

# DAVID H. THOMPSON

## Professor of Chemistry

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### EDUCATION

<b>B.A.</b> , Biology	<b>University of Missouri, Columbia</b>	1978
<b>B.S.</b> , Chemistry	<b>University of Missouri, Columbia</b>	1978
	<u>Research Advisor:</u> <i>John P. McCormick</i>	
<b>Ph.D.</b> , Organic Chemistry	<b>Colorado State University</b>	1984
	<u>Thesis Advisor:</u> <i>Louis S. Hegedus</i>	
	<u>Dissertation:</u> <i>Mechanistic Study of <math>\pi</math>-Methallyl Nickel Bromide Cross Coupling Reactions with Organic Halides</i>	

### POSITIONS HELD

Postdoctoral Research Associate, Oregon Health & Sciences University (OHSU/OGI)	1984-1987
<u>Research Advisor:</u> <i>James K. Hurst</i>	
Assistant Professor, OHSU/OGI – Dept. of Chemical & Biological Sciences	1987-1994
Visiting Professor, University of British Columbia – Dept. of Biochemistry	1992
Associate Professor, Purdue University – Dept. of Chemistry	1994-2001
Professor, Purdue University – Dept. of Chemistry	2001-present
Visiting Professor, University of Florida – Dept. of Pharmaceutics	2003
Visiting Professor, Osaka University – Dept. of Applied Chemistry	2003
Visiting Professor, Japan Advanced Institute of Science & Technology – Dept. of Biomaterials	2005
Professor, Purdue University – Dept. of Biomedical Engineering	2008
Visiting Professor, Technical University of Denmark – Dept. of Micro & Nanotechnology	2012
Visiting Professor, Chulalongkorn University – Dept. of Pharmaceutics	2013 & 2016

### DISTINCTIONS

Colorado Fellowship	1983-1984
Fall MRS Gold Paper Award	1999
Special Issue Editor, <i>Advanced Drug Delivery Reviews</i>	2001
Head, Organic Chemistry Division, Department of Chemistry, Purdue University	2003-2010
Top Ten Outstanding Teachers in the College of Science, Purdue U.	2004-2005
Chair, <i>Chemistry of Supramolecules &amp; Assemblies</i> Gordon Conference	2005
JSPS Fellow, Japan Society for the Promotion of Science	2006
University Faculty Scholar, Purdue University	2006-2011
Award for Undergraduate Advising, College of Science, Purdue U.	2008
Co-Director, <i>Chemical &amp; Structural Biology Group</i> , Purdue Center for Cancer Research	2008-2018
Director, <i>Medicinal Chemistry Group</i> , Purdue Center for Cancer Research	2018-present
Alternate Counselor, American Chemical Society – Division of Colloid & Surface Science	2012-2015
Chair, HC Brown Symposium in Organic Chemistry	2014
Director, NIH-National Cancer Institute, Experimental Therapeutics – Chemical Biology Consortium, Purdue University Specialized Center	2016-present

**GOVERNMENT SERVICE & ADVISORY BOARDS**

NIH Panelist, P50 <i>Cancer Imaging</i> Program (ad hoc)	1999
NSF Reviewer, <i>IGERT</i> Program (ad hoc)	1996-2000
Editorial Advisory Board, <i>Langmuir</i>	2000-2005
NIH Study Section, <i>Bioorganic &amp; Natural Products Chemistry</i> (ad hoc)	2001
Editorial Advisory Board, <i>Bioconjugate Chemistry</i>	2004-2010
Associate Editor, <i>WIREs: Nanomedicine &amp; Nanobiotechnology</i>	2005-2018
NIH Study Section Panelist, <i>Bioengineering &amp; Physiology SBIR</i>	2001-2005
NIH Study Section Panelist, <i>Nanoscience &amp; Nanotechnology in Biology &amp; Medicine</i>	2004-2006
NIH Advisory Board, <i>Nanomedicine Development Center</i> Initiative	2004-2006
NIH Study Section Charter Member, <i>Gene &amp; Drug Delivery</i>	2006-2010
NIH Study Section, <i>COBRE Type I</i> (ad hoc)	2008
NIH Study Section, <i>Major Research Instrumentation - Flow Cytometry Grants</i>	2009-2010
NIH Study Section, P01 Review	2009-2010
NIH-NCI <i>Nanobiology</i> Site-Visit Program Review	2010
NIH Study Section, <i>Nano</i> (ad hoc)	2010
NIH Study Section, <i>MBRS SCORE</i> (ad hoc)	2012
NSF Division of Materials Research – Biomaterials Panelist	2018
NSF MRSEC Site Visit Reviewer	2018
NSF CAREER Award Panelist	2018

