Christopher D. Spilling
Professor of Chemistry
Vice Provost for Research and Graduate Studies

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Education

Loughborough University of Technology, England	B.Sc. Hons. (1st class)	1983
Loughborough University of Technology, England (with Brian A. Marples)	Ph.D.	1986

Experience

Northwestern University (with A.G.M. Barrett)	Postdoctoral Associate	1986-1989
University of Missouri-St. Louis	Assistant Professor	1989-1995
	Associate Professor	1995-2001
	Professor	2001-pres.
	Dept. Chair	2004-2015.
	Chair, Faculty Senate	2012-2014
	Interim Vice Provost for Graduate Studies and Research	Jan 2016-June 2016
	Interim Provost and Vice Chancellor for Academic Affairs	July 2016-May 2017
	Dean of the Graduate School	June 2017- 12/2018
	Vice Provost for Graduate Studies and Research,	June 2017-present
Cambridge University (with S. V. Ley)	Visiting Scholar (research leave)	1996-1997

Co-Founder Alkymos, Inc 2000
(with Wesley Harris-UMSL, Robert Yokel, Robert Kuhn & Chung Guo Zhan-U of Kentucky)

Affiliations

Fellow of The Royal Society of Chemistry, Chartered Chemist (FRSC, CChem.)
Member of the American Chemical Society
Member of the National Academy of Inventors
Phi Kappa Phi

Honors and Awards

SERC Studentship 1983-1986
Award for Excellence in Teaching, presented by the chemistry graduate students, May 1991
2009 St. Louis Award presented by the St. Louis Section of the American Chemical Society
2009 Entrepreneur of the Year presented by the University of Missouri System
2015 Chancellor's Award for Excellence in Service
NIH CounterACT (Counter Agents for Chemical Terrorism) panel 2012, 2013

TEACHING

Description of Courses Taught.

Chemistry 5694 (469), Special Topics in Organic Chemistry:
This course is designed to teach the strategies and methods of modern synthetic organic chemistry. The students are expected to have a sound understanding of basic organic chemistry, stereochemistry, and reaction mechanism. The course begins by discussing the history of organic synthesis, and the developments that took place in chemistry to enable chemists to perform complex multistep syntheses. The lectures examine recent examples of natural product total syntheses, often comparing several syntheses of a molecule. The students are required to write and present a paper on a modern synthetic method, and research and design a synthesis project on a given molecule.

Chemistry 5612 (361, 461), Advanced Organic Chemistry II-Synthesis and Mechanism
The overall emphasis of the course is to understand the synthetic and mechanistic aspects of organic chemistry. The lectures followed the areas outlined in the appropriate text book chapters (Carey & Sundberg, Advanced Organic Chemistry, part B), but many additional examples from current literature were used as a supplement.

Chemistry 306, Intermediate Organic Chemistry (discontinued):
This course is for graduate students deficient in organic chemistry and is a review of the basic concepts of organic chemistry taught in the two semester undergraduate sophomore sequence. The choice of lecture material is made by the instructor and is dependent upon the needs of the class.

Chemistry 2633 (263), Techniques of Organic Chemistry:
This course is designed to teach the techniques of organic chemistry. In the early stages of the course, the various techniques are demonstrated during the lab session prior to the students performing the experiment. Several new experiments were added to increase the range of reactions and techniques experienced by the student.

Chemistry 2612 (261), Structural Organic Chemistry:
First semester sophomore organic chemistry course. Subjects covered include bonding, structure, properties, stereochemistry, conformation, and the chemistry and properties of alkanes, alkenes, alkyl halides, alcohols, and thiols.

Chemistry3022 (202), Introduction to Chemical Literature:
Introduces the chemical literature including origin of publication types, sources, data bases, and searching.

Most Recent Courses

Chemistry 3643 (364), Synthetic and Analytical Techniques of Organic Chemistry:
This was completely redesigned and modernized as an advanced laboratory course in synthesis and spectroscopic characterization of organic compounds. The lecture component of the course covers the application IR, mass spec., highfield FT NMR and X-ray crystallography to organic chemistry. The lab is composed of six "training" experiments where the products have been selected to demonstrate a particular spectroscopic property (e.g. coupling constant vs. dihedral angle). The students then perform a multistep synthesis using the techniques they have learned. They are given key references and are required to design the reactions to prepare 1g of final product with full characterization

Chemistry 6687 (468), Organic Problem Seminar:
This course is designed to help students refine their problem solving skills, and increase their awareness of the chemical literature. This is achieved by assigning reading, requiring the students to write abstracts of papers, and to set and solve problems. The instructor must be aware of the current literature and be conversant with many of the accepted reaction mechanisms to guide the students during the classroom sessions.

Chemistry 6812, Introduction to Graduate Studies in Chemistry:
This is a seminar course is designed to teach graduate students general laboratory and chemical safety, several aspects of teaching labs and discussion sections, interacting with undergraduates in a professional manner, the organization of a University, and the fundamentals of making presentations. The format is short presentations followed by discussion about the topic. The students are also required to give a short presentation which is videotaped for their viewing.

6905, Graduate Research in Chemistry
All aspects of supervising the research of graduate students. To date I have guided 18 students to the successful completion of a PhD dissertation and 4 students to completion of a Masters theses (see below).

3905, Undergraduate Research in Chemistry
All aspects of supervising the research of undergraduate students. I have successfully directed the research of more than 45 undergraduate students (see below).

Undergraduate Research Assistants

Todd Boehlow, Darci Hunter, Marla Williams, Scott Kratz, Joann Henry, Matthew Mahoney, Greg Bertin, Lisa Tyler, Margaret Martin, James Kozlowski, John, Kozlowski, Lata Singh, Toni Kent, James McGill, Titilola Gros, Jeff Scholten, Matt Lanham, Nicolas Drolet, Karine Houde, Martin Hayes, Aaron Burns, Katherine Block, Paul Docherty, Kayla Gincherman, Janet Xue, Elaine Warner, Arie Hughes, Diana Buleske, Ben Martin, Lindsay Mangum, Joshua Lang, Sean Whittemore, Jennifer Rizzo, Jimmy Allen, Michael Mannino, Melissa Mueller, Alex Sherman, Kaitlin Egan, Courtney Gipson, Terrence Blue, Robrion Sills, Michael Brown, Joshua Stukel, Anosha Abdul Basir, Chris Tipton, Mahdia Sadiq, Tori Thunderburk, Robert Guilmett, Hosea Covington, Eli LaChance

Graduate and Postdoctoral Research Assistants

Graduate Students (Non Thesis Research, Coursework M.S.)

Nawana Lawson, Edita Schranz, Hilary Goode, Donnie Smith, Mercy Kirru

Graduate Students (Thesis M.S.)

Yihia Liao (May 1996)	Thesis: Preparation and Reactions of Acylphosphonates Current position: Research Chemist, Aries Technologies, Boston, MA
Michael Groaning (August 1996)	Thesis: Catalytic Asymmetric Phosphonylation of Aldehydes Ph.D.: Colorado State University (Al Meyers) Postdoc: ETH, Zurich (Eric Carreira) Current position: Research Chemist, Endocyte, West Lafayette, IN
Luis Llamas (August 2001)	Thesis: Oxidation Reactions of 1-Hydroxyphosphonates Current position Novartis, Boston, MA
Joe Ocheskey (May 2003)	Thesis: Preparation of Novel Organic Ferrofluids Current Position: Asst Prof Military Science, Millersville University in Pennsylvania (Cpt 56th Stryker Brigade, Pa National Guard)
Christopher Tipton	Thesis: Rational Drug Design Directed at Blocking the Initial Signaling Events in Lipopolysaccharide-Induced Sepsis MD/PhD student, UM-Columbia

Graduate Students (Ph.D.)

Kevin Koeller (December 1993)	Dissertation: Phosphonates and Phosphonamides in Stereoselective Bond Formations Postdoc: Univ. of Nebraska (Jim Takacs) Current position: Research Chemist, NanoVir, St. Louis, MO
Cecilia Marzabadi (December 1995)	Dissertation: The Chemistry of Glucal Halohydrins Postdoc: Hunter College, CUNY (Richard Franck) Current position: Professor and Chair, Seton Hall University, NJ.
Antonette De La Cruz (August 1996)	Dissertation: Preparation and Reaction Chiral α-Hydroxy Phosphonic Acid Derivatives Current position: Instructor, Washington University
Todd Boehlow (January 1997)	Dissertation: A Biomimetic Approach to the

	Synthesis of Some Bromotyrosine Derived Sponge Metabolites Postdoc: University of Technology, Loughborough (Brian Marples), then Montana State University (Cynthia McClure) Current position: Chemical Specialties Scientist, Ascend Performance Materials, Pensacola, FL
Isabel Vasconcelos (January 1998)	Dissertation: Synthesis of New Chiral Aminophosphine Ligands: Structural Studies and Application in Asymmetric Catalysis Last known position: Market Development Manager for S. America, Ecolab, San Paolo, Brazil
Hossein Shabany (May 1998)	Dissertation: Synthesis of Protease Inhibitors from Allylic-α-Hydroxy Phosphonates Postdoc: Washington University Medical School (George Gokel) Current position: ABC labs (now EAG), Columbia, MO
Bradley Rowe (December 2002)	Dissertation: Synthesis of Chiral 1-Hydroxy Phosphonates of High Enantiomeric Excess and Their Synthetic Applications Postdoc: UMSL (Chris Spilling) Current position: unknown
Anchalee Thanavaro (Aug 2003)	Dissertation: The Preparation and Reactions of Allylic Hydroxy Phosphonates: A Study Toward the Synthesis of Sphingomyelin Phosphonate Analogs Current position: Senior Scientist, Steris, St. Louis, MO
Bingli Yan (May 2005)	Dissertation: Palladium Catalyzed Nucleophilic Addition Reactions of Allylic Phosphonates and their Application to the Preparation of Natural Products Postdoc: U of Pittsburgh (Kay Brummond) Current position: Chemist, Pfizer St. Louis
Anyu He (August 2005)	Dissertation: The Stereoselective Synthesis of α-Hydroxy Phosphonates: Application in the Synthesis of Heterocyclic Compounds Postdoc, Southwest Texas Medical Center, Dallas Current position: Scientist, Cerilliant, Austin, Texas
Pallavi Badkar (August 2006)	Dissertation: Asymmetric Synthesis of 2-Alkyl-3-Phosphono Propanoic Acid and Studies Toward the Synthesis of a Model Core of Sclerophytin Current position: Chemist, Analytical Lab Manager, Pfizer, NJ.
Saibal Bandyopadhyay (May 2008)	Dissertation: Approaches to the Synthesis of Cyclophostin and an Endophosphonate Analog Postdoc: Ohio State University (Dennis Bong) Current Position: Research Chemist, Aerotek, PA
Nongnuch Sutivisedsak (August 2008)	Dissertation: Synthesis of α-hydroxy and Fluorophosphonates and Cyclic Ether Containing Natural Products Current Position: Product Development Chemist,

