

Martin D. Burke – *Curriculum Vitae*

Early Career Scientist
Howard Hughes Medical Institute
Professor of Chemistry
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Born: Feb. 5, 1976, Westminster, MD

Education

- 1998-2005 National Institutes of Health Fellow in the Medical Scientist Training Program
Harvard Medical School/Massachusetts Institute of Technology
Division of Health Sciences and Technology: Boston, Massachusetts
Degree awarded: M.D.
- 1999-2003 Howard Hughes Medical Institutes Predoctoral Fellow
Harvard University, Department of Chemistry and Chemical Biology
Cambridge, Massachusetts, Degree Awarded: Ph.D.
Thesis advisor: Professor Stuart L. Schreiber
- 1994-1998 Johns Hopkins University, Baltimore, Maryland
Degree Awarded: B.A. Chemistry
Research advisors: Professors Henry Brem and Gary H. Posner

Appointments

- 2014 Professor of Chemistry, UIUC
2011 Associate Professor of Chemistry, UIUC
2009 Early Career Scientist, Howard Hughes Medical Institute
2009 Affiliate Faculty, Department of Biochemistry, UIUC
2005 Assistant Professor of Chemistry, UIUC

Awards and honors

- 2016 Aldrich Lectureship McGill University and University of Montreal, Canada
2015 Bristol Chemical Synthesis CDT-Syngenta Award, UK
2014 Thieme-International Union of Pure and Applied Chemistry (IUPAC) Prize in Synthetic Organic Chemistry
2014 American Asthma Foundation Scholars Award
2014 Hirata Gold Medal, Japan
2014 International Organic Chemistry Foundation Lectureship Award, Japan
2013 Kavli Foundation Emerging Leader in Chemistry Award, American Chemical Society
2013 Elias J. Corey Award for Outstanding Original Contribution in Organic Synthesis by a Young Investigator, American Chemical Society
2013 University of Illinois Innovation Discovery Award
2012 Novartis Chemistry Lectureship: Basel, Horsham, Shanghai, Singapore, San Francisco, and Cambridge
2011 Arthur C. Cope Scholar Award, American Chemical Society
2011 Teacher Ranked as Excellent, UIUC Center for Teaching Excellence
2010 Bristol-Myers Squibb Lectureship at Harvard University
2010 Frontiers in Chemistry Lectureship at The Scripps Research Institute
2010 Novartis Lectureship at The University of California Berkeley
2009 Howard Hughes Medical Institute Early Career Scientist

2009	Alfred P. Sloan Foundation Research Fellowship
2009	Bristol-Myers Squibb Unrestricted Grant in Synthetic Organic Chemistry Award
2009	Eli Lilly Grantee Award
2009	AstraZeneca Excellence in Chemistry Award
2009	Amgen Young Investigator Award
2009	Bristol-Myers Squibb Lectureship at Princeton University
2009	Thieme Chemistry Journals Award
2008	Teacher Ranked as Excellent, UIUC Center for Teaching Excellence
2008	Arnold and Mabel Beckman Foundation Young Investigator Award
2008	"World's 35 Top Innovators Under 35" <i>Technology Review Magazine</i>
2008	National Science Foundation CAREER Award
2008	"Scientist to Watch" <i>The Scientist Magazine</i>
2007	Teacher Ranked as Outstanding, UIUC Center for Teaching Excellence
2006	Teacher Ranked as Excellent, UIUC Center for Teaching Excellence
2005	ACS Petroleum Research Foundation Type G Award
2005	Camille and Henry Dreyfus New Faculty Award
2005	Henry Asbury Christian Award, Harvard Medical School
2003	National Institutes of Health Medical Scientist Training Program Fellowship
2000	Howard Hughes Medical Institute Predoctoral Fellowship
1998	Hunterian Research Award - Johns Hopkins Department of Neurosurgery
1997	Phi Beta Kappa - Junior Year, Johns Hopkins University
1997	Howard Hughes Undergraduate Research Fellowship - Johns Hopkins University
1997	Provost's Undergraduate Research Award - Johns Hopkins University
1994-1998	Dean's List - Johns Hopkins University
1994-1998	Beneficial Hodson Scholar - Johns Hopkins University
1994-1998	Maryland Distinguished Scholar

Publications

<http://www.scs.illinois.edu/burke/index.php?p=publications> ,

For short videos describing research in the Burke Group, see:

https://www.youtube.com/watch?v=y_0wC5kDN3s

<https://www.youtube.com/watch?v=FkIOpDJ5XUc>

35. Davis, S. A.; Vincent, B. M.; Endo, M. M.; Whitesell, L.; Marchillo, K.; Andes, D. R.; Lindquist, S.; Burke, M. D. "Nontoxic Antimicrobials that Evade Drug Resistance" *Nature Chem. Bio.* **2015**, *11*, 481-487.

* Highlighted in *Nature*, "Antifungal Drug Dodges Resistance".

