

## *Curriculum Vitae*

### **DAVID HOWARD SHERMAN**

#### ***Address***

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#### ***Education***

B.A. in Chemistry (with Honors) from the University of California, Santa Cruz, CA: 1975 - 1978  
Research Advisor: Professor Phil Crews

Ph.D. in Organic Chemistry from Columbia University, New York City, NY; 1978 - 1981  
Research Advisor: Professor Gilbert Stork

#### ***Professional Appointments***

1981 - 1982	Postdoctoral, Yale University, New Haven, CT (R.E. Handschumacher)
1982 - 1984	Postdoctoral, Massachusetts Institute of Technology, Cambridge, MA (H.N. Eisen)
1984 - 1987	Research Scientist, Biogen Research Corp., Cambridge, MA
1987 - 1990	Research Scientist, John Innes Institute, Norwich, U.K.
1990 - 1995	Assistant Professor, University of Minnesota, Department of Microbiology and BioTechnology Institute
1995 - 2000	Associate Professor, University of Minnesota, Department of Microbiology and BioTechnology Institute
1996 - 1998	Director, University of Minnesota, Center for Microbial Physiology and Metabolic Engineering
1997	(sabbatical) Senior Director, ChromaXome Corporation, San Diego, CA
1998 - 2001	Director, Microbiology, Immunology and Cancer Biology Graduate Program
1999 - 2007	Founder and Chief Technical Consultant, Acera Biosciences, Inc.
2000 - 2003	Director, UMN-NIGMS Biotechnology Training Program
2000 - 2003	Professor, University of Minnesota, Department of Microbiology and BioTechnology Institute
2003 - 2007	J. G. Searle Professor, University of Michigan, Department of Medicinal Chemistry
2004 - 2014	Director, Center for Chemical Genomics, Life Sciences Institute, University of Michigan
2003 - present	Professor, University of Michigan, Department of Chemistry
2003 - present	Professor, University of Michigan, Department of Microbiology & Immunology
2007 - present	Hans W. Vahlteich Professor, University of Michigan, Department of Medicinal Chemistry

2011 – 2016 Associate Dean for Research and Graduate Education (College of Pharmacy)  
 2016 – present *Microbiology Spectrum* Advisory Board, American Society for Microbiology Press  
 2017 – present Member Editorial Board, *Journal of Biological Chemistry*, American Society for Biochemistry and Molecular Biology

### ***Honors and Awards***

1978 American Chemical Society Award for Excellence in Undergraduate Research  
 1978 University of California, Santa Cruz, Honors in the Major (Chemistry)  
 1981 Pegram Award for Excellence in Graduate Research, Columbia University  
 1982 - 1984 National Institutes of Health Postdoctoral Fellowship  
 1984 - 1986 Myron A. Bantrell Postdoctoral Research Fellowship in Molecular Biology  
 1990 - 1992 Eli Lilly Life Sciences Award  
 1992 - 1995 Procter & Gamble University Exploratory Research Program  
 2003 - 2007 John Gideon Searle Jr. Professorship, University of Michigan  
 2005- Co-chair, University of Miami Oceans and Human Health Center External Advisory Committee  
 2007- Hans W. Vahlteich Professorship, University of Michigan  
 2008 Elected Fellow, American Association for the Advancement of Science  
 2009 A. C. Cope Scholar Award, American Chemical Society  
 2009 Charles Thom Award, Society for Industrial Microbiology  
 2015 American Society for Microbiology Distinguished Lecturer (2015-2017)

### ***Select Named Lectureships and Major Symposia:***

2006 Gordon Cragg Symposium Lecture, Missouri Botanical Garden  
 2007 Abbott Laboratories Distinguished Lecture, Notre Dame Univ., Dept. of Chemistry & Biochemistry  
 2010 Joseph F. Bunnett Lecture, UC Santa Cruz Department of Chemistry and Biochemistry  
 2010 National Academy of Sciences Peru (Lima, Peru)  
 2012 J. Clarence Karcher Lecture, Department of Chemistry and Biochemistry, University of Oklahoma  
 2012 Plenary Lecture, Korean Society for Microbiology (Seoul, Korea)  
 2012 Plenary Lecture, International Symposium for Natural Product Research, (New York, NY)  
 2012 Plenary Lecture, Directing Biosynthesis III, (Nottingham, UK)  
 2012 Foster Colloquium Lecture, University of Buffalo, Department of Chemistry  
 2012 Plenary Lecture, University of Colorado Symposium on Translating Structural Biology to Medicine  
 2013 Plenary Lecture, Drexel Univ. School of Medicine, Symposium on Metagenomics & Synthetic Biology  
 2014 C. Richard Hutchinson Lecture, University of Wisconsin-Madison  
 2015 Distinguished Organic Research Lecture, University of British Columbia  
 2015 Madeleine Joullié Lecture, University of Pennsylvania, Department of Chemistry  
 2016 Melvin Calvin Lecture, University of California, Berkeley, Department of Chemistry  
 2016 Plenary Lecture, Genetics of Industrial Microorganisms Symposium (Wuhan, China)  
 2017 Plenary Lecture, International Symposium for the Biology of Actinomycetes (Jeju, Korea)

- 2017 Plenary Lecture, Bristol-Myers Squibb Company Green Chemistry Symposium  
2017 4<sup>th</sup> Annual General Electric Santé Lecture in Biochemistry, McGill University (Montreal, Canada)  
2019 Keynote Speaker, Copenhagen Bioscience Conference; Natural Products Discovery, Biosynthesis and Application (Novo Nordisk Foundation, Copenhagen, Denmark)

### ***Research Experience and Interests***

Undergraduate Research (U.C. Santa Cruz): A novel GC/MS method was developed for the identification and characterization of polysaccharide natural products from marine alga.

Graduate Research (Columbia University): A general method was developed for construction of trans-hydrindanone ring systems, and the total synthesis of 11-keto steroids using an intramolecular Diels-Alder approach.

Postdoctoral Research (Yale University): Studies of the immunosuppressive drug cyclosporin A were performed to determine its effects on thymocyte populations in mice.

Postdoctoral Research (MIT): Studies were conducted on non-H-2 class I molecules of the mouse major histocompatibility complex. Our work showed that specific subpopulations of T cells expressed structurally diverse molecules encoded in the Qa-2 locus.

Biogen Research Corporation (Cambridge, MA): A molecular genetic study was conducted on insulin-specific, class II MHC restricted T cell receptors in mice. Further biochemical and molecular genetic studies were conducted on Qa-2 encoded MHC molecules.

John Innes Institute (Norwich, U.K.): A molecular genetic analysis of type II polyketide synthase systems was conducted to explore the identity and mechanism of construction of complex secondary metabolites in *Streptomyces*.