	Ag Precision Formulators, Madison, WI
Raj Malla (August 2011)	Dissertation: Thesis Title: Synthesis of Cyclophostin, Cyclipostin P, Their Phosphonate Analogs and New Chemistry of Vinyl Phosphonates Current Position: Reliable BioPharmaceuticals
Mahesh Paudyal (August 2012)	Dissertation: Nickel Catalyzed Homoallylation Reactions and Synthesis of Potent Inhibitors of YopH Postdoc: Southwest Texas Medical Center, Dallas Current position: Research Chemist, Adesis, Delaware.
Sudeshna Roy (August) 2012	Dissertation: Studies Toward Tetrahydrofuran-Containing Natural Products: Total Synthesis of Amphidinilide C and Oxylipids Postdoc: University of Kansas and then University of N. Carolina (Jeff Aube) Current Position: Asst Professor, University of Mississippi
Surendra Dawadi (August 2013)	Dissertation: Design and Synthesis of Chelating Compounds and Solid-Supported Chelators for Metal Depleted Solutions. Postdoc: University of Minnesota (Courtney Aldrich)
Ben Martin (August 2014)	Dissertation: Synthesis of Cyclic Enolphosphonates and Enolphosphates as Inhibitors of Serine Hydrolases Current position: Chemist III, Millipore Sigma
Jeremy Ridenour	Dissertation: current student (now part time) Current position: Chemist III, Millipore Sigma
Rishi Paudel	Dissertation: current student
Giri Raj Gnawali	Dissertation: current student
Saroj Kafle	Dissertation: current student

Postdoctoral Associates and Academic Visitors

Vince Blazis	Current position: Research Chemist, ABC Labs, Columbia, MO
J. Jonathan Harburn	Current position: Senior Lecturer, Faculty of Medical Sciences, Newcastle University, UK
Meiguo Xin	Current position: Unknown
Prof. Peng Wang	Current position: Prof., School of Chemical Eng. and Materials Science, Beijing Inst. of Tech.
Sampathkumar, Elleppan	Moved to UMKC, Current position: unknown
Praveen Kommana	Current position: Research Scientist, Laurus Labs Pvt Ltd, Hyderabad, India

RESEARCH

1) Publications (Scopus H index = 26)

A. Dissertations:

"The Intramolecular Ene Reactions of Some Unsaturated Acyloins" Christopher D. Spilling, Ph.D. thesis, University of Technology, Loughborough, England, 1986.

B. Papers:

Doctoral

1) "The Ene Reactions of Some Unsaturated Acyloins" Brian A. Marples and Christopher D. Spilling *Tetrahedron Letters* **1985**, *26*, 6515-6518.

2) "The Ene Reaction of 5-Allyl-2ξ-hydroxy-5α-cholestan-3-one: An Unusually Facile Ene Reaction" Brian A. Marples and Christopher D. Spilling *Tetrahedron Letters* **1987**, *28*, 581-584.

3) "Intramolecular Ene Reactions of the Unsaturated Acyloin 3-(But-3-enyl)-2-hydroxy-3-methylcyclohexanone" David S. Brown, Brian A. Marples and Christopher D. Spilling *Journal of the Chemical Society, Perkin Transaction 1* **1988**, 2033-2036.

4) "Facile Intramolecular Ene Reactions of Steroidal Unsaturated Acyloins" Brian A. Marples and Christopher D. Spilling *Tetrahedron* **1992**, *48*, 4017-4026.

5) "The Intramolecular Ene Reaction of 5-(Prop-2-enyl)-2ξ-Hydroxy-5α-Cholest-3-one" Brian A. Marples and Christopher D. Spilling *Tetrahedron* **1994**, *50*, 13461-13468.

Postdoctoral

6) "Transfer Hydrogenation: A Stereospecific Method for the Conversion of Nitro Alkanes into Amines" Anthony G.M. Barrett and Christopher D. Spilling *Tetrahedron Letters* **1988**, *29*, 5733-5734.

7) "(Benzyloxy)nitromethane: A New Reagent in β-Lactam Synthesis" Anthony G.M. Barrett, Minn-Chang Cheng, Christopher D. Spilling and Sven J. Taylor *Journal of Organic Chemistry* **1989**, *54*, 992-994.

8) "Dichloro(isopropoxy)titanium Nitronates as Reagents for Stereoselective Henry Reactions" Anthony G.M. Barrett, Chantal Robyr and Christopher D. Spilling *Journal of Organic Chemistry* **1989**, *54*, 1233-1234.

9) "Stereocontrolled Synthesis of the Pencillanate Ester (2R, 5S) Benzyl-3,3-dimethyl-7-oxo-4-thia-1-azabicyclo[3.2.0]-heptane-3-carboxylate" Anthony G.M. Barrett, Minn-Chang Cheng, Santi Sakdarat, Christopher D. Spilling and Sven J. Taylor *Tetrahedron Letters* **1989**, *30*, 2349-2352.

10) "Stereoselective Syntheses of S-Phenyl Tetrahydrofuran-2-thiocarboxylate and Tetrahydropyran-2-thiocarboxylate Derivatives using (Phenylthio)nitromethane" Anthony G.M. Barrett, John A. Flygare and Christopher D. Spilling *Journal of Organic Chemistry* **1989**, *54*, 4723-4726.

11) "Approaches to Avermectin Assembly: A Concise Stereospecific Synthesis of the hexahydrobenzofuran Entity" Anthony G.M. Barrett, Thomas E. Barta, John A. Flygare, Michal Sabat and Christopher D. Spilling *Journal of Organic Chemistry* **1990**, *55*, 2409-2414.

Independent Career

12) "The Preparation and Reactions of Chiral Phosphorous Acid Diamides" Kevin J. Koeller and Christopher D. Spilling *Tetrahedron Letter* **1991**, *32*, 6297-6300.

13) "Reactions of Chiral Phosphorous Acid Diamides" Vincent Blazis, Antonette De la Cruz, Kevin J. Koeller and Christopher D. Spilling *Phosphorus, Sulfur and Silicon* **1993**, *75*, 159-163.

14) "Stereoselective Glucal Epoxide Formation" Cecilia H. Marzabadi and Christopher D. Spilling *Journal of Organic Chemistry* **1993**, *58*, 3761-3766.

15) "Structure of a Chiral Monocyclic Phosphonamide" Kevin J. Koeller, Nigam P. Rath, and Christopher D. Spilling *Acta Crystallographica* **1993**, *C49*, 1199-1201.

16) "Structure of a Chiral Bicylic 1-Hydroxy Phosphonamide" Kevin J. Koeller, Nigam P. Rath, and Christopher D. Spilling *Acta Crystallographica* **1993**, *C49*, 1547-1549.

17) "The Enantioselective Addition of Dialkylphosphites to Aldehydes: Catalysis by a Lanthanum Binaphthoxide Complex" Nigam P. Rath and Christopher D. Spilling *Tetrahedron Letters* **1994**, *35*, 227-230.

18) "Asymmetric Synthesis of α-Hydroxy Phosphonamides, Phosphonates and Phosphonic Acids" Vincent J. Blazis, Kevin J. Koeller and Christopher D. Spilling *Tetrahedron Asymmetry* **1994**, *5*, 499-502.

19) "Chemistry of Glucal Halohydrins: The Effect of Halide on Epoxide Formation" Cecilia H. Marzabadi, Christopher D. Spilling and Lisa M. Tyler *Tetrahedron* **1994**, *50*, 6783-6796.

20) "Structure of a Chiral Bicylic 1-Acetoxy Phosphonamide" Vincent J. Blazis, Kevin J. Koeller, Nigam P. Rath and Christopher D. Spilling *Acta Crystallographica* **1995**, *C51*, 86-88.

21) "Chemistry of Chiral Phosphorous Acid Diamides: Lewis Acid Catalyzed Addition to Imines and Oxidation with $SnCl_4$" Kevin J. Koeller, Nigam P. Rath and Christopher D. Spilling *Phosphorus, Sulfur and Silicon* **1995**, *103*, 171-181.

22) "Reactions of Phosphorous Acid Diamides: The Asymmetric Synthesis of α-Hydroxy Phosphonamides, Phosphonates and Phosphonic Acids" Vincent J. Blazis, Kevin J. Koeller and Christopher D. Spilling *Journal of Organic Chemistry* **1995**, *60*, 931-940.

23) "Determination of the Enantiomeric Purity and Absolute Configuration of α-Hydroxy Phosphonates" James Kozlowski, Nigam P. Rath and Christopher D. Spilling *Tetrahedron* **1995**, *51*, 6385-6396.

24) "An Efficient Biomimetic Synthesis of Some Marine Sponge Tyrosine Metabolites" Todd R. Boehlow and Christopher D. Spilling *Nat. Prod. Lett.* **1995**, *7*, 1-6.

25) "Structure of Ethyl 3-(3-bromo-4-hydroxyphenyl)-2-oximo-propanoate" Todd R. Boehlow, Nigam P. Rath and Christopher D. Spilling *Acta Crystallographica* **1995**, *C51*, 2654-2656.