* Highlighted in *Nat. Chem. Bio.*, "The Toxicity-Resistance Yin-Yang"

* Highlighted in *C&EN News*, "Amphotericin B Analogs Boast Lower Toxicity"

34. J. Li, S.G. Ballmer, E.P. Gillis, S. Fujii, M.J. Schmidt, A.M.E. Palazzolo, J.W. Lehmann, G.F. Morehouse, M.D. Burke, "Synthesis of Many Different Types of Organic Small Molecules Using One Automated Process" *Science* **2015**, *347*, 1221-1226.

• Highlighted in *Science*, "The Synthesis Machine".

• Highlighted in *Nature*, "Complex Molecules Made to Order in Synthesis Machine".

• Highlighted in *Scientific American* "Machine Stitches Complex Molecules at Touch of a Button".

• Highlighted in *Chem. and Eng. News*, "Machine Automates Assembly of Small Molecules".

• Highlighted in *Illinois News* "Molecule-Making Machine Simplifies Complex Chemistry".

- Highlighted in *HHMI News*, "3D Printer for Small Molecules Opens Access to Customized Chemistry".
- Highlighted by *Popular Mechanics*, "This Chemistry 3D Printer Can Synthesize Molecules from Scratch"
- Highlighted on *AAAS Radio Science Update* "Do-It-Yourself Molecules"
- Highlighted by *Forbes* "Scientists Hone Synthetic Drugs Based on Mother Nature's Handiwork"
- Highlighted in *The Huffington Post* "'New 'Molecule Making Machine' Could be the '3-D Printer of Chemistry'"
- Also highlighted in *Der Zeit (Germany)*, *Nature World News*, *Science Daily*, *eScience News*, *News Everyday*, *Design and Trend*, *ZME Science*, *Silicon Angle*, *Yibada*, *Engineering.com*, *Make Magazine*, *3D Print*, *GizMag*, *Ecumenical News*, *International Business Times*.

33. E.M. Woerly, J. Roy, M.D. Burke, "Synthesis of Most Polyene Natural Products Using Just Twelve Building Blocks and One Coupling Reaction" *Nature Chemistry* **2014**, 6, 484-491.

- Highlighted in *Nature*, "Simple Recipe for Small Molecules".
- Highlighted in *Nature Chemistry*, "Natural Products on Demand".
- Highlighted in *Nature Chemical Biology*, "A Plethora of Polyenes".
- Highlighted in *C&EN News*, "Easier Route to Polyenes".
- Highlighted in *Genetic and Engineering News*, "LEGO-Style Chemistry to Build Thousands of Small Molecule Drug Candidates".
- Highlighted by My Science, "*Making Better Medicines with a Handful of Chemical Building Blocks*"
- Highlighted on YouTube "Making Medicine with Chemical Building Blocks"
<https://www.youtube.com/watch?v=FkIOpDJ5XUc>

32. T.M. Anderson, M.C. Clay, A.G. Cioffi, K.A. Diaz, G.S. Hisao, M.D. Tuttle, A.J. Nieuwkoop, G. Comellas, S. Wang, B.E. Uno, E.L. Wildeman, N. Maryum, T. Gonen, C.M. Rienstra, M.D. Burke "Amphotericin Forms an Extramembranous and Fungicidal Sterol Sponge." *Nature Chemical Biology*, **2014**, 10, 400-406.

- Highlighted in *Nature Chemical Biology*, "A Sponge against Fungal Infections".
- Highlighted by *Illinois News* describing the elucidation of amphotericin's biological activity.
- Also highlighted in *Science Newsline*, *Phys.org*, *Science Daily*, *Health Canal*, and *Chemistry Views*.

31. B.C. Wilcock, M.M. Endo, B.E. Uno, M.D. Burke, "The C2'-OH of Amphotericin Plays a Major Role in Binding the Primary Sterol of Human But Not Yeast Cells" *J. Am. Chem. Soc.* **2013**, 135, 8488-8491.

- Highlighted in *Chemical and Eng. News*, "A Less Toxic Antifungal Agent" **2013**, 91, 10.

30. Woerly, E. M.; Miller, J. E.; Burke, M. D. "(1-Bromovinyl)-MIDA boronate: a readily accessible and highly versatile building block for small molecule synthesis" *Tetrahedron Special Issue in Honor of Professor Paul Wender for receipt of the Tetrahedron Award* **2013**, 69, 7732-7740.

29. B. C. Wilcock, B.E. Uno, G.L. Bromann, M.J. Clark, T.M. Anderson, M.D. Burke, "Electronic Tuning of Site-Selectivity" *Nature Chemistry* **2012**, 4, 996-1003.