University of Michigan (Ann Arbor, MI): Research interests include synthetic chemistry, bioorganic and biochemical studies of natural product biosynthetic pathways from marine and terrestrial microbes. Metabolic engineering and microbial genomic and proteomic technologies are being developed and utilized for analysis and production of novel biologically active molecules and liquid fuels.

### ***Professional Memberships***

- 1978 - Present American Chemical Society  
1982 - Present American Association for the Advancement of Science  
1987 - Present American Society for Microbiology  
2000 – Present Society for Industrial Microbiology  
2015 – Present American Association of Pharmaceutical Scientists  
2015 – Present American Society for Pharmacognosy  
2016 – Present American Heart Association

### ***Publications***

1. Stork, Gilbert and David H. Sherman. 1982. "Efficient *de novo* construction of the indanpropionic acid precursor of 11-keto steroids. An improved internal Diels-Alder sequence," *J. Amer. Chem. Soc.* 104:3758-3759.
2. Kranz, David M., David H. Sherman, Michael V. Sitkovsky, Mark S. Pasternack, and Herman N. Eisen. 1984. "Immunoprecipitation of cell surface structures of cloned cytotoxic T lymphocytes by clone-specific antisera," *Proc. Natl. Acad. Sci. USA* 81:573-577. PMID: PMC344721
3. Sherman, David H. 1984. "Increasing sensitivity of luminescent enzyme immunoassay," *Trends in Biotechnology* 2:1-2.
4. Sherman, David H., David M. Kranz, and Herman N. Eisen. 1984. "Expression of structurally diverse Qa-2 encoded molecules on the surface of cloned cytotoxic T lymphocytes," *Journal of Experimental Medicine* 160:1421-1430. PMID: PMC2187513
5. Devlin, James J., Georg Widera, Andrew L. Mellor, Karen Fahrner, David H. Sherman, Elisabeth H. Weiss, and Richard A. Flavell. 1985. "Evolution and expression of the transplantation antigen gene family," *Federation Proceedings* 44:2736-2740. PMID:3926542
6. Sherman, David H., David M. Kranz, and Herman N. Eisen. 1985. "Qa-2 encoded molecules expressed on the surface of cloned cytotoxic T lymphocytes are structurally diverse," *The Cell Biology of the MHC*, H. Vogel and B. Pernis (eds.), Academic Press, Inc., New York.
7. Flavell, Richard A., Hamish Allen, Linda C. Burkly, David H. Sherman, Gerald L. Waneck, and Georg Widera. 1986. "Molecular biology of the H-2 complex," *Science* 233:437-443.
8. Sherman, David H., Paula S. Hochman, Robert Dick, Richard Tizard, K.L. Ramachandran, Richard A. Flavell, and Brigitte T. Huber. 1987. "A molecular analysis of antigen recognition by insulin specific T cell hybridomas from B6 wild type and bm12 mutant mice," *Molecular and Cellular Biology* 7:1865-1872. PMID: PMC365290
9. Waneck, Gerald L., David H. Sherman, Susan Calvin, Hamish Allen, and Richard A. Flavell. 1987. "Tissue-specific expression of a transfected Qa region gene (Q7<sup>b</sup>) encoding the Qa-2 alloantigen," *Journal of Experimental Medicine* 165:1358-1370. PMID: PMC2188306
10. Sherman, David H., Gerald L. Waneck, and Richard A. Flavell. 1988. "Qa-2 antigen encoded by Q7<sup>b</sup> transfected R1.1 cells is biochemically indistinguishable from Qa-2 expressed on the surface of C57B1/10 mouse spleen cells," *Journal of Immunology* 140:138-142. PMID:3335777
11. Waneck, Gerald L., David H. Sherman, Paul W. Kincade, Martin G. Low, and Richard A. Flavell. 1988. "Molecular mapping of sites in Qa-2 required for attachment of the phosphatidylinositol membrane anchor," *Proc. Natl. Acad. Sci. USA* 85:577-581. PMID: PMC279594
12. Sherman, D.H., F. Malpartida, M.J. Bibb, H.M. Kieser, S.E. Hallam, J.A. Robinson, S. Bergh, M. Uhlen, T.J. 1988. "Cloning and analysis of genes for the biosynthesis of polyketide antibiotics in *Streptomyces* species," in Durand, G., Bobichon, L. and Florent, J. (eds.) *Proceedings of the 8th International Biotechnology Symposium, Paris*. Societe Francaise de Microbiology, Vol. 1, pp. 123-137.

13. Sherman, David H., Francisco Malpartida, Maureen J. Bibb, Helen M. Kieser, Mervyn J. Bibb, and David A. Hopwood. 1989. "Structure and deduced function of the granaticin-producing polyketide synthase gene cluster from *Streptomyces violaceoruber* Tu22," *EMBO Journal* 8:2717-2725. PMID: PMC401279
14. Hopwood, David A. and David H. Sherman. 1990. "Molecular genetics of polyketides and its comparison to fatty acid biosynthesis," *Annual Review of Genetics* 24:37-66. PMID:2088174
15. Hopwood, David A., David H. Sherman, Chaitan Khosla, Maureen J. Bibb, Thomas J. Simpson, Miguel A. Fernandez, Eduardo Martinez and Francisco Malpartida. 1990. "Hybrid pathways for the production of secondary metabolites," in Proceedings of the Sixth International Symposium on the Genetics of Industrial Microorganisms (GIM 90), Strassbourg, France .
16. Sherman, David H., M.J. Bibb, T.J. Simpson, D. Johnson, F. Malpartida, M. Fernandez-Moreno, E. Martinez, C.R. Hutchinson and D.A. Hopwood. 1991. "Molecular genetic analysis reveals a putative bifunctional polyketide cyclase/dehydrase gene from *Streptomyces coelicolor* and *Streptomyces violaceoruber*, and a cyclase/O-methyltransferase from *Streptomyces glaucesens*," *Tetrahedron*, 47:6029-6043.
17. Arrowsmith, T.J., F. Malpartida, D.H. Sherman, D.A. Hopwood, A. Birch, J.A. Robinson. 1992. "Characterization of *actI*-homologous DNA encoding polyketide synthase genes from the monensin producer *Streptomyces cinnamonensis*." *Mol. Gen. Genet.* 234:254-264. PMID:1508151
18. Sherman, D.H., Eung-Soo Kim, M.J. Bibb, and D.A. Hopwood, 1992. "Functional replacement of polyketide synthase genes in *Streptomyces coelicolor* by heterologous genes from a different polyketide pathway," *J. Bacteriol.* 174:6184-6190. PMID: PMC207686
19. Malmberg, Li-Hong, Sherman, D.H., Hu, Wei-Shou, 1993. "Analysis of rate-limiting reactions in cephalosporin biosynthesis," *Annals of the New York Academy of Sciences* 665:16-26. PMID:1416602
20. Khosla, C., McDaniel, R., Ebert-Khosla, S., Torres, R., Sherman, D.H., Bibb, M.J. and Hopwood, D.A., 1993. "Genetic construction and functional analysis of hybrid polyketide synthases containing heterologous acyl carrier protein." *J. Bacteriol.* 175:2197-2204. PMID: PMC204504
21. Malmberg, L.-H., Hu, W.-S. and D.H. Sherman, 1993. "Precursor flux control through targeted chromosomal insertion of the lysine  $\epsilon$ -aminotransferase gene in cephamycin C biosynthesis." *J. Bacteriol.* 175:6916-6924. PMID: PMC206817
22. Hopwood, D.A., C. Khosla, D.H. Sherman, M.J. Bibb, S. Ebert-Khosla, E.-S. Kim, R. McDaniel, W.P. Revill, R. Torres, and T.-W. Yu. 1994. "Toward an understanding of the programming of aromatic polyketide synthases: a genetics-driven approach," in R.H. Baltz, G.D. Hegeman, and P.L. Skatrud (Eds.), *Industrial Microorganisms: Basic and Applied Molecular Genetics*, American Society for Microbiology, Washington, D.C.
23. Kim, E.-S., D.A. Hopwood and D.H. Sherman, 1994. "Analysis of type II polyketide  $\beta$ -ketoacyl synthase specificity in *Streptomyces coelicolor* A3(2) by *trans* complementation of actinorhodin synthase mutants." *J. Bacteriol.* 176:1801-1804. PMID: PMC205275