26) "The Stereo- and Regio- Selective Epoxidation of Alkenes with Methyl Trioxorhenium and Urea-Hydrogen Peroxide Adduct" Todd R. Boehlow and Christopher D. Spilling *Tetrahedron Letters* **1996**, *37*, 2717-2720.

27) "Methyl 4-Hydroxy-3-(4-methoxy-2-methoxymethylenoxy-phenyl)-2-(4-methoxy-2-methoxymethylenoxy-phenylmethyl)-5-oxo-2,5-dihydrofuran-2-Carboxylate" Todd R. Boehlow, Nigam P. Rath and Christopher D. Spilling *Acta Crystallographica* **1997**, *C53*, 92-95.

28) "Chemistry of Glucal Halohydrins (II): An Unusual Protecting Group Effect in the Competitive Formation of Formyl Furanosides and Methyl Glycosides" John S. Kozlowski, Cecilia H. Marzabadi, Nigam P. Rath and Christopher D. Spilling *Carbohydrate Research* **1997**, *300*, 301-313.

29) "Application of Wallach's Rule in the Comparison of the X Ray Crystal Structures of the Racemate and (S) Enantiomer of (1-hydroxy-3-phenyl-prop-2-enyl) Dimethyl Phosphonate" Vincent J. Blazis, Kevin J. Koeller, Nigam P. Rath and Christopher D. Spilling *Acta Crystallographica* **1997**, *B53*, 838-842.

30) "Dimethyl (±) 1S*,2R*,3S*-[2,3-epoxypropyl-3-phenyl-1-(N-phenylcarbamoyloxy)] phosphonate" Todd Boehlow, Antonette De la Cruz, Nigam P. Rath and Christopher D. Spilling *Acta Crystallographica* **1997**, *C53*, 1947-1949.

31) "Substituent Effects in the Reaction of Allylic Trichloroacetimidates with N-Halosuccinimides: Rearrangement Vs Cyclization" Hossein Shabany and Christopher D. Spilling *Tetrahedron Letters* **1998**, *39*, 1465-1468.

32) "New Homochiral Amino-Phosphonamine Ligands: Application in Asymmetric Palladium Catalyzed Allylic Alkylation" Isabel C. F. Vasconcelos, Nigam P. Rath and Christopher D. Spilling *Tetrahedron Asymmetry.* **1998**, *9*, 937-948.

33) "The Preparation and Structure of New Homochiral Diazaphosphole Ligands and Their Platinum (II) Chloride Complexes" Isabel C. F. Vasconcelos, Gordon K. Anderson, Nigam P. Rath and Christopher D. Spilling *Tetrahedron Asymmetry*. **1998**, *9*, 927-935.

34) "New Homochiral Cyclic Diol Ligands for the Titanium Alkoxide Catalyzed Asymmetric Phosphonylation of Aldehydes" Michael D. Groaning, Bradley J. Rowe, and Christopher D. Spilling *Tetrahedron Letters* **1998**, *39*, 5485-5488.

35) "The Synthesis, Structure and Properties of Homochiral Diazaphospholes: Reagents and Ligands for Asymmetric Synthesis" Antonette De la Cruz, Kevin J. Koeller, Nigam P. Rath, Christopher D. Spilling and Isabel Vasconcelos *Tetrahedron* **1998**, *54*, 10513-10524.

36) "Intermolecular Charge Transfer in Organic Donor-Acceptor Systems for Optical Storage Applications" Zhi Xu, Ying Dong, C. D. Spilling, V. Lakshminarayanan, and S. V. Pappu, *Proceedings of The International Society for Optical Engineering* (SPIE), **1998**, 3417, 12-18.

37) "Preparation of Acyl Phosphonates by the Heterogeneous Oxidation of 1-Hydroxy Phosphonates" Yihua Liao, Hossein Shabany and Christopher D. Spilling *Tetrahedron Letters* **1998**, *39*, 8389-8393.

38) "New Catalysts for the Hydrophosphonylation of Aldehydes" Michael D. Groaning, Bradley J. Rowe and Christopher D. Spilling *Phosphorus, Sulfur and Silicon* **1999**, *147*, 1217.

39) "Stereoselective Reactions of Allylic Hydroxy Phosphonates," M. Antonette De la Cruz, Hossein Shabany and Christopher D. Spilling *Phosphorus Sulfur and Silicon*. **1999**, *144-146*, 181-184.

40) "Chemistry of Insect Antifeedants from Azadirachta indica (Part 22): Functionalization of the Decalin Fragment of Azadirachtin via a Claisen Rearrangement Reaction" Steven V. Ley, Clare E. Gutteridge, Andrew R. Pape, Christopher D. Spilling and Cornelia Zumbrunn *Synlett*, **1999**, 1295-1297.

41) "An Intramolecular N-H···Co Hydrogen Bond and a Structure Correlation Study of the Pathway for Protonation of the $Co(CO)_3L^-$ Anion (L = CO, PR_3)" Lee Brammer, Juan C. Mareque Rivas and Christopher D. Spilling *Journal of Organometallic Chemistry*, **2000**, *609*, 36-43.

42) "The Synthesis of 1-Hydroxy Phosphonates of High Enantiomeric Excess using Sequential Asymmetric Reactions: Titanium Alkoxide Catalyzed P-C Bond Formation and Kinetic Resolution," Bradley J. Rowe and Christopher D. Spilling *Tetrahedron Asymmetry*, **2001**, *12*, 1701-1708.

43) "Approaches to the Synthesis of Some Tyrosine Derived Sponge Metabolites: Synthesis of Verongamine and Purealidin N" Todd R. Boehlow, J. Jonathan Harburn, and Christopher D. Spilling, *Journal of Organic Chemistry*, **2001**, *66*, 3111-3118.

44) "Formation of Cyclic Acetals from Allylic Hydroxy Phosphonates via Intramolecular Oxymercuriation" Anchalee Thanavaro and Christopher D Spilling *Phosphorus, Sulfur and Silicon* **2002**, *177*, 1583-1586.

45) "Palladium Catalyzed Additions to Allylic Hydroxy Phosphonates: Applications in the Enantioselective Synthesis of Enterolactone and Turmerone" Bradley J. Rowe, Jeffrey Scholten and Christopher D. Spilling *Phosphorus, Sulfur and Silicon* **2002**, *177*, 1881-1884.

46) "The Synthesis of 1-Hydroxy Phosphonates of High Enantiomeric Excess using Sequential Asymmetric Reactions: Titanium Alkoxide Catalyzed P-C Bond Formation and Kinetic Resolution" Bradley J. Rowe and Christopher D. Spilling *Phosphorus, Sulfur and Silicon* **2002**, *177*, 1955.

47) Effects of Proline Analogue Binding on the Spectroscopic and Redox Properties of PutA" Weidong Zhu, Yekatarina Gincherman, Paul Docherty, Christopher D. Spilling, and Donald F. Becker *Archives of Biochemistry and Biophysics* **2002**, *408*, 131-136.

48) "Stereospecific Pd(0)-Catalyzed Arylation of an Allylic Hydroxy Phosphonate Derivative: Formal Synthesis of Turmerone" Bradley J. Rowe and Christopher D. Spilling *Journal of Organic Chemistry* **2003**, *68*, 9502-9505.

49) "Stereospecific Pd(0)-Catalyzed Malonate Additions to Allylic Hydroxy Phosphonate Derivatives: A Formal Synthesis of (-) Enterolactone" Bingli Yan and Christopher D. Spilling *Journal of Organic Chemistry* **2004**, *69*, 2859-2862.

50) "Release of Iron from Transferrin by Phosphonocarboxylate and Diphosphonate Chelating Agents" Wesley R. Harris, Claire E. Brook, Christopher D. Spilling, Sampathkumar Elleppan, Wang Peng, Meiguo Xin and Jennifer Van Wyk *Inorganic Biochemistry* **2004**, *98*, 1824-1836.

51) "The Synthesis of Non-Racemic Allylic Hydroxy Phosphonates via Alkene Cross Metathesis" Christopher D. Spilling, Anyu He, Bingli Yan and Anchalee Thanavaro *Journal of Organic Chemistry* **2004**, *69*, 8643-8651.

52) "Allylic Hydroxy Phosphonates: Versatile Chiral Building Blocks" Antonette De la Cruz, Anyu He, Anchalee Thanavaro, Bingli Yan, Christopher D. Spilling and Nigam P. Rath *Journal of Organometallic Chemistry* **2005**, *690*, 2577-2592.

53) "Effect of Ligand Structure on the Pathways for Iron Release from Serum Transferrin" Claire E. Brook, Wesley R. Harris, Christopher D. Spilling, Wang Peng, J. Jonathan Harburn and Sujittra Srisung *Inorganic Chemistry* **2005**, 44, 5183-5191.

54) "Efficient Synthesis of Tyrosine Derived Marine Sponge Metabolites via Acylation of Amines with a Coumarin" J. Jonathan Harburn, Nigam P. Rath and Christopher D. Spilling *Journal of Organic Chemistry* **2005**, *70*, 6398-6403.

55) "Total Synthesis of Rapamycin" Matthew L. Maddes, Miles N. Tackett, Hidenori Watanabe, Paul E. Brennan, Christopher D. Spilling, James S. Scott, David P. Osborn and Steven. V. Ley *Angewandte Chemie International Edition* **2007**, *119*, 597-603.

56) "Asymmetric Synthesis of 2-Alkyl-3-Phosphono Propanoic Acids via P-C Bond Formation and Hydrogenation" Pallavi Badkar, Nigam P. Rath, and Christopher D. Spilling *Organic Letters* **2007**, *9*, 3619-3622.

57) "Synthesis of Cyclopentenones via Intramolecular HWE and the Palladium Catalyzed Reactions of Allylic Hydroxy Phosphonate Derivatives" Bingli Yan and Christopher D. Spilling *Journal of Organic Chemistry* **2008**, *73*, 5385-5396.