- Highlighted in *Nature Chemistry*, “Remodelling by diversity and design” **2012**, 4, 963-964.
28. K.C. Gray, D.S. Palacios, I. Dailey, M. Endo, B.E. Uno, B.C. Wilcock, M.D. Burke, “Amphotericin Primarily Kills Yeast by Simply Binding Ergosterol.” *Proc. Natl. Acad. Sci. U.S.A.* **2012**, 109, 2234-2239.
- Highlighted in *Nature Chemical Biology*, “Channel Closure.” **2012**, 8, 222.
 - Highlighted in *Proc. Natl. Acad. Sci. U.S.A.* “50 Year Old Antimicrobial’s Mechanism of Action.” **2012**, 109, 222.
 - Highlighted in *Microbe Magazine* “Amphotericin binds ergosterol instead of forming ion channels.” **2012**, 109, 222.
 - Also highlighted in *Infection Control Today*, *PhysOrg*, *ScienceNewsOnline*, *Medical News Today*, *eScience News*, and *News Room America*.
27. G.R. Dick, E.M. Woerly, M.D. Burke, “A General Solution to the 2-Pyridyl Problem” *Angew. Chem. Int. Ed.* **2012**, 51, 2667-2672.
26. J. Li, M.D. Burke, “Pinene-Derived Iminodiacetic Acid (PIDA): A Powerful Ligand for Stereoselective Synthesis and Iterative Cross-Coupling of C(sp³) Boronate Building Blocks” *J. Am. Chem. Soc.* **2011**, 131, 13774-13777.
- Highlighted as *News of the Week*: “Prefab Synthesis Moves Ahead” by *Chemical and Engineering News*; Aug. 29, 2011, p. 5.
25. S. Fujii, S.Y. Chang, M.D. Burke, “Total Synthesis of Synechoxanthin through Iterative Cross-Coupling” *Angew. Chem. Int. Ed.* **2011**, 50, 7862-7864.
- Highlighted on the cover of *Angew. Chem.* August 16, 2011.
 - Highlighted in *Science Dailey*, *R&D Magazine*, *Chemistry Times*, *Life Sciences World*, *Free Radical Science*, *Nanotechnology Now*, and *Drug Discovery and Development*.
24. D.S. Palacios, I. Dailey, D.M. Siebert, B.C. Wilcock, M.D. Burke “Synthesis-Enabled Functional Group Deletions Reveal Key Underpinnings of Amphotericin B Ion Channel and Antifungal Activities” *Proc. Natl. Acad. Sci. U.S.A.* **2011**, 108, 6733-6738.
- Highlighted in *Chem. Eng. News*: “Amphotericin B Mystery Solved: Decades-long Question about Antifungal Agent’s Mechanism is Answered.” **2011**, 89, p. 51.
 - Highlighted in *Chemistry World* “Chemical Mystery of Antifungal Compound Solved” March 9, **2011**.
 - Highlighted as “Chemical Entity of the Month” *Chemical Entities of Biological Interest*. April 4, **2011**.
23. E.M. Woerly, J.R. Struble, N. Palyam, S. O’Hara, M.D. Burke “(Z)-(2-Bromovinyl) MIDA Boronate, A Readily-Accessible and Highly Versatile Building Block for Small Molecule Synthesis.” *Invited Contribution to Tetrahedron: Special Issue in Honor of Professor Dean Toste Tetrahedron Young Investigator Award* **2011**, 67, 4333-4343.
22. E.M. Woerly, A.H. Cherney, E.K. Davis, M.D. Burke, “Stereoretentive Suzuki-Miyaura Coupling of Haloallenes Enables Fully Stereocontrolled Access to (-)-Peridinin” *J. Am. Chem. Soc.* **2010**, 132, 6941-6943.
21. S.J. Lee, T.M. Anderson, M.D. Burke, “A Simple and General Platform for Generating Stereochemically Complex Polyene Frameworks via Iterative Cross-Coupling.” *Angew. Chem. Int. Ed.* **2010**, 47, 8860-8863.