**RESEARCH INTERESTS**

- Transiently-stable carrier system development for intracellular drug & nucleic acid delivery
- Applications of energy-efficient, analytics-guided continuous synthesis
- Materials for accelerated protein structure elucidation

**PROFESSIONAL & SCHOLARLY ASSOCIATIONS**

- American Association for the Advancement of Science
- American Chemical Society (Organic and Colloid & Surface Science Divisions)
- American Society for Gene Therapy
- Materials Research Society

**PUBLICATIONS**

1. L. S. Hegedus & D. H. Thompson, "Reactions of Organic Halides with ( $\pi$ -Allyl)nickel Halide Complexes: A Mechanistic Study" *Journal of the American Chemical Society* **1985** *107*, 5663-5669.
2. J. K. Hurst & D. H. Thompson, "Mechanisms of Oxidation-Reduction Across Vesicle Bilayer Membranes: An Overview" *Journal of Membrane Science* **1986** *28*, 3-29.
3. J. K. Hurst, D. H. Thompson & J. S. Connolly, "Oxidative Quenching of Photoexcited ZnTPPS<sup>4-</sup> Ion by Dihexadecylphosphate Vesicle-Bound Viologens" *Journal of the American Chemical Society* **1987** *109*, 507-515.
4. J. K. Hurst & D. H. Thompson, "One-Electron Reduction of Dihexadecylphosphate-Bound Viologens by Pentacyanocobaltate Ions" *Inorganic Chemistry* **1987** *26*, 39-43.

5. D. H. Thompson, W. C. Barrette & J. K. Hurst, "One-Electron Reduction of Dihexadecylphosphate Vesicle-Bound Viologens by Dithionite Ions" *Journal of the American Chemical Society* **1987** *109*, 2003-2009.
6. M. J. Colaneri, L. Kevan, D. H. Thompson & J. K. Hurst, "Variation of Alkylmethylviologen Radical Cation-Water Interactions in Micelles and Vesicles from ESEM Spectroscopy: Effect of Alkyl Chain Length" *Journal of Physical Chemistry* **1987** *91*, 4072-4077.
7. T. Lu, T. M. Cotton, J. K. Hurst & D. H. Thompson, "A Raman and Surface-Enhanced Raman Study of Asymmetrically-Substituted Viologens" *Journal of Physical Chemistry* **1988** *92*, 6978-6985.
8. T. Lu, T. M. Cotton, J. K. Hurst & D. H. Thompson, "A Voltammetric Study of Asymmetric Viologen in an Organic Solvent, Aqueous Solution and Vesicle Systems" *Journal of Electroanalytical Chemistry* **1988** *246*, 337-347.
9. D. H. Thompson & J. K. Hurst, "Intermolecular Transmembrane Redox--Electron Tunneling or Molecular Diffusion?" in *Molecular Electronic Devices III*, F. L. Carter, R. Siatkowski, and H. Wohltjen, Eds., Elsevier, Amsterdam, **1988**, pp. 413-425.
10. B. C. Patterson, D. H. Thompson & J. K. Hurst, "Methyl Viologen-Mediated Oxidation-Reduction Across Dihexadecylphosphate Vesicles Involves Transmembrane Diffusion" *Journal of the American Chemical Society* **1988** *110*, 3656-3657.
11. B. C. Patterson, D. H. Thompson & J. K. Hurst, "Pathways of Transmembrane Redox Reactions for Dihexadecylphosphate Vesicle-Bound Viologens" in *Molecular Electronics—Science and Technology*, Aviram, A., Ed., Engineering Foundation Publications, New York, **1989**, pp. 385-392.
12. P. L. Camacho, E. Geiger, G. Vigh, R. Webster & D. H. Thompson, "Separation of the Enantiomeric Intermediates of Some Platelet-Activating Factor Analogues on a Naphthylalanine-Type Pirkle Column" *Journal of Chromatography* **1990** *506*, 611-616.
13. R. Humphry-Baker, D. H. Thompson, Y. Lei, M. Hope & J. K. Hurst, "Structural Investigations of Dihexadecylphosphate Small Unilamellar Vesicles" *Langmuir* **1991** *7*, 2592-2601.
14. J. M. Kim & D. H. Thompson, "Tetraether Bolaform Amphiphiles as Models of Archaeobacterial Membrane Lipids: Synthesis, Differential Scanning Calorimetry, and Monolayer Studies" *Langmuir* **1992** *8*, 637-644.
15. A. Heuer, D. Fink, V. Laraia, J. Arias, P. Calvert, K. Kendall, G. Messing, J. Blackwell, P. Rieke, D. H. Thompson, A. Wheeler, A. Veis & A. Caplan, "Innovative Materials Processing Strategies: A Biomimetic Approach" *Science* **1992** *255*, 1098-1105.
16. V. C. Anderson & D. H. Thompson, "Photoinduced Morphology Changes in Plasmalogen Liposomes Using Visible Light" in *Macromolecular Assemblies*, P. Stroeve & A. C. Balazs, Eds., *ACS Symposium Series* **1992** *493*, 154-170.
17. V. C. Anderson & D. H. Thompson, "Triggered Release of Hydrophilic Agents from Plasmalogen Liposomes Using Visible Light or Acid" *Biochimica et Biophysica Acta* **1992** *1109*, 33-42.