58) "Synthesis and Biological Evaluation of a Phosphonate Analog of the Natural Acetyl Cholinesterase Inhibitor Cyclophostin" Saibal Bandyopadhyay, Supratik Dutta, Christopher D. Spilling, Cynthia M. Dupureur and Nigam P. Rath *Journal of Organic Chemistry* **2008**, *73*, 8386-8391.

59) "The Synthesis of Azadirachtin: A Potent Insect Antifeedant" Steven V. Ley, Antonio Abad-Somovilla, James C. Anderson, Carles Ayats, Rolf Bänteli, Edith Beckmann, Alistair Boyer, Maria G. Brasca, Abigail Brice, Howard B. Broughton, Brenda J. Burke, Ed Cleator, Donald Craig, Alastair A. Denholm, Ross M. Denton, Thomas Durand-Reville, Luca B. Gobbi, Michael Gçbel, Brian Lawrence Gray, Robert B. Grossmann, Claire E. Gutteridge, Norbert Hahn, Sarah L. Harding, David C. Jennens, Lynn Jennens, Peter J. Lovell, Helen J. Lovell, Mary L. de la Puente, Hartmuth C. Kolb, Win-Jan Koot, Sarah L. Maslen, Catherine F. McCusker, Amos Mattes, Andrew R. Pape, Andrea Pinto, Dinos Santafianos, James S. Scott, Steven C. Smith, Andrew Q. Somers, Christopher D. Spilling, Frank Stelzer, Peter L. Toogood, Richard M. Turner, Gemma E. Veitch, Anthony Wood and Cornelia Zumbrunn *Chemistry, A European Journal* **2008,** *14*, 10683-10704.

60) **"**Total Synthesis of Rapamycin" Steven V. Ley, Miles N. Tackett, Matthew L. Maddess, James C. Anderson, Paul E. Brennan, Michael W. Cappi, Jag P. Heer, Céline Helgen, Masakuni Kori, Cyrille Kouklovsky, Stephen P. Marsden, Joanne Norman, David P. Osborn, María Á. Palomero, John B. J. Pavey, Catherine Pinel, Lesley A. Robinson, Jürgen Schnaubelt, James S. Scott, Christopher D. Spilling, Hidenori Watanabe, Kieron E. Wesson, Michael C. Willis *Chemistry, A European Journal* **2009**, 15, 2874-2914.

61) "Stereoselective Synthesis of Cyclic Ethers via the Intramolecular Addition of Alcohols to Phosphono Allylic Carbonates" Anyu He, Nongnuch Sutivisedsak, Christopher D. Spilling *Organic Letters* **2009**, *11*, 3124-3127.

62) "Synthesis and Kinetic Analysis of Some Phosphonate Analogs of Cyclophostin as Inhibitors of Human Acetylcholinesterase" Supratik Dutta, Raj Malla, Saibal Bandyopadhyay, Christopher D. Spilling and Cynthia M. Dupureur *Bioorganic and Medicinal Chemistry* **2010**, *18*, 2265-2274.

63) "A Formal Synthesis of the C1-C9 Fragment of Amphidinolide C Employing the Tamaru Reaction" Mahesh Paudyal, Nigam P. Rath and Christopher D. Spilling *Organic Letters* **2010**, *12,* 2954-2957.

64) Synthesis of the C(18)-C(34) Fragment of Amphidinolide C and the C(18)-C(29) Fragment of Amphidinolide F" Sudeshna Roy and Christopher D. Spilling *Organic Letters* **2010**, 12, 5326-5329.

65) "Concise Synthesis of 1,3-di-O-substituted Tetrahydropyran Derivatives as Conformationally Restricted Pyranose Mimetics" Laurel K. Mydock, Christopher D. Spilling and Alexei V. Demchenko *Comptes rendus – Chimie* **2011**, 14, 301-306.

66) "The First Total Synthesis of (±) Cyclophostin and(±) Cyclipostin P: Inhibitors of the Serine Hydrolases Acetyl Cholinesterase and Hormone Senstive Lipase" Raj K. Malla, Saibal Bandyopadhyay, Christopher D. Spilling, Supratik Dutta and Cynthia M. Dupureur *Organic Letters* **2011**, *13*, 3094-3097.

67) "An Expeditious Total Synthesis of both Diastereoisomeric Lipid Dihydroxytetrahydrofurans from *Notheia anomala"* Sudeshna Roy and Christopher D. Spilling *Organic Letters* **2012,** *14*, 2230-2233.

68) "Synthesis and Biological Evaluation of Purpurlealidin E-Derived Marine Sponge Metabolites: Aplysamine-2, Aplyzanzine A, and Suberedamines A and B" Suresh K. Kottakota, Dimitrios Evanelopoulos, Amani Alnimr, Sanjib Bhakta, Timothy D. McHugh, Mark Gray, Paul W. Groundwater, Emma C. L. Marrs, John D. Perry, Christopher D. Spilling and J. Jonathan Harburn *Journal of Natural Products* **2012**, *75*, 1090-1101.

69) "Synthesis and Kinetic Evaluation of Cyclophostin and Cyclipostins Phosphonate Analogs as Selective and Potent Inhibitors of Microbial Lipases" Vanessa Point, Raj K. Malla, Sadia Diomande, Benjamin P. Martin, Frederic Carrière, Stéphane Canaan, Nigam P. Rath, Christopher D. Spilling and Jean-François Cavalier *Journal of Medicinal Chemistry* **2012**, 55, 10204-10219.

70) "Enantioselective Inhibition of Microbial Lipolytic Enzymes by Nonracemic Monocyclic Enolphosphonate Analogs of Cyclophostin" Vanessa Point, Raj K. Malla, Sadia Diomande, Frederic Carrière, Stéphane Canaan, Christopher D. Spilling and Jean-François Cavalier *Journal of Medicinal Chemistry* **2013**, 56, 4393-4401.

71) "A filtration System that Greatly Reduces Aluminum in Calcium Gluconate Injection USP used to Prepare Parenteral Nutrition Solutions" Robert A. Yokel, Wesley R. Harris, Christopher D. Spilling, Vasiliy P. Abramov, Jason M. Lone and Robert J. Kuhn *The Journal of Pediatric Pharmacology and Therapeutics* **2014**, *19(3)*, 189-195

72) "Support of Academic Synthetic Chemistry using Separation Technologies from the Pharmaceutical Industry" Erik L. Regalado, Marisa C. Kozlowski, John Curto, Tobias Ritter, Michael G. Campbell, Anthony R. Mazzotti, Bruce Hamper, Christopher D. Spilling, Michael P. Mannino, Li Wan, Jin-Quan Yu, Jinchu Liu and Christopher J. Welch *Organic and Biomolecular Chemistry* **2014**, 12, 2161-2166.

73) "Relay Cross Metathesis Reactions of Allyl Vinyl Phosphonates" Raj K. Malla, Jeremy N. Ridenour and Christopher D. Spillng *Beilstein Journal of Organic Chemistry* **2014**, *10*, 1933-1941.

74) "A New Class of Salicylic Acid Derivtives for Inhibiting YopH of Yersinia Pestis" Mahesh Paudyal, Li Wu, Zhong-Yin Zhang, Christopher D. Spilling and Chung F. Wong *Bioorganic and Medicinal Chemistry* **2014** 22(24), 6781-6788.

75) "Trapping Hemiacetals with Phosphono Substituted Palladium Pi Allyl Complexes for the Synthesis of Substituted Cyclic Ethers" Nongnuch Sutivisedsak, Surendra Dawadi and Christopher D. Spilling *Tetrahedron Letters* **2015**, *56*, 3534-3537.

76) Rat Hormone Senstive Lipase Inhibition by Cyclipostins and Their Analogs Elena Vasilieva, Supratik Dutta, RaJ K. Malla, Benjamin P. Martin, Christopher D. Spilling and Cynthia M. Dupureur *Bioorganic and Medicinal Chemistry* **2015**, *23*, 944-952.

77) "A Practical and Scalable Synthesis of (*S*) & (*R*) 1-(Dimethoxyphosphoryl) allyl methyl carbonate" Sudeshna Roy, Nongnuch Sutivisedsak, Alexander M. Lyss Bruce C. Hamper and Christopher D. Spilling *Synthesis* **2015***, 47*, 3669-3672.

78) Synthesis and Comparison of the Biological Activity of Monocyclic Phosphonate, Difluorophosphonate and Phosphate Analogs of the Natural AChE Inhibitor Cyclophostin, Benajmin P. Martin, Elena Vasillieva, Cynthia M. Durpureur and Christopher D. Spilling *Bioorganic and Medicinal Chemistry* **2015**, *23*, 7529-7534.

79) "Enantioseparation of α-Hydroxyallylphosphonates and Phosphonoallylic Carbonate Derivatives on Chiral Stationary Phases using Sequential UV, Polarimetric and Refractive Index Detection" Bruce C. Hamper, Michael P. Mannino, Melissa E. Mueller, Liam Harrison and Christopher D. Spilling *Chirality* **2016**, *28*, 656-662.

80) "A Practical and Scalable Synthesis of Acrylohydroxamic Acid" Bruce C. Hamper, Brendon T. Sullivan, Nigam Rath and Christopher D. Spilling *Synthesis* **2017**, *49*, 5335-5338.

81) "Cyclipostins and Cyclophostin analogs as promising compounds in the fight against tuberculosis" Phuong Chi Nguyen, Vincent Delorme, Anaïs Bénarouche, Benjamin P. Martin, Rishi Paudel, Giri R. Gnawali, Abdeldjalil Madani, Rémy Puppo, Valérie Landry, Laurent, Kremer, Priscille Brodin, Christopher D. Spilling, Jean-François Cavalier1 and Stéphane Canaan *Scientific Reports* **2017**, 7, 11751.