20. G.R. Dick, D.M. Knapp, E.P. Gillis, M.D. Burke, "A General Method for Synthesis of 2-Heterocyclic N-Methyliminodiacetic Acid Boronates" *Organic Letters* **2010**, *12*, 2314-2317.
19. I. Dailey, M.D. Burke. "N-(Carboxymethyl)-N-methyl-glycine" *Encyclopedia of Reagents for Organic Synthesis*, **2010**.
18. J.R. Struble, S.J. Lee, M.D. Burke "Ethyne MIDA Boronate, A Readily-Accessible and Highly Versatile Building Block for Small Molecule Synthesis." *Invited Contribution to Tetrahedron: Special Issue in Honor of Professor Brian Stoltz' Tetrahedron Young Investigator Award* **2010**, *66*, 4710-4718.
17. D.M. Knapp, E.P. Gillis, M.D. Burke. "A General Solution for Unstable Boronic Acids: Slow-Release Cross-Coupling from Air-Stable MIDA Boronates" *J. Am. Chem. Soc.* **2009**, *131*, 6961-6963. (>100 citations)
- Highlighted in *Chem. Eng. News, News of the Week*: "New way to protect unstable boron reagents: masked boronates make 2-pyridyl coupling possible." **2009**, *87*, 8.
 - One of the top 10 "Most Read" articles in JACS, May-June, 2009.
 - Highlighted in *Angew. Chem. Int. Ed.* "Controlled Iterative Cross-Coupling: On the Way to the Automation of Organic Synthesis" **2009**, *48*, 5240-5244.
 - For Prof. Richard Taylor's application of this methodology in the total synthesis of dictyosphaeric acid A, see *Angew. Chem. Int. Ed.* **2010**, *49*, 5574-5577.
 - For Prof. Jon Ellman's recent development of asymmetric additions to aldimines via slow-release with MIDA boronates, see *J. Org. Chem.* **2010**, *75*, 3147-3150; *Org. Lett.* **2010**, *12*, 2004-2007.
16. E.P. Gillis, M.D. Burke. "Iterative Cross-Coupling with MIDA Boronates: Towards a General Strategy for Small Molecule Synthesis," *Aldrichimica Acta*, **2009**, *42*, 17-27.
15. M.D. Burke. "Flexible Tetracycline Synthesis Yields Promising Antibiotics" *Nature Chemical Biology, News and Views* **2009**, *5*, 77-79.
14. B.E. Uno, E.P. Gillis, M.D. Burke. "Vinyl MIDA Boronate, A Readily-Accessible and Highly Versatile Building Block for Small Molecule Synthesis." *Invited Contribution to Tetrahedron: Special Issue in Honor of Professor Justin Dubois' Tetrahedron Young Investigator Award* **2009**, *65*, 3130-3138.
13. S.G. Ballmer, E.P. Gillis, M.D. Burke. "B-Protected Haloboronic Acids for Iterative Cross-Coupling" *Org. Synth.* **2009**, *86*, 344-359.
12. E.P. Gillis, M.D. Burke. "Multistep Synthesis of Complex Boronic Acids from Simple MIDA Boronates" *J. Am. Chem. Soc.* **2008**, *130*, 14084-14085.
- Highlighted in *Chemistry World*: "Organic synthesis set for auto-pilot" Nov. **2008**.
 - Highlighted in *Angew. Chem. Int. Ed.* "Devising boron reagents for orthogonal functionalization through Suzuki-Miyaura cross-coupling" **2009**, *48*, 3565-3568.
 - Highlighted by Steven Ley in *Chemtracts* "Methyliminodiacetic Acid (MIDA) Boronates: A New Strategy for Organic Synthesis" **2009**, *21*, 457-465.
11. S.J. Lee, K.C. Gray, J.S. Paek, M.D. Burke. "Simple, Efficient, and Modular Syntheses of Polyene Natural Products via Iterative Cross-Coupling" *J. Am. Chem. Soc.* **2008**, *130*, 466-468.
- Highlighted in *Chemistry World*: "Off-the-peg organic synthesis goes commercial" February **2008** p. 27.
 - Highlighted in *Chemistry and Industry*: "Off-the-shelf small molecules on the way" January 14, **2008** p. 7.
 - Highlighted in *Synform* **2008**, *5*, 58-59.