24. Kim, E.-S., Bibb, M.J., Butler, M.J., Hopwood, D.A., and D.H. Sherman. 1994. "Sequences of the oxytetracycline polyketide synthase-encoding *otc* genes from *Streptomyces rimosus*." *Gene* 141:141-142 (1994) PMID:8163168
25. Bibb, M.J., D.H. Sherman, S. Omura and D.A. Hopwood. 1994. "Cloning, sequencing and deduced functions of a cluster of *Streptomyces* genes probably encoding for biosynthesis of the polyketide antibiotic frenolicin." *Gene* 142:31-39. PMID:8181754
26. August, P.A., Flickinger, M.C. and D.H. Sherman. 1994. "Cloning and analysis of a locus (*mcr*) involved in mitomycin C resistance from *Streptomyces lavendulae*." *J. Bacteriol.* 176:4448-4454. PMID: PMC205660
27. Malmberg, L.H., A. Khetan, D.H. Sherman and W.-S. Hu. 1994. "Metabolic engineering of cephalosporin biosynthesis in *Streptomyces clavuligerus*." In *Advances in Bioprocess Engineering*. E. Galindo & O.T. Ramirez, Eds.: 413-416. Kluwer Pub.
28. Kim, E.-S., Cramer, K., Shreve, A., and D.H. Sherman. 1995. "Heterologous expression of an engineered biosynthetic pathway: functional dissection of type II polyketide synthase components in *Streptomyces* species." *J. Bacteriol.* 177:1202-1207. PMID: PMC176724
29. Crosby, J., Sherman, D.H., Bibb, M.J., Revill, W.P., Hopwood, D.A., and T.J. Simpson, 1995. "Polyketide synthase acyl carrier proteins from *Streptomyces*: Expression in *Escherichia coli*, purification and partial characterization." *Biochimica et Biophysica Acta* 1251:32-41. PMID:7647090
30. Malmberg, L.-H., Hu, W.-S., and D.H. Sherman. 1995. "Effects of enhanced lysine  $\epsilon$ -aminotransferase activity on cephamycin C biosynthesis in *Streptomyces clavuligerus*." *Applied Microbiol. Biotechnol* 44: 198-205. PMID:8579831
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32. August, P.R., J.A. Rahn, M.C. Flickinger, and D.H. Sherman, 1996. "Inducible expression of the mitomycin C resistance gene product (MCRA) from *Streptomyces lavendulae*." *Gene* 175:261 - 267. PMID:8917108
33. Williams, M.D., A.M. Fieno, R.A. Grant and D.H. Sherman. 1996. "Expression and analysis of a bacterial poly(hydroxyalkanoate) synthase in insect cells using a baculovirus system." *Prot. Exp. Purif.* 7:203-211. PMID:8812862
34. Williams, M.D., J. Rahn, and D.H. Sherman. 1996. "Production of a polyhydroxyalkanoate biopolymer in insect cells with a modified eucaryotic fatty acid synthase." *Appl. Environ. Microbiol.* 62:2540-2546. PMID: PMC168036
35. Sheldon, P.J., D.A. Johnson, P.R. August, H.-w. Liu and D.H. Sherman. 1997. "Characterization of a mitomycin resistance determinant (*mrd*) from the producing organism. *Streptomyces lavendulae*." *J. Bact.* 179:1796 - 1804. PMID: PMC178896