82) "Cyclophostin and Cyclipostins analogs, new promising molecules to treat mycobacterial-related diseases" J.-F. Cavalier, Phuong Chi Nguyen, Abdeldjalil Madani, Pierre Santucci, Benjamin P Martin, Rishi Paudel; Sandrine Delattre; Jean-Louis Herrmann, Christopher D SpillingLaurent Kremer, Stéphane Canaan *International Journal of Antimicrobial Agents* **2018**, *51*, 651-654

83) "Cyclipostins and Cyclophostin analogs inhibit the antigen 85C from *Mycobacterium tuberculosis* both *in vitro* and *in vivo"* Albertus Viljoen, Matthias Richard, Phuong Chi Nguyen, Patrick Fourquet, Luc Camoin, Rishi Paudal, Giri Gnawali, Christopher Spilling, Jean-François Cavalier, Stéphane Canaan, Mickael Blaise, and Laurent Kremer *Journal of Biological Chemistry* **2018**, *293*, 2755-2769

84) "Biochemical and structural characterization of TesA, a major thioesterase required for outer-envelope lipid biosynthesis in M. tuberculosis" Phuong Chi Nguyen, Van Son Nguyen, Benjamin P Martin, Patrick Fourquet, Luc Camoin, Chistopher D Spilling, Jean-François Cavalier, Christian Cambillau, Stephane Canaan *J. Mol. Biol.* **2018**, 430, 5120-5136.

85) "LipG a bifunctional phospholipase/thioesterase involved in mycobacterial envelope remodeling" Pierre Santucci, Vanessa Point, Isabelle Poncin, Alexandre Guy, Céline Crauste, Carole Serveau-Avesque, Jean Marie Galano, Chistopher D. Spilling, Jean-François Cavalier and Stéphane Canaan *Bioscience Reports* **2018**, 38, BSR20181953

86) "Synthesis of Phostones via the Palladium-Catalyzed Ring Opening of Epoxy Vinyl Phosphonates" Giri Raj Gnawali, Nigam P, Rath, Christopher D. Spilling *J. Org. Chem.* **2019**, *84*, 8724-8730.

87) "The Chemistry and Biology of Cyclophostin, the Cyclipostins and Related Compounds" Christopher D. Spilling *Molecules* **2019**, *24*, 2579

88) "Multi-target inhibitors, Cyclipostins and Cyclophostin analogs impair growth of Mycobacterium abscessus" Abdeldjalil Madani, Jeremy Ridenour, Benjamin Martin, Rishi Paudel, Anosha Abdul Basir, Vincent Le Moigne, Jean-Louis Herrmann, Stephane Audebert, Luc Camoin, Laurent Kremer, Christopher Spilling, Stephane Canaan, Jean-François Cavalier *ACS Infectious Diseases* **2019,** 5, 1597-1608

89) "Leaving Group Effects in a Series of Electrosprayed CcHhN1 Anthracene Derivatives" Maha T. Abutokaikah, Giri R. Gnawali, Joseph W. Frye, Curtis M. Stump, John Tschampel, Matthew J. Murphy, Eli S. Lachance, Christopher D. Spilling, Benjamin Bythell *Journal of the American Society for Mass Spectrometry* **2019**, *30*(11), 2306-2317.

90) "Synthesis of Phosphonomethyl Tetrahydrofurans via the Mori-Tamaru Reaction of Phosphonodienes" Rishi R. Paudel, Jeremy N. Ridenour, Nigam P. Rath and Christopher D. Spilling *Organic Letters* **2020**, *22*, 2, 830-3834.

C. Patents:

1) "Method of Preparing Stereospecific Nitroaldols," Anthony G. M. Barrett and Christopher D. Spilling, June 12, 1990, United States Patent Number 4,933,505.

2) "Use of Ammonium Formate as a Hydrogen Transfer Reagent for Reduction of Chiral Nitro Compounds with Retention of Configuration," Anthony G. M. Barrett and Christopher D. Spilling, March 24, 1992, United States Patent Number 5,099,067.

3) "Coated Magnetically Responsive Particles, and Embolic Materials using Coated Magnetically Responsive Particles" Ritter, Rogers C.; Harburn, Jonathan; Spilling, Christopher; Miller, Kathleen M. 2004, United States Patent 2004/0157082, filed 7/21/03, published 8/14/04, abandoned.

4) "Chelating Compounds And Immobilized Tethered Chelators" (original) Wesley R. Harris, Robert Yokel, Christopher D. Spilling, Chang-Guo Zhan, US Patent 7,932,326 B2, filed April 16th 2008, published 10/22/2009, issued 4/26/2011.

5) "Removing Aluminum from Solution Using Chelating Compounds And Immobilized Tethered Chelators" (divisional) Wesley R. Harris, Robert Yokel, Christopher D. Spilling, Chang-Guo Zhan, United States Patent 8,066,883, filed 3/21/2011, published 7/14/2011, issued 11/29/2011.

6) "Chelating Compounds and Immobilized Tethered Chelators" (continuation in part) Robert Yokel, Wesley R. Harris, Christopher D. Spilling, Robert Kuhn, Surendra Dawadi, United States Patent application US2012/0061325 A1, filed 10/21/2011, published 3/15/2012.

7) "Chelating Compounds and Immobilized Tethered Chelators" (continuation in part) Robert Yokel, Wesley R. Harris, Christopher D. Spilling, Robert Kuhn, Surendra Dawadi, Canadian Patent Application 2,792,724

8) "Flow Through Filter to Remove Aluminum from Medical Solutions" (continuation in part II) Robert Yokel, Wesley R. Harris, Christopher D. Spilling, Robert Kuhn, Vasiliv P. Abramov, Jason M. Lone, United States Patent Application 2014/186,207, filed 2/21/2014, published. PCT Application PCT/US2014/017608

9) "Immobilized Ligands for the Removal of Metal Ions and Methods Thereof" Wesley R. Harris, Christopher D. Spilling, Bruce Hamper, Surendra Dawadi, PCT application PCT/US2014/017685, filed 2/21/2014, published.

10) "Fluorescent Labeled Lipase Inhibitors" Christopher D. Spilling, Benjamin P. Martin,. Jean Francois Cavalier, Stephane Canaan PCT application (Ref: UM Disclosure No. 14UMS004) PCT/US2015/017137, filed 2/21/2015, published, U.S. Patent No. 10,047,112 Issue Date August 14, 2018

D. Books (chapters, contributions):

1) "Thiophosphoryl Trichloride" in *Encyclopedia of Organic Reagents*, Leo Paquette, Ed., John Wiley and Sons Ltd., **1995**, vol 7, pp 4883-4884. (I, UM)

2) "Tetraethyl Pyrophosphite" in Encyclopedia of Organic Reagents, Leo Paquette, Ed., John Wiley and Sons Ltd., **1995**, vol 7, pp 4761-4762. (I, UM)

3) "Tetramethylammonium Dimethyl Phosphate" in *Encyclopedia of Organic Reagents*, Leo Paquette, Ed., John Wiley and Sons Ltd., **1995**, vol 3, pp 2055-2056. (I, UM)

4) "Diphenyl 2-oxo-3-oxazolinylphosphonate" in *Encyclopedia of Organic Reagents*, Leo Paquette, Ed., John Wiley and Sons Ltd., **1995**, vol 4, pp 2233-2234. (I, UM)

5) "Tetraethyl Pyrophosphite" in *Reagents for Glycoside, Nucleotide and Peptide Synthesis*, David Crich, Ed., John Wiley and Sons Ltd., **2005**, pp 583-584. (I, UM)

6) "Synthesis of Non-racemic a-Hydroxy Phosphonates via Asymmetric Phospho-Aldol Reactions" Malla, R. K. and Spilling, C. D. in Topics in Current Chemistry: Phosphorus Chemistry. Montchamp, J.-L. Ed., Springer **2015**, *361*, 83-136,

E. Book Reviews

1. A review of "New Aspects in Phosphorus Chemistry II. Topics in Current Chemistry, 223. Edited by Jean Pierre Majoral, Springer Verlag, NY, 2003, ISBN 3-540-44086-0" Christopher D. Spilling *Journal of the American Society* **2003**, *125*, 11453.

2) Invited Lectures

1) "Phosphorus and Bromine: A Synthetic Playground" Washington University, St. Louis, MO, November 7, 1991.

2) "Phosphorus and Bromine: A Synthetic Playground" St. Louis University, St. Louis, MO, November 22, 1991.

3) "The Preparation and Reactions Chiral Phosphorous Acid Diamides (and related chemistry)" University of Delaware, Newark, Delaware, February 16, 1993.

4) "New Phosphorus Reagents for Asymmetric Synthesis" 6th Missouri Organic Day, University of Missouri-Columbia, April 17, 1993.

5) "Preparation and Reactions of Chiral, Non Racemic 1-Hydroxy Phosphonic Acid Derivatives" Michigan Technological University, Houghton, MI, January 4, 1994.

6) "Preparation and Reactions of Chiral, Non Racemic 1-Hydroxy Phosphonic Acid Derivatives" University of Nebraska, Lincoln, NE, January 19, 1994.

7) "Preparation and Reactions of Chiral, Non Racemic 1-Hydroxy Phosphonic Acid Derivatives" Kansas State University, Manhattan, KS, January 20, 1994.

8) "Preparation and Reactions of Chiral, Non Racemic 1-Hydroxy Phosphonic Acid Derivatives" University of Kansas, Lawrence, KS, January 21, 1994.

9) "New Phosphorus Reagents for Asymmetric Synthesis" University of Missouri-St. Louis, February 7, 1994.

10) "New Phosphorus Reagents for Asymmetric Synthesis" South East Missouri State University, Cape Giradeau, MO, March 2, 1994.

11) "Chiral Phosphorous Acid Diamides: Asymmetric Synthesis of 1-Hydroxy and 3-Amino Phosphonic Acids" Loughborough University, England, June 6th, 1994.

12) “Asymmetric Phosphonylation Methods and Synthetic Applications” Organic Reactions and Processes Gordon Research Conference, New Hampton School, NH, July 16-21, 1995

13) “Asymmetric Phosphonylation Methods and Synthetic Applications” Ceregen-Monsanto, St. Louis, August 10, 1995

14) “Asymmetric Organophosphorus Chemistry: New Reactions and Applications” Cambridge University, November 1996.