- Highlighted in *Angew. Chem. Int. Ed.* “Devising boron reagents for orthogonal functionalization through Suzuki-Miyaura cross-coupling” **2009**, *48*, 3565-3568.
 - Highlighted in *Angew. Chem. Int. Ed.* “Controlled Iterative Cross-Coupling: On the Way to the Automation of Organic Synthesis” **2009**, *48*, 5240-5244.
 - Reviewed in *Acc. Chem. Res.* **2008**, *41*, 1461-1473.
10. D.S. Palacios, T.M. Anderson, M.D. Burke. “A Post-PKS Oxidation of the Amphotericin B Skeleton Predicted to be Critical for Channel Formation is Not Required for Potent Antifungal Activity” *J. Am. Chem. Soc.* **2007**, *129*, 13804-13805.
- Highlighted in *Nature Chemical Biology*: “Chemical ‘Knockout’ Challenges the Amphotericin B Channel Model” **2008**, *4*, 19-20.
 - Highlighted in *Natural Products Reports* **2008**, *25*, p. 11.
 - Highlighted in *The Scientist*: “The Smart Synthesizer” **2008**, *22*, p. 63.
9. E.P. Gillis and M.D. Burke. “A Simple and Modular Strategy for Small Molecule Synthesis: Iterative Suzuki-Miyaura Coupling of B-Protected Haloboronic Acid Building Blocks.” *J. Am. Chem. Soc.* **2007**, *129*, 6716-6717. (>115 citations)
- Highlighted in *Chemical and Engineering News*: “Masks unveil new synthetic routes” **2007**, *85*, 63-64.
 - Highlighted in *SynFacts* **2007**, *10*, 1007
 - Highlighted in *Synform* **2008**, *5*, 58-59.
 - Highlighted in *Chemistry World* February **2008**, p. 27.
 - Reviewed in *Accounts of Chemical Research* **2008**, *41*, 1461-1473.
 - Highlighted in *Angew. Chem. Int. Ed.* “Devising Boron Reagents for Orthogonal Functionalization through Suzuki-Miyaura Cross-Coupling” **2009**, *48*, 3565-3568.
 - Highlighted in *Angew. Chem. Int. Ed.* “Controlled Iterative Cross-Coupling: On the Way to the Automation of Organic Synthesis” **2009**, *48*, 5240-5244.
 - Highlighted by Steven Ley in *Chemtracts* “Methyliminodiacetic Acid (MIDA) Boronates: A New Strategy for Organic Synthesis” **2009**, *21*, 457-465.
 - “Burke boronates” included in *Name Reactions*, 4th ed. Springer-Verlag Berlin Heidelberg 2009.
8. M.D. Burke. "Molecular Prosthetics: Replicating the Functions of the Molecules of Life" *Enhancing Chemistry Conference* sponsored by the American Chemical Society. University of Illinois at Urbana-Champaign, Urbana, Illinois, March 17, 2006.
-
7. M.D. Burke, E.M. Berger, and S.L. Schreiber. “A Synthesis Strategy Yielding Skeletally Diverse Small Molecules Combinatorially.” *J. Am. Chem. Soc.* **2004**, *126*, 14095-14104.
6. M.D. Burke and S.L. Schreiber. “A Planning Strategy for Diversity-Oriented Synthesis.” *Angew. Chem. Int. Ed.* **2004**, *43*, 46-58.
- Recognized by Thomson-ISI as “one of the most cited recent papers in the field of chemistry.” *ISI Essential Science Indicators* (>670 citations).
5. M.D. Burke, E.M. Berger, and S.L. Schreiber. “Generating Diverse Skeletons of Small Molecules Combinatorially.” *Science* **2003**, *302*, 613-618. (>220 citations)
- Selected as one of the top *Chemistry Highlights 2003* “for making natural-product-like libraries of unprecedented diversity.” *Chem. & Eng. News* **2003**, *81:51*, 48.
 - Highlighted in *Chem. & Eng. News* **2003**, *81:43*, 40 and **2004**, *82:40*, 32.
 - Highlighted in *Nature Rev. Drug Discovery* **2003**, *2:12*, 948.
 - Reviewed in *Nature*, **2004**, *432*, 846-854.

4. R.M. Kohli, M.D. Burke, X.L. Tao, and C.T. Walsh. "Chemoenzymatic Route to Macrocyclic Hybrid Peptide/Polyketide-like Molecules." *J. Am. Chem. Soc.* **2003**, *125*, 7160-7161.
3. M.D. Burke and G. Lalic. "Teaching Target-Oriented and Diversity-Oriented Organic Synthesis at Harvard University." *Chemistry and Biology* **2002**, *9*, 535-541.
2. M.C. White, M.D. Burke, S. Peleg, P. Dolan, T. Kensler, H. Brem, and G.H. Posner. "Conformationally Restricted Hybrid Analogs of 1,25-Dihydroxyvitamin D₃, Design, Synthesis, and Preliminary Biological Evaluation." *Bioorg. & Med. Chem.* **2001**, *9*, 1691-1699.
1. G.H. Posner, J.K. Lee, Q. Wang, S. Peleg, M.D. Burke, H. Brem, P. Dolan, and T. Kensler. "Non-Calcemic, Antiproliferative, Transcriptionally-Active, 24-Fluorinated Hybrid Analogs of the Hormone 1 α ,25-Dihydroxyvitamin D₃. Synthesis and Preliminary Biological Evaluation." *J. Med. Chem.* **1998**, *41*, 3008-3014.

Dissertation

M.D. Burke. "A Synthesis Strategy for Generating Diverse Skeletons of Small Molecules Combinatorially." Department of Chemistry and Chemical Biology, Harvard University, **2003**.