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37. Sheldon, P.J., D. A. Johnson, P.R. August, H.-w. Liu and D. H. Sherman. 1997. "Cellular self-protection against the antitumor antibiotic mitomycin C in *Streptomyces lavendulae*." *Industrial Microorganisms: Basic and Applied Molecular Genetics* (R. Baltz, G. Hegemann and P. Skatrud), Vol. 34, pp. 123 - 130.
38. Van Pilsum, J.F., D.H. Sherman, T.V. Line, A. Bedekar and L. Ayala. 1997. "Sequence comparison and functional analysis of amidinotransferases from eukaryotes and prokaryotes." In De Deyn, P.P., Marescau, B., Qureshi, I.A., and Mori, A. (eds.) *Guanidino Compounds in Biology and Medicine II*, London: John Libbey and Company LTD; 111 - 120.
39. Bedeker, B., R.M. Zink, D. H. Sherman, T.V. Line, and J. Van Pilsum. 1998. "The comparative amino acid sequences, substrate specificities and gene or cDNA nucleotide sequences of some procaryotic and eucaryotic amidinotransferases: implications for evolution." *Comp. Biochem. Physiol.* 119:677-690. PMID:9787760
40. Zhao, L., D. H. Sherman, and H.-w. Liu. 1998. "Biosynthesis of desosamine: molecular evidence suggesting  $\beta$ -glucosylation as a self-resistance mechanism in methymycin/neomethymycin producing strain, *Streptomyces venezuelae*." *J. Amer. Chem. Soc.* 120:9374-9375.
41. Zhao, L., D. H. Sherman, and H.-w. Liu. 1998. "Biosynthesis of desosamine: Construction of a new methymycin/neomethymycin analog by deletion of a desosamine biosynthetic gene." *J. Amer. Chem. Soc.* 120:10256-10257.
42. Xue, Y., L. Zhao, H.-w. Liu and D. H. Sherman. 1998. "A gene cluster for macrolide antibiotic biosynthesis in *Streptomyces venezuelae*: Architecture of metabolic diversity." *Proc. Natl. Acad. Sci. USA* 95:12111-12116. PMCID: PMC22793
43. Xue, Y., D. Wilson, L. Zhao, H.-w. Liu, and D. H. Sherman. 1998. Hydroxylation of macrolactones YC-17 and narbomycin is mediated by the *pikC*-encoded cytochrome P450 in *Streptomyces venezuelae*. *Chem. & Biol.* 5:661-667. PMID:9831532
44. Zhao, L., N.L.S. Que, Y. Xue, D. H. Sherman, and H.-w. Liu. 1998. "Mechanistic studies of desosamine biosynthesis: C-4 deoxygenation precedes C-3 transamination." *J. Amer. Chem. Soc.* 120:12159-12160.
45. Borisova, S., L. Zhao, D.H. Sherman and H.-w. Liu. 1999. Biosynthesis of desosamine: Construction of a new macrolide carrying a genetically designed sugar moiety. *Organic Lett.* 1:133-136. PMID:10822548
46. Zhao, L., J. Ahlert, Y. Xue, Jon S. Thorson, David H. Sherman, and Hung-wen Liu. 1999. Engineering A Methymycin/Pikromycin-Calicheamicin Hybrid: Construction of Two New Macrolides Carrying a Designed Sugar Moiety. *J. Amer. Chem. Soc.* 121:9881-9882.

47. Mao, Y., M. Varoglu and D.H. Sherman. 1999. "Molecular characterization of two genes (*mitAB*) required for biosynthesis of the antitumor antibiotic mitomycin C." *J. Bacteriol.* 181:2199-2208. PMID: PMC93634
48. Sheldon, P.J., Y. Mao, Min He and D.H. Sherman. 1999. "Mitomycin resistance in *Streptomyces lavendulae* includes a novel drug-binding protein-dependent export system." *J. Bacteriol.* 181:2507-2512. PMID: PMC93678
49. Mao, Y., M. Varoglu and D. H. Sherman. 1999. Molecular characterization and analysis of the biosynthetic gene cluster for the antitumor antibiotic mitomycin C from *Streptomyces lavendulae* NRRL 2564. *Chem. & Biol.* 6:251-263. PMID:10099135
50. Khetan, A., L.-H. Malmberg, Y. S. Kyung, D.H. Sherman and W.-S. Hu. 1999. "Precursor and cofactor as a check valve for cephamycin biosynthesis in *Streptomyces clavuligerus*." *Biotechnology Progress* 15:1020-1027. PMID:10585184
51. Han, Lei, A. Khetan, W.-S. Hu, and D.H. Sherman. 1999. "Time-lapse microscopy reveals temporal and spatial expression of lysine- $\epsilon$ -aminotransferase gene in *Streptomyces clavuligerus*." *Mol. Microbiol.* 34:878-886. PMID:10594815
52. Belcourt, M.F., P.G. Penketh, W.F. Hodnick, D.A. Johnson, D.H. Sherman, S. Rockwell and A.C. Sartorelli. 1999. "Mitomycin resistance in mammalian cells expressing the bacterial mitomycin C resistance protein MCRA." *Proc. Natl. Acad. Sci. USA* 96:10489-10494. PMID: PMC17916
53. Xue, Y., and D.H. Sherman. 2000. Alternative modular polyketide synthase expression controls macrolactone structure. *Nature* 403:571-575. PMID:10676969
54. Xue, Y., D. Wilson, and D.H. Sherman. 2000. "Genetic architecture of the polyketide synthases for methymycin and pikromycin series macrolides." *Gene* 245:203-211. PMID:10713461
55. He, M., M. Varoglu and D.H. Sherman. 2000. "Functional analysis of conserved amino acid residues in the actinorhodin  $\beta$ -ketoacyl-ACP-synthase." *J. Bacteriol.* 182:2619-2623. PMID: PMC111329
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66. Sang-Jung Kim, Han-Young Kang, and David H. Sherman. 2001. Synthesis of triketide delta-lactones. *Synthesis* 12:1790-1793.
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pikromycin PikAIV, leads to efficient triketide lactone synthesis. *Biochemistry* 41:10827-10833. PMID:12196022

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### ***Patents (issued)***

Sherman, D. H. et al., "Nonribosomal peptide synthetases." Filing Date: January 22, 2014, Issue Date: June 12, 2018 as U. S. Patent 9,994,885 B2.

Sherman, D. H. et al., "Baulamycins, compositions and methods of use thereof." Filing Date: May 20, 2014, Issue Date: October 31, 2017 as U. S. Patent 9,803,187 B2.

Sherman, D. H. et al., "Biosynthetic pathway for heterologous expression of a nonribosomal peptide synthetase drug and analogs". Filing Date: August 25, 2014, Issue Date: April 4, 2017 as U. S. Patent 9,611,491.

Sherman, D. H. et al. "Non-ribosomal peptide synthetases". Filing Date: May 15, 2016, Issue Date: November 8, 2016 as U. S. Patent 9,487,763.

Sherman, D. H. et al. "Method for enzymatic production of decarboxylated polyketides and fatty acids" Filing Date: July 23, 2009, Issue Date: July 1, 2014 as U. S. Patent 8,765,431.

Sherman, D.H., N. A. Magarvey, Z. Q. Beck, "Nucleic Acids and Polypeptides Involved in the Production of Cryptophycin." University of Michigan. Issue Date: November 20, 2012, as U. S. Patent #8,313,936

Sherman, D.H., N. A. Magarvey, Z. Q. Beck, "Nucleic Acids and Polypeptides Involved in the Production of Cryptophycin." University of Michigan. Filing Date: March 27, 2007; Issue Date: February 16, 2010, U.S. Patent #7,662,599.

Dordick, J., Clark, D. and D. H. Sherman, "In vitro Metabolic Engineering on Microscale Devices." U.S. Patent #7,427,497; issued September 23, 2008.

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Sherman, D.H., Y. Xue and M.D. Williams, "Metabolic Engineering of Polyhydroxyalkanoate Monomer Synthases," U.S. Patent No. 6,600,029. Issued, July 29, 2003.

