biocatalytic Opportunities in Agrochemicals”, Calgene, Inc., Davis, CA, April 1999.

"Enzyme Technology", Short Course for Hercules, Inc., Barnaveld, The Netherlands, October, 1998.

"Enzymatically-Derived Sugar Based Polymers", SCA, Gothenburg, Sweden, October, 1998.

"Enzyme Technology for the Chemical Industry", Dow Chemical Co., Midland, MI, June, 1998.

“Enzyme Technology”, Short Course for Engelhard Corp., Iselin, NJ, June, 1997.

“Industrial Enzymology”, Short Course for Hercules, Inc. Wilmington, DE, June, 1997.

“Combinatorial Biocatalysis for Drug Discovery”, Ciba-Geigy, Basel, Switzerland, October, 1996.

“Enzymatic Catalysis for the Pharmaceutical Industry”, Abbott Laboratories, North Chicago, IL, June, 1996.

“Biocatalysis for the Petroleum Industry”, British Petroleum Chemicals, London, England, June, 1996.

“Enzymatic Catalysis for Bulk and Fine Chemicals Production”, Hercules, Wilmington, DE, April, 1996.

“Enzymes Masquerading as Chemical Catalysts: The Properties and Potentials of Enzyme Technology”, Dow Chemical Company, Midland, MI, April, 1996.

"Modern Methods of Influencing Enzyme Structure and Function", Lonza, Ltd., Visp, Switzerland, September, 1994.

"Unusual Catalytic Properties of Peroxidases", Clorox, Co., Pleasanton, CA, September, 1993.

"Enzyme Technology Short Course", Mallinckrodt Chemicals, St. Louis, April, 1993.

"Enzymatic Catalysis in Organic Solvents", Lonza, Ltd., Visp, Switzerland, February, 1993.

"Potential of Nonaqueous Enzymology for the Pharmaceutical Industry", Hoffmann-La Roche, Basel, February, 1993.

"Enzymes in Industrial Biotechnolgy", Sumitomo Corp., Takarazuka, Japan, September, 1992.

"Peroxidases and Their Commercial Opportunities", Novo Nordisk, Bagsvaerd, Denmark, April, 1992.

"Enzymes for the Synthesis of Specialty Chemicals", Yukong Ltd, Fairfield, NJ, November, 1991.

Short-Course entitled "Enzymes for Novel Food Applications", Kraft General Foods, Tarrytown, NY, May, 1991.

"Biocatalysis and Biorecognition in Nonaqueous Systems for Reaction and Separation", Olin Chemical, Cheshire, CT, May, 1991.

"Enzymatic Catalysis in Organic Media", Enzon, Inc., South Plainfield, NJ, April, 1991.

"Chemoenzymatic Approaches to Organic and Polymer Syntheses", Allied-Signal, Des Plaines, IL, January, 1991.

"Protein Design for Organic Media", Procter and Gamble, Co., Cincinnati, OH, February, 1990.

"Potential of Enzymes as Catalysts for Biodegradable Polymer Synthesis", E. I. Du Pont De Nemours & Co., Wilmington, DE, June, 1989.

"Alterations in Enzymic Substrate Specificity in Organic Solvents", Genencor, Inc., South San Francisco, CA, April, 1989.

"Peroxidases in Coal Liquefaction", Amoco Oil Co., Naperville, IL, January, 1989.

"Peroxidase Catalysis in Organic Media", Mead Corp., Chillicothe, OH, October, 1988.

Ph.D. Students and Postdocs
Total number of Ph.D. students graduated = 55
Total number of postdocs supervised = 70