Patents

9. M.D. Burke et al, "Amphotericin B Derivatives with Improved Therapeutic Index" Provisional Application Filed Fall 2014.
8. M.D. Burke, B.C. Wilcock, M.M. Endo, B.E. Uno, "Amphotericin B Derivative with Reduced Toxicity" Provisional Application filed May 2013.
7. M.D. Burke, B.C. Wilcock "Electronic Tuning of Site Selectivity" Provisional Application filed October 12, 2012.
6. M.D. Burke, J.Q. Li, E.P. Gillis, PCT/US**2012**/035247 "Automated Synthesis of Small Molecules Using Chiral Nonracemic Boronates"
5. Burke et al PCT/US**2011**/045064 "Apparatus and Methods for the Automated Synthesis of Small Molecules"
4. M.D. Burke, J. Li, E.P. Gillis "Chiral Ligands for Making Boronates in Nonracemic Form" Provisional Application April 27, 2011.
 - Licensed to Sigma-Aldrich (Milwaukee, WI).
3. M.D. Burke, G.R. Dick, E.P. Gillis, J.A. Klubnick, D.M. Knapp, B.E. Uno, "Methods for Forming Protected OrganoBoronic Acids" U.S. Utility Patent Application No.: 13/030,83. Claims Granted 7/23/2013.
 - Licensed to Sigma-Aldrich (Milwaukee, WI).
2. M.D. Burke, D.M. Knapp, E.P. Gillis, "Slow-Release of Unstable Boronic Acids from Air-Stable MIDA Boronates" Claims Granted 9/6/2012 (US09/58421).
 - Licensed to Sigma-Aldrich (Milwaukee, WI).
1. M.D. Burke, E.P. Gillis, S.J. Lee, D.M. Knapp, K.C. Gray, "System for Controlling the Reactivity of Boronic Acids" U.S. Patent # 8,013,203 Issued Sept. 6, 2011.
 - Licensed to Sigma-Aldrich (Milwaukee, WI), Boropharm (Ann Arbor, MI), and Allychem (Dalian, China) leading to the commercialization of more than 175 MIDA boronates to date, which are now being widely utilized to promote the discovery of new medicines by more than 70 different pharmaceutical companies throughout the world,

including the U.S., Canada, United Kingdom, Germany, Spain, France, Switzerland, Denmark, Belgium, Sweden, Netherlands, China, Japan, Singapore, India, and Australia. Moreover, several MIDA boronates are already commercially available on the multi-kilogram scale, and one is already being used on the process scale to prepare a new drug candidate currently being evaluated in clinical trials in humans. The launch of this commercial platform was highlighted by *CNN*, *Forbes*, *Tech.com*, *Chemical and Engineering News*, *Chemistry World*, *Genetic Engineering and Biotechnology News*, *Bio-Medicine*, *Pharmasia*, and *Merck Medicus*.

A complete list of commercially available MIDA boronates can be found at:

www.sigmaaldrich.com/mida

See also: <http://www.sigmaaldrich.com/chemistry/chemical-synthesis/learning-center/chemfiles.html>

Other reviews and book chapters

2. M.D. Burke, H. Brem, and R. Langer. "Central Nervous System, Drug Delivery to Treat." In *The Encyclopedia of Controlled Drug Delivery*. Mathiowitz, E., Ed.; John Wiley and Sons., Vol. 1, **1999**, 184-212.
1. J. Hanes and M.D. Burke. "Polymer-Controlled Drug Delivery: An Overview for the Clinician." *Hospital Pharmacist Report*. December **1997**, 2-11.

Published abstracts

33. S.A. Davis, M.D. Burke, "Non-toxic Amphotericin B Derivatization Guided by a Ligand-Selective Allosteric Effects Strategy" 247th ACS National Meeting & Exposition. March 16-20, 2014, Dallas, TX.
32. M.D. Burke "Making Molecular Prosthetics with a Small Molecular Synthesizer" The Kavli Foundation Emerging Leader in Chemistry Lecture, 246th ACS National Meeting, September 8-12, 2013, Indianapolis, Indiana.
31. M.D. Burke "Amphotericin B: A Prototype for Small Molecules with Protein-like Functions" Emerging Science Frontiers: Young Investigators, 246th ACS National Meeting that will be held in Indianapolis, Indiana, September 8-12, 2013
30. S.G. Ballmer, E.P. Gillis, S. Fujii, J. Li, G.F. Morehouse, M.J. Clark, M.D. Burke, "Automated Iterative Cross-coupling for the Synthesis of Diverse Small Molecules." 246th ACS National Meeting & Exposition. September 8-12, 2013, Indianapolis, IN.
29. A. Cioffi, M.D. Burke, "Functional Complementation of a Deficient Protein with a Small Molecule Restores Cell Physiology." 246th ACS National Meeting & Exposition. September 8-12, 2013, Indianapolis, IN.
28. M.M. Endo, B.C. Wilcock, B.E. Uno, M.D. Burke, "C2' Hydroxyl Group of Amphotericin is Required for Binding Cholesterol but not Ergosterol." 246th ACS National Meeting & Exposition. September 8-12, 2013, Indianapolis, IN.
27. H.M.S. Haley, E.M. Woerly, M.D. Burke, "Peridinin is a Potent Antilipoperoxidant." 246th ACS National Meeting & Exposition. September 8-12, 2013, Indianapolis, IN.
26. J.R. Struble, N. Palyam, P. Wang, S.A. Davis, I. Dailey, D.M. Knapp, K.C. Gray, B.E. Uno, J.K. Tucker, L. Chen, M.D. Burke, "Total Synthesis of Protected Doubly ¹³C labeled Amphotericin B (AmB-¹³C₂) via Iterative Cross-Coupling (ICC) Enabled by *N*-methyliminodiacetic acid (MIDA) Boronates." 246th ACS National Meeting & Exposition. September 8-12, 2013, Indianapolis, IN.