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Sherman, D.H., L.-H. Malmberg and W.-S. Hu, "Method for increasing production of microbial metabolites by genetic engineering," U.S. Patent No. 5,474,912. Issued, December 12, 1995.

## **Books**

*Manual of Industrial Microbiology and Biotechnology* (Editors in Chief: A.L. Demain and J.E. Davies); eds (R.M. Atlas, G. Cohen, C.L. Hershberger, W.-S. Hu, D. H. Sherman and J. H. D. Wu). ASM Press, Washington, D.C. (1999).

*Aziridines and Epoxides in Organic Synthesis* (Editor, Andrei Yudin), Wiley-VCH Publishers, Weinheim, Germany (2005)

## **Invited Lectures and Presentations (since 2005)**

- 2005 Vanderbilt Institute of Chemical Biology (Nashville, TN)
- 2005 Southwest Oncology Group Spring Meeting, Nurse Oncologist Plenary Session (Denver, CO)
- 2005 DowAgro, Indianapolis, IN
- 2005 University of California, San Diego (Department of Chemistry and Biochemistry)
- 2005 Gordon Research Conference on Mycotoxins and Phycotoxins (Colby College, Maine)
- 2005 Bio-X Life Sciences Institute, Shanghai Jiao Tong University (Shanghai, China)
- 2005 Pacificchem Symposium on Biosynthesis of Natural Products (Honolulu, HI)
- 2005 Pacificchem Symposium on Biopolymers (Honolulu, HI)
- 2006 University of California, Irvine, Department of Chemistry and Biochemistry (Irvine, CA)
- 2006 Sea Secrets Plenary Lecture, University of Miami (Miami, FL)
- 2006 University of Colorado, Department of Chemistry (Fort Collins, CO)
- 2006 Ann Arbor/Ypsilanti Reads Lecture, Ann Arbor District Library (Ann Arbor, MI)
- 2006 Boston College, Department of Chemistry (Boston, MA)
- 2006 University of Papua New Guinea, Papua New Guinea
- 2006 ACS National Meeting, Symposium on "Modern Natural Products Chemistry and Drug Discovery" (Atlanta, GA)
- 2006 Annual Meeting of Korean Society for Microbiology and Biotechnology (Busan, Korea)
- 2006 GIM Symposium on Novel Bioactive Compounds (Prague, Czech Republic)
- 2006 InBio, Islas Murcielago, Costa Rica
- 2006 American Society of Pharmacognosy Meeting on "Natural Products on Target" (Arlington, VA)
- 2006 University of Michigan, Department of Medicinal Chemistry
- 2006 Gordon Cragg Symposium, Missouri Botanical Garden (St. Louis, MO)
- 2007 University of Utah, Department of Medicinal Chemistry (Salt Lake City, UT)
- 2007 International Marine Biotechnology Symposium (Elat, Israel)
- 2007 Notre Dame University, Department of Chemistry and Biochemistry, Abbott Laboratories Distinguished Lecturer Seminar (South Bend, IN)
- 2007 Texas A & M University, Department of Chemistry (College Station, TX)
- 2007 Michigan State University, Department of Chemistry (East Lansing, MI)
- 2007 Eli Lilly & Co. (Indianapolis, IN)
- 2007 INBio Marine Cyanobacteria Workshop (Puerto Viejo, Costa Rica)
- 2007 US/Japan Marine Natural Products Symposium (Park City, Utah)
- 2007 7<sup>th</sup> Annual Marine Natural Products Symposium (Walindi, West New Britain, PNG)
- 2007 Great Lakes Regional Center of Excellence for Biodefense National Meeting (Hilton Head, NC)
- 2008 Zing Natural Products Conference, Plenary Lecture (Bolans Village, Antigua, West Indies)
- 2008 University of Michigan, Department of Pharmacology (Ann Arbor, MI)

2008 Marine Natural Products Gordon Research Conference (Ventura, CA)  
2008 University of Kentucky, Department of Pharmaceutical Sciences, College of Pharmacy (Lexington, KY)  
2008 Department of Chemistry, Portland State University (Portland, OR)  
2008 Department of Chemistry, University of Chicago (Chicago, IL)  
2008 Cempra Pharmaceuticals, Inc. (Chapel Hill, NC)  
2008 Costa Rica Institute for Biodiversity (San Jose, Costa Rica)  
2008 Enzymes, Co-Enzyme, Metabolic Pathways, Gordon Research Conference (Biddeford, ME)  
2008 Workshop on Molecular Biodiversity and Bioprospecting, Universidad Nacional Agraria La Molina (Lima, Peru)  
2008 Department of Chemical and Biological Engineering, SUNY Buffalo (Buffalo, NY)  
2008 1<sup>st</sup> Euro-Mediterranean Conference on Marine Natural Products (Sharm el Sheikh, Egypt)  
2009 Department of Chemistry, Brown University (Providence, RI)  
2009 Department of Chemistry, University of Illinois-Champaign/Urbana  
2009 Natural Products Gordon Research Conference (Tilden School, NH)  
2009 Charles Thom Award Lecture, Society for Industrial Microbiology (Toronto)  
2009 A. C. Cope Award Symposium, ACS National Meeting (Washington, D.C.)  
2009 Department of Chemistry, Ohio University (Athens, Ohio)  
2009 Department of Chemistry and Biochemistry, Boston University (Boston, MA)  
2009 Pfizer Animal Health (Kalamazoo, MI)  
2010 Department of Chemistry, University of Pennsylvania (Philadelphia, PA)  
2010 7th International Symposium for Chinese Medicinal Chemists, Kaohsiung Medical University  
2010 Department of Chemistry, Case Western Reserve University (Cleveland, OH)  
2010 Department of Drug Discovery and Development, Eisai Pharmaceuticals (Tokyo, Japan)  
2010 Keystone Conference on Medicinal Chemistry (Whistler, BC)  
2010 Joseph F. Bunnett Lecturer, UC Santa Cruz Department of Chemistry and Biochemistry (Santa Cruz, CA)  
2010 Department of Chemistry, Northwestern University (Evanston, Ill)  
2010 Gordon Research Conference on Stereochemistry (Salve Regina University, Rhode Island)  
2010 American Chemical Society National Meeting (Boston, MA)  
2010 National Academy of Sciences Peru (Lima, Peru)  
2010 Department of Chemistry, University of Nebraska (Lincoln, NE)  
2010 Pacificchem Conference on the Biosynthesis of Natural Products (Honolulu, HI)  
2010 Pacificchem Conference on Chemoenzymatic Synthesis (Honolulu, HI)  
2011 Sandler Center for Drug Discovery, UCSF (San Francisco, CA)  
2011 Department of Medicinal Chemistry, University of Illinois-Chicago (Chicago, IL)  
2011 Abbott Lectureship and Workshop, Department of Chemistry, UMN (MPLS, MN)  
2011 27<sup>th</sup> International Symposium on the Chemistry of Natural Products (Brisbane, Australia)  
2011 School of Medicine and Health Sciences, University of Papua New Guinea (Port Moresby, PNG)  
2011 Joint Genome Institute/University of Costa Rica Bioinformatics Workshop (San Jose, Costa Rica)  
2011 Department of Chemistry, University of Costa Rica (San Jose, Costa Rica)  
2011 Department of Chemistry, Texas A & M University (College Station, Texas)  
2012 International Workshop on Microbial Symbiosis (Elat, Israel)  
2012 Life Sciences Symposium, Tel Aviv University (Tel Aviv, Israel)  
2012 Great Lakes Regional Center of Excellence for Biodefense Entrepreneurial Workshop, University of Chicago (Chicago, Illinois)  
2012 J. Clarence Karcher Lecturer, Department of Chemistry and Biochemistry, University of Oklahoma (Norman, OK)