15) “Asymmetric Organophosphorus Chemistry: New Reactions and Applications” Loughborough University, March 17th, 1997.

16) “Asymmetric Organophosphorus Chemistry: New Reactions and Applications” SmithKline Beecham, Tonbridge, Kent, May 21, 1997

17) “Asymmetric Organophosphorus Chemistry: New Reactions and Applications” Astra- Zeneca, Macclesfield, June 2, 1997.

18) "Recent Developments in Asymmetric Synthesis Using Organophosphorus Compounds" University of Missouri-Columbia, November 17, 1997.

19) "Recent Developments in Asymmetric Synthesis Using Organophosphorus Compounds" University of Missouri-Kansas City, January 29, 1998.

20) "Recent Developments in Asymmetric Synthesis Using Organophosphorus Compounds" University of Memphis, February 20, 1998.

21) "The Application of Pericyclic Reactions to Some Stereochemical Problems" University of Missouri-St. Louis, April 27, 1998.

22) "From Chemo-Enzymatic Synthesis to Enzyme Inhibitors: Chemistry of Allylic Hydroxy Phosphonates" Washington University, School of Medicine, Jan 19, 1999.

23) "From Chemo-Enzymatic Synthesis to Enzyme Inhibitors: Chemistry of Allylic Hydroxy Phosphonates" University of Iowa, Feb 12, 1999.

23) "From Chemo-Enzymatic Synthesis to Enzyme Inhibitors: Chemistry of Allylic Hydroxy Phosphonates" Montana State University, March 5, 1999.

24) "From Chemo-Enzymatic Synthesis to Enzyme Inhibitors: Chemistry of Allylic Hydroxy Phosphonates" Illinois State University, March 19, 1999.

25) "From Chemo-Enzymatic Synthesis to Enzyme Inhibitors: Chemistry of Allylic Hydroxy Phosphonates" Roche Discovery, Welwyn Garden City, UK, June 8, 1999.

26) "From Chemo-Enzymatic Synthesis to Enzyme Inhibitors: Chemistry of Allylic Hydroxy Phosphonates" Birmingham University, UK, June 24, 1999.

27) "From Chemo-Enzymatic Synthesis to Enzyme Inhibitors: Chemistry of Allylic Hydroxy Phosphonates" Brown University, Providence, Rhode Island, November 16, 1999.

28) "From Chemo-Enzymatic Synthesis to Enzyme Inhibitors: Chemistry of Allylic Hydroxy Phosphonates" University of Massachusetts-Dartmouth, November 17, 1999.

29) "From Chemo-Enzymatic Synthesis to Enzyme Inhibitors: Chemistry of Allylic Hydroxy Phosphonates" University of Connecticut, November 18, 1999.

30) "Chemoezymatic Approaches to Chiral, Non Racemic Hydroxy Phosphonates and Synthetic Applications" Pharmacia, Chesterfield, Missouri, September 27, 2000.

31) "From Chemo-Enzymatic Synthesis to Enzyme Inhibitors: Chemistry of Allylic Hydroxy Phosphonates" University of Kansas, Lawrence, Kansas, September 29, 2000.

32) "Recent Advances in Organophosphorus Chemistry" University of Missouri-St. Louis, October 9, 2000.

33) "Chemoezymatic Approaches to Chiral, Non Racemic Hydroxy Phosphonates and Synthetic Applications" Pharmacia, Chesterfield, Missouri, September 27, 2000.

34) "From Chemo-Enzymatic Synthesis to Enzyme Inhibitors: Chemistry of Allylic Hydroxy Phosphonates" University of Kansas, Lawrence, Kansas, September 29, 2000.

35) “Recent Advances in Organophosphorus Chemistry” University of Missouri-St. Louis, October 9, 2000.

36) “Asymmetric Synthesis with Allylic Hydroxy Phosphonates” Southeast Missouri State University, September 19, 2001.

37) “Stereoselective Reactions of Allylic Hydroxy Phosphonates” University of Wisconsin-Eau Claire, November 30,2001.

38) “Palladium Catalyzed Reactions of Allylic Hydroxy Phosphonates” Missouri Inorganic Day, University of Missouri-St. Louis, May 4, 2002.

39) “Palladium Catalyzed Reactions of Allylic Hydroxy Phosphonates” Kings College, London, UK, May 27, 2002.

40) “Palladium Catalyzed Reactions of Allylic Hydroxy Phosphonates” Astra-Zeneca, Macclesfield, UK, May 29, 2002.

41) “Asymmetric Synthesis with Allylic Hydroxy Phosphonates” Natural Products Gordon Research Conference, Tilton Academy, NH, July 29-August 2, 2002.

42) Asymmetric Synthesis and Stereoselective Reaction of Allylic Hydroxy Phosphonates” Western Michigan University, May 19, 2003.

43) “Allylic Hydroxy Phosphonates: Versatile Chiral Building Blocks” University of Memphis, TN, October 3, 2003.

44) “Allylic Hydroxy Phosphonates: Versatile Chiral Building Blocks” St. Louis University – St. Louis Section of the American Chemical Society Organic Synthesis Discussion Group, December 17, 2003.

45) Allylic Hydroxy Phosphonates: Versatile Chiral Building Blocks, University of Mississippi, March, 4, 2004.

46) Allylic Hydroxy Phosphonates: Versatile Chiral Building Blocks, 16th International Conference on Phosphorus Chemistry, Birmingham, England July 7, 2004.

47) Allylic Hydroxy Phosphonates: Versatile Chiral Building Blocks, University of Arkansas, September 9, 2004.

48) "Natural Products as Scaffolds for Crystal Engineering," Open House Symposium for the UMSL X-Ray Facility, Christopher D. Spilling, UMSL, St. Louis MO, 08-17-2005.

49) "Natural Product Synthesis with Allylic Hydroxy Phosphonates," Southern Illinois University-Edwardsville, Illinois, 09-14-2005.

50) "Natural Product Synthesis with Allylic Hydroxy Phosphonates," Sheffield University, UK, 12-12-2005.

51) "Natural Product Synthesis with Allylic Hydroxy Phosphonates," Sunderland University, UK, 12-08-2005.

52) "Natural Product Synthesis with Allylic Hydroxy Phosphonates," Heriot-Watt University, Edinburgh, Scotland, 12-07-2005.

53) "Asymmetric Synthesis of Biologically Interesting Phosphates, Phosphonates and Phosphinates" A Symposium in Honor of Prof Sheldon Cremer at the Great Lakes Regional Meeting of the American Chemical Society, Milwaukee, WI, June 1, 2006.

54) "Natural Product Synthesis with Allylic Hydroxy Phosphonates" University of Texas-Arlington, November 6th, 2006

55) "Natural Product Synthesis with Allylic Hydroxy Phosphonates" Texas Christian University, November 7th, 2006

56) "Natural Product Synthesis with Allylic Hydroxy Phosphonates" Western Illinois University March 2, 2007

57) "Natural Product Synthesis with Allylic Hydroxy Phosphonates" University of Missouri- St. Louis, April 23, 2007

58) "Natural Product Synthesis with Allylic Hydroxy Phosphonates" University of East Anglia, UK, July 3, 2007

59) "Natural Product Synthesis with Allylic Hydroxy Phosphonates" University of Maryland, June 2, 2008.

60) "Total Synthesis of Cyclophostin, the Cyclipostins, and Phosphonate Analogs" 44th Midwest Regional Meeting of the American Chemical Society: Symposium on Organophosphorus Chemistry, Iowa City, IA, October 2009.

61) "Total Synthesis of Cyclophostin, the Cyclipostins, and Phosphonate Analogs" Department of Biochemistry and Biophysics, Washington University, St. Louis, February 24th, 2010.

62) "Approaches to Tetrahydrofuran Containing Natural Products," Joint 46th Midwest and 39th Great Lakes Regional Meeting of the American Chemical Society, St. Louis, MO, October 19, 2011.

63) "Applications of Phosphono Allylic Carbonates in the Asymmetric Synthesis of Heterocycles" Michigan State University, October 12th 2012.

64) "Applications of Phosphono Allylic Carbonates in the Asymmetric Synthesis of Heterocycles" South East Missouri State University, February 27th 2013.

65) "Applications of Phosphono Allylic Carbonates in the Asymmetric" Missouri Organic Day April 27, 2013.

66) "Applications of Phosphono Allylic Carbonates in the Asymmetric Synthesis of Heterocycles" Washington Universty, St. Louis, September 26, 2013

67) "Technology Transfer from Academic Labs" St. Louis Section American Chemical Society Younger Chemist Committee, Dentons Law Firm, St. Louis, MO December 3, 2013.

68) "Synthesis of Analogs of Cyclophostin for Structure Activity Relationship Studies with Acetylcholinesterase and Hormone-Sensitive Lipase" International Conference on Phosphorus Chemistry, Ireland, June 29-July 2, 2014.

69) "Synthesis of Cyclophostin and Realted Compounds as Lipase Inhibitors" University of Iowa April 30th 2015.

70) "Removal of aluminum from total parenteral nutrition solutions" Two Year College Chemistry Consortium (2YC3) conference, St. Charles Community College, September 18th, 2015 (banquet lecture).

71) "New Phosphonate Analogs Cyclosphostin and Cyclipostins: Synthesis and Kinetic Evaluation as Inhibitors of Lipases" Florida Internaional University, November 18th, 2015.

72) "A Comparison of Classical and De Novo Approaches to Synthesis of Phostones " XXI International Conference on Phosphorus Chemistry, Kazan, Russia, June 5th-10th, 2016 (Keynote).

73) "Synthesis and Evaluation of Analogs of Cyclophostin and the Cyclipostins as Inhibitors of Microbial Lipases" XXI International Conference on Phosphorus Chemistry, Kazan, Russia, June 5th-10th, 2016.