25. B.E. Uno, B.C. Wilcock, M.M. Endo, G.L. Bromann, M.J. Clark, T.M. Anderson, M.D. Burke, "Synthesis of C2'deoxy Amphotericin B." 246th ACS National Meeting & Exposition. September 8-12, 2013, Indianapolis, IN.
24. P. Wang, M.D. Burke, "Site- and Stereoretentive Cross-Coupling of Unactivated Chiral Nonracemic Secondary Boronic Acids." 246th ACS National Meeting & Exposition. September 8-12, 2013, Indianapolis, IN.
23. E.M. Woerly, M.D. Burke, "Synthesis of Most Polyene Natural Product Motifs Using Just Twelve Building Blocks and One Reaction." 246th ACS National Meeting & Exposition. September 8-12, 2013, Indianapolis, IN
22. M.D. Burke. "Making Molecular Prosthetics" E.J. Corey Award Address, 245th ACS National Meeting & Exposition. April 7-11, 2013 New Orleans, LA.
21. E. M. Woerly, M.D. Burke, "Towards a Universal Platform for Polyene Synthesis". 244th ACS National Meeting & Exposition. March 25-29, 2012, San Diego, CA.
20. S. Fujii, S.Y. Chang, M.D. Burke, "Total Synthesis of Synechoxanthin via Iterative Cross-Coupling." 244th ACS National Meeting & Exposition. March 25-29, 2012, San Diego, CA.
19. J. Lee, M.D. Burke, "Pinene-derived iminodiacetic acid (PIDA): A powerful ligand for stereoselective synthesis and iterative cross-coupling of C(sp)³ boronate building blocks." 244th ACS National Meeting & Exposition. 244th ACS National Meeting & Exposition. March 25-29, 2012, San Diego, CA.
18. M.D. Burke, "The Prospect of Molecular Prosthetics" Arthur C. Cope Scholar Awardee Address. 243rd ACS National Meeting & Exposition, August 28-Sept. 1, 2011, Denver, CO.
17. P. Wang and M.D. Burke, "Diastereoselective Hydroboration and sp³-sp² Suzuki Coupling: Application to the Construction of the Amphotericin B Polyol Subunit" Boron in the Americas XII, June 6-10, 2010, Michigan State University, East Lansing, MI
16. M.D. Burke, "The Prospect of Molecular Prosthetics: Small Molecules with Protein-Like Functions" 239th ACS National Meeting, *Frontiers in Chemical Biology* Symposium, San Francisco, CA.
15. S.J. Lee and M.D. Burke, "A General Platform for Polyene Synthesis Via Iterative Cross-Coupling" 239th ACS National Meeting & Exposition - March 21-25, 2010, San Francisco, CA.
14. I. Dailey and M.D. Burke, "Synthesis of a Universal Polyene Macrolide Building Block via a Novel Diastereotopic Group-Selective Lactonization." 239th ACS National Meeting, Symposium, San Francisco, CA.
13. S.J. Lee and M.D. Burke, "A General Platform for Polyene Synthesis Via Iterative Cross-Coupling" ACS Midwest Regional Meeting, Iowa City, IA, October 23, 2009.
12. M.D. Burke, "Synthesis and Study of Small Molecules with Protein-Like Functions" 238th ACS National Meeting, Washington DC, United States, August 16-20, 2009.
11. D.M. Knapp, E.P. Gillis, M.D. Burke, "In Situ Release of Boronic Acids from Air Stable MIDA Boronates" 238th ACS National Meeting, Washington DC, United States, August 16-20, 2009.
10. M.D. Burke, "Probing the Amphotericin B Ion Channel via Iterative Cross-Coupling with MIDA Boronates" 237th ACS National Meeting, Salt Lake City, UT, United States, March 22-28, 2009.