18. D. H. Thompson & J.-M. Kim, "Photoinduced Charge Transfer Studies in Bolaamphiphile-Gramicidin-Porphyrin Membranes" *MRS Symposium Proceedings, Macromolecular Host-Guest Complexes: Optical & Optoelectronic Properties and Applications* **1992** 277, 93-98.
19. D. H. Thompson, K. Wong, R. Humphry-Baker, J. Wheeler, J. M. Kim & S. B. Rananavare, "Tetraether Bolaform Amphiphiles as Models of Archaeobacterial Membrane Lipids: Raman Spectroscopy, <sup>31</sup>P-NMR, X-Ray Scattering and Electron Microscopy" *Journal of the American Chemical Society* **1992** 114, 9035-9042.
20. D. H. Thompson, J.-M. Kim & C. DiMeglio, "Photoinduced Charge Transfer Properties of Bolaamphiphile Membrane-Gramicidin Diad and Triad Composites" *SPIE Proceedings, Organic and Biological Optoelectronics* **1993** 1853, 142-147.
21. P. L. Camacho-Torralba, G. Vigh & D. H. Thompson, "High Performance Chiral Displacement Chromatographic Separations in the Normal Phase Mode. Part 1. Retention and Adsorption Studies of Potential Displacers Developed for the Pirkle-Type Naphthylalanine Silica Stationary Phase" *Journal of Chromatography* **1993** 641, 31-38.
22. P. L. Camacho-Torralba, M. D. Beeson, G. Vigh & D. H. Thompson, "High Performance Chiral Displacement Chromatographic Separations in the Normal Phase Mode. Part 2. Separation of the Enantiomers of 1,2-O-Dihexadecyl-*rac*-glycerol-3-O-(3,5-dinitrophenyl)carbamate Using the Pirkle-Type Naphthylalanine Silica Stationary Phase" *Journal of Chromatography* **1993** 646, 259-266.
23. D. H. Thompson, C. B. Svendsen, C. DiMeglio & V. C. Anderson, "Synthesis of Chiral Diether and Tetraether Phospholipids. Regiospecific Ring Opening of Epoxides Derived from Asymmetric Epoxidation" *Journal of Organic Chemistry* **1994** 59, 2945-2955.
24. Y. Rui & D. H. Thompson, "Stereocontrolled Synthesis of Plasmalogen-Type Lipids from Glyceryl Ester Precursors" *Journal of Organic Chemistry* **1994** 59, 5758-5762.
25. D. H. Thompson, O. V. Gerasimov, J. J. Wheeler & V. C. Anderson, "Triggerable Plasmalogen Liposomes: Improvement of System Efficiency" *Biochimica et Biophysica Acta* **1996** 1279, 25-34.
26. Y. Rui & D. H. Thompson, "Efficient Stereoselective Synthesis of Plasmenylcholines" *Chemistry—A European Journal* **1996** 2, 1505-1508.
27. D. H. Thompson, Y. Rui & O. V. Gerasimov, "Triggered Release from Liposomes Mediated by Physically- and Chemically-Induced Phase Transitions" *Surfactant Science Series: Vesicles*, M. Rosoff, Ed.; Marcel Dekker: New York, NY, **1996**, pp. 679-746.
28. O. Gerasimov, A. Schwan & D. H. Thompson, "Acid-Catalyzed Plasmenylcholine Hydrolysis and its Effect on Bilayer Permeability: A Quantitative Study" *Biochimica et Biophysica Acta* **1997** 1324, 200-214.
29. E. Barklis, J. McDermott, S. Wilkens, E. Schabtach, M. Schmid, S. Fuller, S. Karanjia, Z. Love, R. Jones, X. Zhao, Y. Rui & D. H. Thompson, "Structural Analysis of Membrane-Bound Retrovirus Capsid Proteins" *EMBO Journal* **1997** 16, 1199-1213.

