

## **Christopher D. Spilling**

*Professor of Chemistry*

*Vice Chancellor for Research and Economic and Community Development*

University of Missouri-St. Louis  
One University Boulevard, St. Louis, MO 63121  
Tel: (314) 516-5285  
E-mail [CSPILL@UMSL.EDU](mailto:CSPILL@UMSL.EDU)  
<http://www.umsl.edu/chemistry/Faculty/spilling.html>

### **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 2017-4/2020
	Vice Chancellor for Research and Economic and Community Development	May 2020-present

Cambridge University (with S. V. Ley)	Visiting Scholar (research leave)	1996-1997
Co-Founder Alkymos, Inc (with Wesley Harris-UMSL, Robert Yokel, Robert Kuhn & Chung Guo Zhan-U of Kentucky)		2000

### **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.

*Chemistry 3022 (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, Chris Thomas

## 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: Vertex Pharmaceuticals, 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: Amgen, Thousand Oaks, CA
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 56 <sup>th</sup> 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, Current Position: Radiology Resident, Mayo Clinic

### *Graduate Students (Ph.D.)*

Kevin Koeller (December 1993)	Dissertation: Phosphonates and Phosphoramides in Stereoselective Bond Formations Postdoc: Univ. of Nebraska (Jim Takacs) Current position: Research Chemist, Mallinckrodt Pharmaceuticals 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	Dissertation: Preparation and Reaction Chiral $\alpha$ -

1996) 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: Senior Research Scientist, Curia, Albany, NY

Isabel Vasconcelos (January 1998) Dissertation: Synthesis of New Chiral Aminophosphine Ligands: Structural Studies and Application in Asymmetric Catalysis  
 Last known position: Independent Translator, San Paolo, Brazil

Hossein Shabany (May 1998) Dissertation: Synthesis of Protease Inhibitors from Allylic- $\alpha$ -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: Adjunct instructor, UMSL

Anchalee Thanavaro (Aug 2003) Dissertation: The Preparation and Reactions of Allylic Hydroxy Phosphonates: A Study Toward the Synthesis of Sphingomyelin Phosphonate Analogs  
 Current position: Manager Scientific, 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  $\alpha$ -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: Chief Scientific Officer, Freeflow Medical Devices, Lancaster, PA

Nongnuch Sutivisedsak (August 2008)	Dissertation: Synthesis of $\alpha$ -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: Snior Chemist II, Adesisi Middletown, DE
Mahesh Paudyal (August 2012)	Dissertation: Nickel Catalyzed Homoallylation Reactions and Synthesis of Potent Inhibitors of YopH Postdoc: Southwest Texas Medical Center, Dallas Current position: Team Leader, Adesisi, New Castle, DE.
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) Current Position: Scientist, Loxo Oncology at Lily, Boulder, CO
Ben Martin (August 2014)	Dissertation: Synthesis of Cyclic Enolphosphonates and Enolphosphates as Inhibitors of Serine Hydrolases Current position: Chemist III, Millipore Sigma
Rishi Paudel (December 2020)	Dissertation: Synthesis of Phosphonomethyl Tetrahydrofurans and Phostones: Postdoc: Baylor College of Medicine, Houston, Texas (Jin Wang)
Giri Raj Gnawali (Decemeber 2020)	Dissertation: Synthesis of Biologically Active Phosphorus Heterocycles: Postdoc: University of Arizona, College of Pharmacy, Department of Pharmacology and Toxicology (Prof. Wei Wang)
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

Meiguo Xin  
Prof. Peng Wang

Sampathkumar, Elleppan  
Praveen Kommana

Medical Sciences, Newcastle University, UK  
Current position: Unknown  
Current position: Prof., School of Chemical Eng.  
and Materials Science, Beijing Inst. of Tech.  
Moved to UMKC, Current position: unknown  
Current position: Research Scientist, Laurus Labs  
Pvt Ltd, Hyderabad, India

## RESEARCH

1) Publications (Scopus H index = 29)

### 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-2 $\xi$ -hydroxy-5 $\alpha$ -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)-2 $\xi$ -Hydroxy-5 $\alpha$ -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  $\beta$ -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 Bicyclic 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  $\alpha$ -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 Bicyclic 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  $\text{SnCl}_4$ " 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  $\alpha$ -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  $\alpha$ -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 ( $\pm$ ) 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  $\text{Co}(\text{CO})_3\text{L}^-$  Anion (L = CO,  $\text{PR}_3$ )" 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 Puralidin 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 Oxymercuration" 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 Sujitra 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 Banteli, 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 Zumburn *Chemistry, A European Journal* **2008**, *14*, 10683-10704.

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### C. Patents:

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- 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.
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- 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)
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*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.
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- 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 Girardeau, 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.
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- 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.

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- 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 6<sup>th</sup>, 2006
- 55) "Natural Product Synthesis with Allylic Hydroxy Phosphonates" Texas Christian University, November 7<sup>th</sup>, 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" 44<sup>th</sup> 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 24<sup>th</sup>, 2010.
- 62) "Approaches to Tetrahydrofuran Containing Natural Products," Joint 46<sup>th</sup> Midwest and 39<sup>th</sup> 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 12<sup>th</sup> 2012.
- 64) "Applications of Phosphono Allylic Carbonates in the Asymmetric Synthesis of Heterocycles" South East Missouri State University, February 27<sup>th</sup> 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 University, 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 Related Compounds as Lipase Inhibitors" University of Iowa April 30<sup>th</sup> 2015.
- 70) "Removal of aluminum from total parenteral nutrition solutions" Two Year College Chemistry Consortium (2YC3) conference, St. Charles Community College, September 18<sup>th</sup>, 2015 (banquet lecture).
- 71) "New Phosphonate Analogs Cyclophostin and Cyclipostins: Synthesis and Kinetic Evaluation

as Inhibitors of Lipases” Florida Internaional University, November 18<sup>th</sup>, 2015.

- 72) “A Comparison of Classical and De Novo Approaches to Synthesis of Phostones ” XXI International Conference on Phosphorus Chemistry, Kazan, Russia, June 5<sup>th</sup>-10<sup>th</sup>, 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 5<sup>th</sup>-10<sup>th</sup>, 2016.
- 74) “Synthesis of Biologically Active Phosphorus-Containing Heterocycles” International Conference on Phosphorus Chemistry, Budapest, Hungary, July 5<sup>th</sup>-10<sup>th</sup>, 2018 (Plenary)
- 75) “Synthesis of Biologically Active Phosphorus-Containing Heterocycles” University of Ghent, Belgium, September 13<sup>th</sup>, 2018.
- 76) “Synthesis of Biologically Active Phosphorus-Containing Heterocycles” University of Birmingham, UK, May 28<sup>th</sup>, 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**, 5/1/02-12/31/02.
- 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 MacGillivray (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 Olivias (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-investigators)
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 Astronomy 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*

Angewandte 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 44<sup>th</sup> 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 II, 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-

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