2012 Korean Society for Microbiology, Plenary Lecturer (Seoul, Korea)  
2012 Key Laboratory of Microbial Biotechnology, Shanghai Jiaotong University (Shanghai, China)  
2012 Migal Institute, Department of Molecular Microbiology (Kiryat Shmoneh, Israel)  
2012 Weizmann Institute of Sciences, Department of Structural Biology (Rehovot, Israel)  
2012 International Symposium for Natural Product Research, Plenary Lecturer (New York, NY)  
2012 Directing Biosynthesis III, Plenary Lecturer (Nottingham, UK)  
2012 Temple University, Department of Chemistry (Philadelphia, PA)  
2012 University of Buffalo, Department of Chemistry, Foster Colloquium Speaker (Buffalo, NY)  
2012 Technion Institute of Technology (Haifa, Israel)  
2013 Bowling Green State University, Department of Microbiology (Bowling Green, OH)  
2013 Korean Chemical Society Symposium on Bioorganic Chemistry (Seoul, Korea)  
2013 Yonsei University, Symposium on Recent Advances in Life Chemistry (Seoul, Korea)  
2013 University of Colorado Symposium on Translating Structural Biology to Medicine, Plenary Lecturer (Denver, CO)  
2013 International Cooperative Biodiversity Group Lecture (Isla del Coco, Costa Rica)  
2013 University of Costa Rica, Department of Chemistry (San Jose, Costa Rica)  
2013 American Society for Pharmacognosy; Plenary Lecture (St. Louis, MO)  
2013 Professor Phillip Crews Career Symposium; University of California, Santa Cruz (Santa Cruz, CA)  
2013 Society for Industrial Microbiology and Biotechnology (San Diego, CA)  
2013 Synthetic Genomics, Inc. (San Diego, CA)  
2013 Laboratorio de Micologia y Biotecnologia, Universidad Nacional Agraria La Molina (Lima, Peru)  
2013 Queen's University, Department of Chemistry (Kingston, Ontario)  
2013 University of South Carolina, Department of Chemistry and Biochemistry (Columbia, SC)  
2013 Rheinische-Friedrich-Willhelm-University, Post-Genomic Strategies For New Antibiotic Drugs and Targets (Bonn, Germany)  
2013 Drexel University School of Medicine, Plenary Lecture, Symposium on Metagenomics and Synthetic Biology (Philadelphia, PA)  
2014 Eck Institute for Global Health, University of Notre Dame (South Bend, IN)  
2014 Hematology/Oncology (HemOnc) Research Conference (University of Michigan Medical School)  
2014 BIOTA-FAPESP Workshop on Biodiversity and Natural Products (Sao Paulo, Brazil)  
2014 Bioorganic Chemistry Gordon Research Conference (Proctor Academy, New Hampshire)  
2014 Telluride Science Research Center Workshop on The Future of Asymmetric Catalysis (Telluride, CO)  
2014 Fusion Natural Products Symposium; Plenary Lecture (Chicago, Illinois)  
2014 Wayne State University, Department of Chemistry (Detroit, MI)  
2014 Hutchinson Lecturer, University of Wisconsin-Madison (Madison, WI)  
2014 Workshop on Marine Biotechnology and Drug Discovery (King Abdulaziz University, Jeddah, Saudi Arabia)  
2014 North Carolina State University (Department of Chemistry and Biomanufacturing Training and Education Center (Raleigh-Durham, North Carolina)  
2015 Society for Industrial Microbiology and Biotechnology Natural Products Symposium (San Diego)  
2015 Weizmann Institute of Science (Rehovot, Israel)  
2015 University of Michigan Drug Discovery Boot Camp (Department of Pharmacology)  
2015 Novartis Institute for Biomedical Research (Cambridge, MA)  
2015 Gordon Research Conference in Medicinal Chemistry (Colby-Sawyer College, New Hampshire)