74) "Synthesis of Biologically Active Phosphorus-Containing Heterocycles" International Conference on Phosphorus Chemistry, Budapest, Hungary, July 5th-10th, 2018 (Plenary)

75) "Synthesis of Biologically Active Phosphorus-Containing Heterocycles" University of Ghent, Belgium, September 13th, 2018.

76) "Synthesis of Biologically Active Phosphorus-Containing Heterocycles" University of Birmingham, UK, May 28th, 2019.

Grants and Contracts

University of Missouri-St. Louis, Campus Support, funded:

1) "Chiral Phosphonates and Phosphonamides in Stereoselective Bond Formations" UM-St. Louis Improved Research Quality, **$4,500**, 5/90-12/90.

2) "Chiral Phosphonates and Phosphonamides in Stereoselective Bond Formations" UM-St. Louis Weldon Spring Fund, **$13,000**, 5/90-5/91.

3) "Approaches to the Total Synthesis of Gilvocarcin and Related Aryl C-Glycoside Antibiotics" UM-St. Louis Improved Research Quality, **$4,320**, 5/91-12/91.

4) "Approaches to the Total Synthesis of Gilvocarcin and Related Aryl C-Glycoside Antibiotics" UM-St. Louis Summer Research Fellowship, **$4,100**, 5/91-9/91.

5) "Improved NMR Data Handling" UM-St. Louis Improved Research Quality, Chemistry Department proposal written and organized with R E K Winter, **$4,500**, 5/91-9/91.

6) "New Phosphorus Reagents for Asymmetric Synthesis " UMSL Research Incentive Award, **$5,820**, 5/1/94-12/94.

7) "A Biomimetic Approach to the Synthesis of Sponge Secondary Metabolites" UMSL Research Incentive Award, **$6,820**, 5/1/95-12/95.

8) "Research Leave for Fall Semester 1996: A Comprehensive Review of the Intramolecular Ene Reaction" UMSL Research Incentive Award, **$7,350**, 8/1/96-12/96.

9) "Purchase of a Solvent Purification System" UMSL Research Award, **$8, 500**, 5/1/00-12/31/00.

10) "Travel to Japan" Small Grants Competition, **$1,000**, August 2001.

11) "Asymmetric Synthesis of Phosphinates" UMSL Research Award, **$9,616**, 5/1/020-12/31/02.

12) "Travel to 16th ICPC" UMSL Small Grants Fund, **$1,000**, 7/1/04-7/31/04.

13) "Application of Non-Racemic Allylic Hydroxy Phosphonates to the Total Synthesis of Papuamine" UMSL Research Award, **$10,910**, 5/1/04-12/31/04.

14) "Cell Culture Models for Basic Pharmaceutical Research" UMSL Research Award **$11,750**, 5/1/07-8/31/08.

15) "Stable Analogs of Fostriecin" College of Arts &Science Research Grant, **$8230**, 3/1/11-8/30/11.

16) "Fluorescent Affinity Probes for M.tb. Lipases" UMSL Research Award, **$11,400**, 5/1/2014-1/31/2015.

17) New Affinity Probes for M.tb. Lipases" College of Arts &Science Research Grant, **$10,000**, 1/1/2015-8/30/2015.

C. University of Missouri, System Support, funded

1) "Stereoselective Synthesis of Glucal Epoxides" UM Research Board, **$35,000**, 11/93-6/94.

2) "Development of an Integrated NMR Laboratory" UM Research Board, Chemistry Department proposal written and organized with G.K. Anderson, **$89,100**, 1993.

3) "Purchase of an X-Ray Diffractometer" UM Research Board, Chemistry Department proposal, one of six contributors, **$85,500**, 1994.

4) "Catalysts for Asymmetric Phosphonylation" UM Research Board, **$26,200**, 5/1/95-6/96.

5) "Purchase of a High Resolution Mass Spectrometer " UM Research Board (PI, L. Barton, Chemistry Chair), Chemistry Department proposal, one of six contributors, **$85,000**, 1996-97.

6) "New Synthetic Methods for Bio-active Sponge Metabolites' Missouri Research Board, **$37,750,** June 1998-1999.

7) "Upgrade of a 300 MHz Spectrometer" Missouri Research Board, a collaborative proposal (Chemistry Department) written and organized by C. D. Spilling and J. Braddock Wilking,

principal investigator: C.D. Spilling, co- principal investigators: G. Anderson, L. Barton, J. Corey, R. Murray, F.C. Pigge, J. Braddock-Wilking, **$55,694**, 1/11/99-10/31/2000.

8) "Upgrade of a CCD-based X-ray Diffraction Laboratory" Missouri Research Board, a collaborative proposal (Chemistry Department) written and organized by L. Brammer, principal investigator: Lee Brammer, co-principal investigators: G. Anderson, L. Barton, J. Corey, F.C. Pigge, C.D. Spilling, **$55,000,** 2/21/00

9) "Upgrade of the X-ray Diffraction Facility" Missouri Research Board, a collaborative proposal (Chemistry Department) written and organized by Christopher D. Spilling principal investigator: co-principal investigators: G. Anderson, L. Barton, J. Wilking, F.C. Pigge, N.P. Rath, **$59,700,** 12/1/04-05.

10) "Stereoselective Nickel-Catalyzed Homoallylation" Missouri Research Board **$18,000**, 6/1/12-5/31/13.

External Support, funded:

1) "Chiral Phosphonates and Phosphonamides in Stereoselective Bond Formations" American Chemical Society Petroleum Research Fund, Type G, **$18,000**, 9/90-9/92.

2) "Synthesis of Chiral Aminophosphine Ligands" Monsanto Company, **$10,000**, 2/1/92-31/1/93.

3) "Synthesis of 8,9-Dehydro Estrone" Food and Drug Administration, **$3,960**, 1993.

4) "Synthesis of a Chiral Liquid Crystal" Food and Drug Administration, **$2,000**, 1994.

5) "Travel funds to attend XIIth International Conference on Phosphorus Chemistry, Toulouse, France, July 6-10, 1992, an NSF grant administered by Prof. Slayton Evans, University of North Carolina, **$1,200**, July 1992.

6) "Research Experience for Undergraduates at UM-St. Louis" National Science Foundation, Co-PI W.J. Welsh, **$99,648**, 5/91-9/94.

7) "Purchase of an X-Ray Diffractometer" National Science Foundation Chemical Instrumentation Program, Chemistry Department proposal (PI, L. Barton, Chemistry Chair), one of six contributors, **$150,000**, 1/18/94.

8. "Purchase of a 300 MHz Spectrometer" National Science Foundation Chemical Instrumentation Program, Chemistry Department proposal written and organized by C.D. Spilling and G.K. Anderson (PI, L. Barton, Chemistry Chair), **$160,000**, 1/18/94.

9. "Research Experience for Undergraduates at UM-St. Louis" National Science Foundation, Co-PI W.J. Welsh, a non-competitive merit renewal, **$109,560**, 5/95-9/97.

10. "Catalysts for Asymmetric Phosphonylation and Synthetic Applications" National Science Foundation, **$237,270**, 7/96-6/99.

11. "Undergraduate Training Grant" Monsanto, **$9,000**, 5/96-8/96.

12. "Undergraduate Training Grant" Monsanto, **$9,000**, 9/96-5/97.

13. "Purchase of a High Resolution Mass Spectrometer" a collaborative proposal (Chemistry Department) written and organized by R. Winter, principal investigator: L. Barton (Chemistry Chair), co-principal investigators: J. Corey, W. Harris, R. Murray, C.D. Spilling, K. Stine, R. Winter, **$250,000**, 6/97-5/98.

14. "Chiral, Non Racemic Allylic Hydroxy Phosphonates: Synthesis and Applications" Petroleum Research Fund, principal investigator: C.D. Spilling, **$60,000**, 9/1/99-8/31/01.

15. "Upgrade of a 300 MHz Spectrometer" National Science Foundation Chemical Instrumentation Program, a collaborative proposal (Chemistry Department) written and organized by C. D. Spilling and J. Braddock Wilking, principal investigator: G. Anderson (Chemistry Chair), co-principal investigators: L. Barton, J. Corey, R. Murray, F.C. Pigge, J. Braddock-Wilking, C.D. Spilling, **$150,694**, 1/11/9-10/31/2000.

16. "Synthesis and Characterization of Polymer Coated Magnetite Nanoparticles" Stereotaxis, Inc.,PI Christopher D. Spilling **$78,000**, 9/01-6/02.

17. "Synthesis of Polymer Coated Magnetite Nanoparticles" Stereotaxis, Inc., **$100,625**, 7/1/02-2/28/03.

18. "Accelerating Iron Chelation from Serum Transferrin" National Institutes of Health, Wes Harris (PI), Christopher D. Spilling, William Welsh, Ross MacGillivary (U of British Columbia), **$1,195,019**, 7/1/00-6/30/05. (CDS: 1 postdoctoral associate and supplies for 5 years).

19. "Catalysts for Asymmetric Phosphonylation and Synthetic Applications" National Science Foundation, **$300,000**, 7/31/02-6/31/06.

20. "Reduction of Toxicity in the Premature Neonates Associated with Aluminum as a Contaminant of Total Parenteral Nutrition Solutions" Thrasher Foundation, PI Robert Yokel (U of Kentucky) co-PIs Christopher D. Spilling and Wes Harris, (subcontract to UMSL), **$110,008**, 8/01/03-7/31/05.

21. MTA Testing of Compounds for Agricultural and Horticulture, E I DuPont Denemours and Co Inc, **$9,600,** 11/01/04-10/31/05.

22. "Upgrade of a CCD-Based X-ray Diffraction Laboratory" National Science Foundation, a collaborative proposal (Chemistry Department), Christopher D. Spilling principal investigator: co-principal investigators: G. Anderson, L. Barton, J. Wilking, F.C. Pigge, N.P. Rath, **$126,619,** 11/1/04-10/31/07

23. "Tetrahydrofurans, Tetrahydropyrans and 2H-Furanones" NIH-NIGMS, **$1,011,099,** 9/1/2006-8/31/2010.