30. I. Szleifer, O. V. Gerasimov & D. H. Thompson, "Spontaneous Liposome Formation Induced by Grafted Poly(ethylene oxide) Layers: Theoretical Prediction and Experimental Verification" *Proceedings of the National Academy of Sciences USA* **1998** *95*, 1032-1037.
31. N. Wymer, O. V. Gerasimov & D. H. Thompson, "Cascade Liposomal Triggering: Light-Induced Ca<sup>2+</sup> Release from Plasmemylcholine Liposomes Triggers PLA<sub>2</sub>-Catalyzed Hydrolysis and Contents Leakage from DPPC Liposomes" *Bioconjugate Chemistry* **1998** *9*, 305-308.
32. E. Barklis, J. McDermott, S. Wilkens, S. Fuller, & D. H. Thompson, "Organization of HIV-1 Capsid Proteins on a Lipid Monolayer" *Journal of Biological Chemistry* **1998** *273*, 7177-7180.
33. S. Svenson & D. H. Thompson, "Facile and Efficient Synthesis of Bolaamphiphilic Tetraether Phosphocholines" *Journal of Organic Chemistry* **1998** *63*, 7180-7182.
34. Y. Rui, S. Wang, P. S. Low & D. H. Thompson, "Diplasmenylcholine-Folate Liposomes: An Efficient Vehicle for Intracellular Drug Delivery" *Journal of the American Chemical Society* **1998** *120*, 11213-11218.
35. O. V. Gerasimov, N. Wymer, D. Miller, Y. Rui, & D. H. Thompson, "Intracellular Delivery of Liposomal Contents Using pH- and Light-Activated Plasmemyl-Type Liposomes" S.M. Dinh, J.D. DeNuzzio, A.R. Comfort, Eds., *ACS Symposium Series* **1999** *728*, 164-178.
36. J. A. Boomer & D. H. Thompson, "Synthesis of Acid-Labile Diplasmenyl Lipids for Drug and Gene Delivery Applications" *Chemistry and Physics of Lipids* **1999** *99*, 145-153.
37. A. Patwardhan & D. H. Thompson, "Efficient Synthesis of 40- and 48-Membered Tetraether Macrocyclic Bisphosphocholines" *Organic Letters* **1999** *1*, 241-244.
38. O. Gerasimov, J. Boomer, M. Qualls & D. H. Thompson, "Cytosolic Drug Delivery Using pH- and Light-Sensitive Liposomes" *Advanced Drug Delivery Reviews* **1999** *38*, 317-338.
39. C. DiMeglio, S. B. Rannavare, S. Svenson & D. H. Thompson, "Phosphocholine Analogs of Bolaamphiphiles: Phase Structure and Mesomorphism" *Langmuir* **2000** *16*, 128-133.
40. A. Patwardhan & D. H. Thompson, "Novel Flexible and Rigid Tetraether Acyclic and Macrocyclic Bisphosphocholines: Synthesis and Monolayer Properties" *Langmuir* **2000**, *16*, 10340-10350.
41. J. Shin, M. M. Qualls, J. A. Boomer, J. Robarge & D. H. Thompson, "An Efficient New Route to Plasmemyl-Type Lipids: Synthesis and Cytotoxicity of a Plasmemylcholine Analog of the Antitumor Ether Lipid ET-18-OCH<sub>3</sub>" *Journal of the American Chemical Society* **2001** *123*, 508-509.
42. M. M. Qualls & D. H. Thompson, "Synergistic Phototoxicity of Chloroaluminum Phthalocyanine Tetrasulfonate Delivered via Acid-Labile Diplasmenylcholine-Folate Liposomes" *International Journal of Cancer* **2001** *93*, 384-392.
43. J.-M. Kim & D. H. Thompson, "Acid- & Oxidatively-Labile Vinyl Ether Lipids: Synthesis & Drug Delivery Applications" *Surfactant Science Series: Reactions & Synthesis in Surfactant Systems*, J. Texter, Ed.; Marcel Dekker: New York, NY, 2001, pp. 145-154.

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