2015 Eskitis Institute, Griffith University (Brisbane, Australia)  
2015 ACS National Meeting Medicinal Chemistry Symposium (Boston, MA)  
2015 2<sup>nd</sup> European Conference on Natural Products (Goethe University, Frankfurt, Germany)  
2015 Distinguished Organic Research Lecture, University of British Columbia (Vancouver, Canada)  
2015 Simon Fraser University, Department of Chemistry (Vancouver, Canada)  
2015 Vanderbilt Institute for Chemical Biology, Vanderbilt University (Nashville, TN)  
2015 Madeleine Joullié Lecture, University of Pennsylvania, Department of Chemistry (Philadelphia, PA)  
2015 Johns Hopkins University, Department of Chemistry (Baltimore, MD)  
2015 Eli Lilly & Co. 2015 Synthetic Biology Symposium (Indianapolis, IN)  
2016 American Society for Microbiology Symposium (San Francisco, CA)  
2016 Cayman Chemical Company (Ann Arbor, MI)  
2016 2<sup>nd</sup> Annual Symposium, Grand-National Institute for Personalized Medicine (Rehovot, Israel)  
2016 Melvin Calvin Lecture, University of California, Berkeley, Department of Chemistry (Berkeley, CA)  
2016 University of Michigan Medical School, Division of General Pediatrics Child Health Evaluation and Research (CHEAR) Unit (Ann Arbor, MI)  
2016 Society for Industrial Microbiology and Biotechnology (New Orleans, LA)  
2016 University of Minnesota Biotechnology Institute (St. Paul, MN)  
2016 Baruch Blumberg Institute, Natural Products Discovery Institute (Doylestown, PA)  
2016 Genetics of Industrial Microorganisms 2016 Plenary Lecturer (Wuhan, China)  
2016 Zhejiang University, Department of Pharmaceutical Sciences (Hangzhou, China)  
2016 Ocean University, Department of Chemistry (Qingdao, China)  
2016 Qingdao Institute of Bioenergy and Bioprocess Technology, CAS (Qingdao, China)  
2016 Ohio State University, Department of Chemistry and Biochemistry (Columbus, OH)  
2017 25<sup>th</sup> Enzyme Mechanisms Conference, St. Petersburg, FL  
2017 FUSION Natural Product Symposium, Cancun, Mexico  
2017 American Society for Biochemistry and Molecular Biology (Chicago, IL)  
2017 Distinguished Lecturer, Puerto Rico Society for Microbiology, 60th Annual Meeting, Innovation in Microbial Sciences (San Juan, Puerto Rico)  
2017 Plenary Lecturer, International Symposium for the Biology of Actinomycetes (Jeju, Korea)  
2017 U.S./Japan Biosynthesis Symposium (Lake Arrowhead, CA)  
2017 Bristol Myers Squibb Green Chemistry Symposium (New Brunswick, NJ)  
2017 New England BioLabs, Inc. (Ipswich, MA)  
2017 Repligen Award Symposium for the Chemistry of Biological Processes, ACS National Meeting (Washington, DC)  
2017 Gloucester Marine Sciences Institute Research Forum (Gloucester, MA)  
2017 4<sup>th</sup> Annual General Electric Santé Lecture in Biochemistry, McGill University (Montreal, Canada)  
2017 Purdue University, Department of Biochemistry (West Lafayette, Indiana)  
2017 University of Florida, College of Pharmacy (Gainesville, FL)  
2018 Plenary Lecture, Inaugural Symposium of the Peruvian Society for Biochemistry and Molecular Biology (Peruvian Academy of Sciences, Lima, Peru)  
2018 Eastern Michigan University 14<sup>th</sup> Annual Distinguished Lecture Series (Ypsilanti, MI)  
2018 National Taiwan University College of Pharmacy (Taipei, Taiwan)  
2018 Gordon Research Conference, Natural Products and Bioactive Compounds (Andover, NH)  
2018 Shandong University, National Key Laboratory for Microbial Synthetic Biology (Qingdao, China)  
2018 Qingdao International Synthetic Biology Workshop (Qingdao, China)

- 2018 National University Agraria La Molina Workshop in Natural Products and Metagenomics (Lima, Peru)
- 2019 Keynote Speaker, Translating Structural Biology to Medicine, Structural Biology & Biochemistry Symposium, University of Colorado Denver - Anschutz Medical Campus (Denver, CO)
- 2019 Keynote Speaker, Copenhagen Bioscience Conference; Natural Products Discovery, Biosynthesis and Application (Novo Nordisk Foundation, Copenhagen, Denmark)

### ***Students, postdoctoral fellows and technical staff currently in the laboratory***

Dr. Laura Mike (Postdoctoral Research Associate)  
 Dr. Sean Newmister (Research Investigator)  
 Dr. Ashootosh Tripathi (Research Assistant Professor)  
 Dr. Fengan Yu (Bioinformatics Associate)  
 Dr. Yogan Khatri (Postdoctoral Research Associate)  
 Dr. Ying Ye (Postdoctoral Research Associate)  
 Dr. Zachary Litman (CVC Postdoctoral Research Fellow)  
 Dr. Jennifer Schmidt (Postdoctoral Research Associate)  
 Dr. Vikram Shende (Postdoctoral Research Associate)  
 Amy Fraley (Medicinal Chemistry Rackham Predoctoral Fellow)  
 Lyanne Gomez-Rodriguez (Chemical Biology Graduate Research Associate)  
 Rosa Vasquez (Chemical Biology Graduate Research Associate)  
 Robert Hohlman (Medicinal Chemistry Graduate Research Associate)  
 Samantha Kelly (Chemical Biology Graduate Research Associate)  
 Maribel Okiye (Department of Chemistry, Graduate Research Associate)  
 Maria Adrover (Chemical Biology Graduate Research Associate)  
 Pam Schultz, M.S. (Research Scientist/Lab Supervisor)  
 Jennifer Soules (Program Coordinator)

### ***Professional Activities***

Referee of research articles submitted to *ACS Chemical Biology*, *Antimicrobial Agents and Chemotherapy*, *Applied Microbiology and Biotechnology*, *Canadian Journal of Microbiology*, *Gene*, *Journal of Applied and Environmental Microbiology*, *Journal of Bacteriology*, *Microbiology*, *Proceedings of the National Academy of Sciences USA*, *Tetrahedron*, *Science*, *Nature*, *Journal of the American Chemical Society*, *Organic Letters*, *Molecular Microbiology*, *Chemistry & Biology*, *Biotechnology Progress*, *Journal of Natural Products*, *Nature Biotechnology*, *Nature Chemical Biology*

Grant reviews: The Wellcome Trust, USDA, NSF, American Cancer Society, NIH SBIR Review Panel, National Research Initiative Competitive Grants Program, Canadian NSERC, NIH Natural Products and Bioorganic Chemistry Study Section (Ad hoc reviewer, 1997); NIH Special Emphasis Review Panel (March, 2000; April 2000, December 2001). Ad hoc member BNP Study Section NIGMS (February, 2002). NCI P01 Study Section, May 2010, NIH College of CSR Reviewers (2010-2012).

Permanent Member, NIH Synthetic Biological Chemistry B Study Section, (2005-2009)

### ***Graduate Faculty Appointments***

Interdisciplinary Program in Medicinal Chemistry, University of Michigan  
 Program in Biomedical Sciences, University of Michigan

Graduate Program in Chemistry, University of Michigan  
Interdisciplinary Graduate Program in Chemical Biology, University of Michigan

### **Teaching Portfolio (1990 – 1999)**

Biology of Microorganisms (Microbiology 5105/Biology 5013)

Enrollment: 110 students

Credits: 5

Winter Quarter

Academic Short Course - “Genetic Manipulation of Antibiotic Biosynthetic genes in *Streptomyces*,”  
Department of Biochemistry, Philipps University, Marburg, Germany (June, 1995)

Industrial Short Course (co-organizer with Prof. Wei-Shou Hu) - “Quantitative Physiology and Metabolic Engineering,” Department of Chemical Engineering and Materials Science, Biological Process Technology Institute, University of Minnesota, Twin Cities (October, 1995 and September, 1998 and August, 1999)

### **Teaching Portfolio (1999 to 2003) University of Minnesota**

MICA 8001 (Course Director; also responsible for 3 lectures during Part I covering microbial function and metabolism); this is a graduate level survey course required for all first year Microbiology, Immunology and Cancer Biology (MICaB) Ph.D. students.