24. "MRI: Acquisition of a 600 MHz NMR Spectrometer" National Science Foundation, written and organized by Christopher D. Spilling (PI), co-investigators Alexei Demchenko, Janet Wilking, Cindy Dupureur,George Gokel, Wes Harris, Jim Bashkin, Mike Nichols (Chemistry) and Sam Wang and Wendy Olivas (Biology), **$614,500,** 2010-2011.

25. "Develop an In-Line Filter to remove Aluminum" University of Kentucky, **$3,200,** 05/19-2008-12/31/2008

26. "Ligand and Chelating Polymer Synthesis" ALKYMOS, **$65,000,** 06/15/2010-01/15/2012

27. "Ligand and Chelating Polymer Synthesis-2" ALKYMOS, **$8,380,** 08/02/2011-09/01/2011

28. "Kinetics of Metal Binding to Immobilized Ligands" ALKYMOS, PI Wes Harris, Co-I Chris Spilling, **$121,361,** 04/01/2011-05/31/2013

28. "Synthesis of Phostones via Phosphono Substituted Metal Allyl Intermediates" National Science Foundation, **$376,673**, 6/1/15-5/31/18, no cost extension to 5/31/2019.

29. MRI: Acquisition of a Single Crystal X-Ray Diffractometer to Advance Regional Collaboration in Chemical Crystallography, funded amount $325K, NSF funding for $227,500 (+30% match). Funding number NSF-MRI 1827756 (PI Rath, spiling one of 9 co-invesigators)

30. "Innovation Interchnage of Greater St. Louis" EDA I6, **$692,144**, 1/1/2019-12/31/2021.

SERVICE

A. Committee Assignments

i. Departmental:

Department Chair August 2004-2015

NMR Committee (member) 1989-1996, (Chair) 1998-2001, (member) 2001-2004
Executive Committee 1990-1991, 1995-1996, 1997-2004
Technical Staff Review Committee 1990-1992
Chemistry Club/ACS Student Affiliate Faculty Advisor 1990-1992
Student Lounge Oversight Committee (Chair) 1991-1993
Graduate Recruiting Committee 1991-1994
Awards Committee (member) 1991-1995, (Chair) 1992-1995 and 1997
Director of the UMSL Chemistry Summer Undergraduate Research Program (NSF-REU) 1991, 1992, 1993, 1994.
Graduate Committee (Chair) 1998-2001
Graduate Admission and Recruiting (Chair) 2001-2004
X-Ray Committee 1994-1996
Faculty/Staff Search Committees
- Organic Asst. Prof. (member) 1993-94
- Organic Asst. Prof. (Chair) 1994-95
- Organic Full Prof. (Chair) 1999-2000
- Organic Asst Prof., (Chair) 2000-2001
- Organic Asst. Prof. (Chair) 2004-2005
- Director of the CME (member) 2004-2006
- Asst/Assoc Prof Inorganic Chemistry (Chair) 2007-2008

Ad personam Committees
- Christopher Pigge, Asst to Assoc with tenure, 2001
- James O'Brien, Associate to Prof, 2002
- Stephen Holmes, tenure, 2009
- Alexei Demchenko, Associate to Prof, 2010
- Alicia Beatty, tenure, 2011

Member of the Dissertation Committee for
Steven Fallis, Steven Kolodziej, Kathleen Fallis, Kevin J. Koeller (chair), Cecilia Marzabadi (chair), Chongfu Xu, Hong Gu, Herb Kaiser, Hong Fang, Yihua Liao (chair), Michael Groaning (chair), Jean Huhmann, Antonette De la Cruz (chair), Todd Boehlow (chair), Isabel Vasconcelos (chair), Hossein Shabany (chair), Robert Stockland, Ricardo Delgado, Luis Llamas (chair), Brad Rowe (chair), Mesfin Janka, Berevan Baban, Joe Ochesky (chair), Anchalee Thanavaro (chair), Angie Schmidt, Kim Dill, Kevin Trankler, Medha Kamat, Colin White, Papapida Pornsuryasak, William Hanshaw, Bingli Yan (chair), Anyu He (chair), Pallavi Badkar (chair), Saibal Bandyopadhyay (chair), Nongnuch Sutivisedsak (chair), Aileen Bongat, James Smoot, Colin Rodger, Laurel Mydock, Steven Costin, Sergey Sedenkin, Mahesh Paudyal (chair), Sudeshna Roy (chair), Matt Lenze, Scott Hasty, Surendra Dawadi (Chair), Ben Martin (Chair), Joe Meisel, Michael Mannino

ii. University:

Graduate Faculty Nominations Committee, March 1990
Graduate Council, 1993-1995, 1998-2000
Graduate School-Admissions and Scholarships Committee (Chair) 1993-1995, (member) 1999-2000
Graduate School-Rules and Regulation Committee (co-chair) 1999-2000
College of Arts and Science-Planning Committee 2001-2003
College of Arts and Science-Tenure and Promotion Committee 2003
Research Advisory Committee for the VC for Research 2003-2005
Committee on Conflict of Interest 2007, 2008, 2009
Search Committee for the VC for Advancement April-August 2008
Search Committee for the Dean of A&S, September-December 2008
Senator (Chemistry) 2006-2015.
Chair, University Assembly and Faculty Senate September 2012 to August 2014
Appointment Tenure and Promotion Committee September 2006 to June 2008
Senate Steering Committee 2007
Senate Budget and Planning Committee 2010-2012 and 2014-2016 (Chair 2015-2016)
Strategic Planning Committee August 2012 to June 2014
F&A Redistribution Committee (Chair) 2104
Physical Facilities Committee Fall 2015
Search Committee for the CFO, spring 2016
Review team member
- College of Education spring 2015
- Department of Physics and Astonomy 2013
- Curator's Professor Toby Kellog
- Center for Nanoscience (Chair) Fall 2009
- Center for International Studies
- Center for Emerging Technology (Chair) spring 2006

Chaired search committee for associate provost for student success 2018
Chaired search committee for Dean A&S 2018
Chair, Academic Program review 2018

iii. UM-System:

Patent, Copyright, and University-Sponsored Materials Committee (August 2000-2016, Chair 2006-2015)
Intercampus Faculty Council 2012-2015

B. Service to Profession

Manuscript Reviewer
Angawandte Chemie, Advanced Synthesis and Catalysis, Australian Journal of Chemistry, Beilstein Journal of Organic Chemistry, Bioinorganic and Medicinal Chemistry, Bioinorganic and Medicinal Chemistry Letters, Canadian Journal of Chemistry, Chemical Communications, Chemical Reviews, Chemistry-A European Journal, European Journal of Organic Chemistry, Heteroatom Chemistry, Journal of the American Chemical Society, Journal of Combinatorial Chemistry, Journal of Organic Chemistry, Journal of Molecular Catalysis. Organic and Biomolecular Chemistry, Organic Letters, Organic Preparations and Procedures International, Phosphorus, Sulfur and Silicon, Synlett, Synthesis, Tetrahedron (UK and USA Editors), Tetrahedron Asymmetry, Tetrahedron Letters (UK and USA Editors).

- Book reviewer for Prentice Hall Publishing

Grant Reviewer
- Idaho Board of Education Research Grants Program
- UM-Research Board
- Kansas State Depscor
- Petroleum Research Fund
- National Science Foundation
- National Science Foundation SBIR/STTR
- Research Corporation
- Israel Science Foundation
- Hong Kong Science Foundation
- Polish Science Foundation
- Austrian Science Foundation
- NIH CounterACT U01 and U54 program March 2012
- NIH CounterACT R21 grant review panel June 2013

American Chemical Society
- St. Louis section of the ACS representative to the Midwest Regional Steering Committee (1994-2007)
- St. Louis section-ACS Alternate Councilor 1999-present
- Chaired the Organic Chemistry Seminar at the 27th American Chemical Society Midwest Regional Meeting, Kansas University, November 4-6, 1992
- Chaired the Organic Chemistry Seminar at the 29th American Chemical Society Midwest Regional Meeting, UM-Kansas City, November 2-5, 1994
- Organizer of the 1994 St. Louis Award Symposium.
- General Chair (organizer) of the 35th Midwest Regional Meeting of the American Chemical Society in St. Louis, MO, 2000.
- Organized the St. Louis Award Symposium, April 20, 2001
- Invited expert for the American Chemical Society Regional Meeting Planning Conference, Charleston, SC, February 22-25, 2001
- Chaired the Organic Chemistry Seminar at the 38th American Chemical Society Midwest Regional Meeting, UM-Columbia, November 5-7, 2003
- Chaired the Organic Chemistry Seminar at the Joint Southeast/Southwest Regional Meeting of the American Chemical Society Memphis, TN, October, 2005
- Co-Chaired and organized a symposium on "Organophosphorus Chemistry" at the 44th Midwest Regional Meeting of the American Chemical Society:, Iowa City, IA, October 2009.

- Chaired and organized a symposium on “natural products chemistry” at the Joint 46th Midwest and 39th Great Lakes Regional Meeting of the American Chemical Society, St. Louis, MO, October 19, 2011.

Other Professional

- International Conference on Phosphorus Chemistry international steering committee 2014-
- External Examiner for Undergraduate Thesis Defense, Peoria Il, 2006

Community Service

Judge for Classical Academy Science Fair, January 1990
Judge, and Chairman for the Chemistry Section of the Annual Missouri Regional Junior Science, Engineering and Humanities Symposium several years since 1990
During my two-year period as advisor to the Chemistry Club, I designed and initiated, with the help of the Chem Club students, the popular and successful "Chemistry Magic Show". This demonstration was performed on several occasions for "Access to Success" junior high school students (several times since 1990).
Science Fair Judge, St. Ann School Normandy Science Fair, 2005, 2006

Board Memberships
Board Member for Cortex, 2015-
Board Member for Center for Emerging Technologies, 2015-