MICA 8002 (Microbial Physiology and Metabolism; responsible for 10 lectures/research paper review sessions on microbial physiology and metabolism); this is a required course for all Microbiology track Ph.D. students in the MICaB graduate program.

MedC 8700 (Combinatorial Methods in Medicinal Chemistry); this course is offered by the Medicinal Chemistry graduate program and is team-taught with Prof. C. Wagner.

### **Teaching Portfolio (2003 – present) University of Michigan**

#### **Medicinal Chemistry 411 (2004 – 2011)**

Principles of Medicinal Chemistry

Enrollment: 80 Pharm.D. students

Credits: 3

Fall Semester

#### **Medicinal Chemistry 419 (2012 – 2014)**

Principles of Medicinal Chemistry

Enrollment: 80 Pharm.D. students

Credits: 3

Winter Semester

#### **Medicinal Chemistry 612 (2014 – 2016)**

Principles of Medicinal Chemistry

Enrollment: 80 Pharm.D. students  
Credits: 3  
Winter Semester

**Medicinal Chemistry 700 (2017 – present)**

Principles of Medicinal Chemistry  
Enrollment: 80 Pharm.D. students  
Credits: 3  
Fall Semester

**Medicinal Chemistry 310 (2018 - present)**

Principles of Medicinal Chemistry  
Enrollment: 30 students (Bachelor of Science in Pharmaceutical Sciences)  
Credits: 3  
Winter Semester

**Microbiology 619 (2009 – 2014)**

Biochemical genetic methods in bacterial physiology  
Enrollment: 20 graduate students  
Credits: 3  
Winter Semester

**Chemical Biology 502 (2010 – 2012)**

Synthetic, and biochemical approaches to modern drug discovery  
Enrollment: 30 graduate students  
Credits: 3  
Winter semester

**Microbiology 301 (2003 – 2008)**

Biology of Microorganisms  
Enrollment: 65 undergraduate students  
Credits: 5  
Winter Semester

**Medicinal Chemistry 534 (2003 – 2004)**

Modern Techniques in Drug Discovery and Development  
Enrollment: 20 graduate students  
Credits: 3  
Winter Semester

**Chemical Biology Special Topics (2006 – 2007)**

Polyketide Synthases in Natural Product Biosynthesis  
Enrollment: 20 graduate students  
Credits: 1  
Fall Semester

## ***Departmental and University Service***

University of Minnesota, Microbiology, Immunology and Molecular Pathobiology Committee for Graduate Studies (1995 – 1997).

Director of Graduate Studies, Microbiology, Immunology and Cancer Biology graduate program, UMN (1998 – 2001). In 1998 I was elected to a three year directorship of the MICaB graduate program that includes 80 faculty and 75 Ph.D. students. In this capacity, I was responsible for managing all aspects of the graduate program, including chairing the nine-member committee for graduate studies (meetings on a weekly basis), recruiting of new students, annual evaluation of students, and coordination of coursework and budgetary planning, fundraising and management. Please see [www.micab.umn.edu](http://www.micab.umn.edu). During this period we revamped the entire graduate course curriculum in our transition from the quarter to semester systems. In addition, our recruiting activities resulted in a 50% increase in graduate student enrollment.

President's Distinguished Faculty Mentor Program, University of MN (1999 – 2003).

Member, New Faculty Search Committee, Microbial Biochemistry Division of the Department of Biochemistry, Molecular Biology and Biophysics, UMN (1999).

Director, NIH Biotechnology Training Grant, UMN (supports 16 graduate student trainees and includes over 30 faculty with a focus on biotechnology and genomics). (2000-2003)

Chair, Department of Microbiology Search Committee in Microbial Genomics, UMN (2000 – 2001).

Charter Faculty Member, Academic Health Center Biomedical Genomics Center, UMN (2000 – 2003).

Member, Center for Microbial and Plant Genomics, University of Minnesota (2000 – 2003).

Steering Committee Member, Chemistry/Biology Interface NIH Training Grant, UMN (1999-2003).

Member, managing committee, Center for Chemical Genomics, University of Michigan (2003- 2014).

Chair, Medicinal Chemistry Seminar Series, University of Michigan (2004-2005).

Member, College of Pharmacy Executive Committee, University of Michigan (2004-2007).

Member, Chemical Biology Interdepartmental Program Admissions Committee (2005-2006).

Member, LSI Executive Committee, University of Michigan Life Sciences Institute (2005-2007).

Member, Microbiology and Immunology PIBS Graduate Admissions Committee (2005-2011).

Member, Biological Sciences Scholars Program Executive Committee, University of Michigan (2005-2011)

Member, Advisory Board, Center for the Discovery of New Medicines, University of Michigan (2011 – present)

## **Discipline-Related Service Activities**

Participated in the College of Biological Sciences Visit Days (February 10, 1995) where I spoke to participants on “Biochemistry and Biotechnology”.

Mentor for the Minority Students Development Program (Dale Warren Young); University of Minnesota, Summer, 1996.

Science Mentor for the State Regional Science Fair sponsored by the Minnesota Academy of Sciences, March, 1996.

Organized the Intellectual Property Seminar, a workshop held at the University of Minnesota for faculty and students. Seminar speakers were gathered from local law firms as well as the Patents and Technology Marketing Office; November 25, 1996.

Participated as a mentor for elementary school students Learning Fair, 1995 – 2000.

Young Scientist Roundtable (Wayzata Central Middle School); April 26, 1999. I gave a presentation entitled, “The Wonder of Antibiotics” to a group of elementary and middle school students and their parents.

Co-chair, University of Miami Oceans and Human Health Center External Advisory Committee, 2004-present.

Community High School Career Day, Ann Arbor, Michigan (2005)

Ann Arbor District Library Lecture, Ann Arbor, Michigan (2006)

Adult Learning Institute Lecture, Oakland Community College, Farmington Hills, Michigan (2008)

## ***Technical Consulting and Advising***

Merck and Co. (1991 – 1994)

Wyeth Research (1999 – 2000)

ChromaXome Corporation (Scientific Advisory Board, 1996 – 1998)

TerraGen Discovery, Inc. (Scientific Advisory Board, 1998 – 1999)

Acera Biosciences, Inc. (Founder and Chair, Scientific Advisory Board; 1999 – 2007)

Pfizer, Inc. (2003 – 2004)

PharmaForensics, LLC (Founder and President; 2002 – present)

Alluvium Biosciences, Inc. (Co-Founder and Chair, Scientific Advisory Board; 2008 – present)

PharmaForensics Laboratories, LLC (Co-founder; 2009 – present)

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