9. E.P. Gillis, M.D. Burke “Multistep Synthesis of Complex Boronic Acids from Simple MIDA Boronates” 237th ACS National Meeting, Salt Lake City, UT, United States, March 22-28, 2009.
8. E.P. Gillis, M.D. Burke “Iterative Cross-Coupling: A Simple Strategy for Complex Small Molecule Synthesis” 236th ACS National Meeting, Philadelphia, PA, United States, August 17-21, 2008.
7. D.S. Palacios, T.M. Anderson, M.D. Burke “Oxidation at C(41) is Not Necessary for Potent Antifungal Activity in Amphotericin B” 236th ACS National Meeting, Philadelphia, PA, United States, August 17-21, 2008.
6. S.J. Lee, K.C. Gray, J.S. Paek, M.D. Burke. “Simple, Efficient, and Modular Syntheses of Polyene Natural Products via Iterative Cross-Coupling” 236th ACS National Meeting, Philadelphia, PA, United States, August 17-21, 2008.
5. M.D. Burke. “Molecular Prosthetics: Replicating the Functions of the Molecules of Life” *Enhancing Chemistry Conference*. University of Illinois at Urbana-Champaign, Urbana, Illinois, March 17, 2006.
4. M.D. Burke and S.L. Schreiber. "The Generation of Structural Diversity in Split-Pool Synthesis." Harvard-MIT Division of Health Sciences and Technology Forum. Book of Abstracts. Cambridge, Massachusetts: March 9, 2000, p 5.
3. M.D. Burke, M.C. White, M. Watts, J. Lee, B. Tyler, G.H. Posner, and H. Brem. “Hybrid Analogs of 1,25-Dihydroxyvitamin D₃ Having Potent Antiproliferative Effects Against Murine Tumor Cell Lines Metastatic to the Brain.” In *Vitamin D₃: Chemistry, Biology, and Clinical Applications of the Steroid Hormone; Proceedings of the Tenth Workshop on Vitamin D*; A.W. Norman, R. Bouillon, and M. Thommasser, Eds.; University of California Press, 1997, p 487.
2. M.D. Burke, M.C. White, J. Lee, M. Watts, B. Tyler, G.H. Posner, and H. Brem. “Biodegradable Polymer Wafers Impregnated with Hybrid Analogs of 1,25-Dihydroxyvitamin D₃ for the Treatment of Intracranial Metastases.” Fifth Annual Brown University Symposium on Vitamin D. Providence, Rhode Island, September 7-9, 1997.
1. M. Watts, M. Lesniak, M.D. Burke, A. Samdani, B. Tyler, and H. Brem. “Efficacy of Adriamycin in the Treatment of Malignant Glioma.” Conference of the American Association of Neurological Surgeons. Denver, Colorado, April 12-17, 1997.

Invited Conferences and Presentations

1. March, 2006 *Enhancing Chemistry Conference*. UIUC, Urbana, IL
“Molecular Prosthetics: Replicating the Functions of the Molecules of Life”
2. May, 2006 – NIH Mentoring Conference, Greenbelt, MD
3. July, 2007 – Natural Products Gordon Conference, Tilton, NH
“Towards the Total Synthesis of the Channel-Forming Natural Product Amphotericin B”
4. July, 2007 – Sigma-Aldrich Company, Milwaukee, WI
“Iterative Cross-Coupling: A Simple and Modular Strategy for Small Molecule Synthesis”
5. October, 2007 – Rigel Pharmaceuticals, San Francisco, CA
6. October, 2007 – ACS Regional Conference, Milwaukee, WI
“The Channel-Forming Natural Product Amphotericin B”
7. November, 2007 – Illinois Wesleyan University, Bloomington, IL
8. January, 2008 – Abbott Pharmaceuticals, Abbott Park, IL
9. February, 2008 – Bristol-Myers Squibb, Process Research and Development, New Brunswick, NJ
10. February, 2008 – Bristol-Myers Squibb, Drug Discovery, Hopewell, NJ
11. March, 2008 – Novartis Pharmaceuticals, San Francisco, CA

12. March, 2008 – Roche Pharmaceuticals, Palo Alto, CA
13. March, 2008 – Indiana University at Bloomington, Bloomington, IN
14. April, 2008 – Pfizer Medicinal Chemistry, St. Louis, MI
15. March, 2008 – Theravance Pharmaceuticals, San Francisco, CA
16. May, 2008 – Merck Research Laboratories, Rahway, NJ
17. June, 2008 – Bioorganic Gordon Conference, Andover, NH
“Synthesis-Enabled Studies of the Amphotericin B Ion Channel”
18. June, 2008 – National Science Foundation Annual Workshop on Organic Synthesis and Natural Products Chemistry, Minary Center, New Hampshire.
19. August, 2008 – Arnold and Mabel Beckman Foundation Symposium for the Beckman Young Investigator Award, National Academies of Science and Engineering, Irvine, CA
20. October, 2008 – Bristol-Myers Squibb, Drug Discovery, Hopewell, NJ
21. October, 2008 – Bristol-Myers Squibb, Drug Discovery, Wallingford, CT
22. October, 2008 – University of California at Los Angeles, Los Angeles, CA
23. October, 2008 – Gothenburg University, Gothenburg, Sweden
24. October, 2008 – AstraZeneca, Gothenburg, Sweden
25. October, 2008 – Leo Pharmaceuticals, Copenhagen, Denmark
26. October, 2008 – AstraZeneca, Stockholm, Sweden
27. October, 2008 – Royal Institute of Technology, Stockholm, Sweden
28. October, 2008 – Rikshospitalet, Oslo, Norway
29. October, 2008 – FAST Conference sponsored by Johnson Matthey, The National Constitution Center, Philadelphia, PA “Probing the Amphotericin B Ion Channel with Synthetic Knockouts”
30. November, 2008 – Novartis Institute for Biomedical Research, Cambridge, MA
31. January, 2009 – Wayne State University, Detroit, MI
32. January, 2009 – Hope College, Holland, MI
33. March, 2009 – Institute for Genomic Biology, University of Illinois, IL
34. March, 2009 – 237th ACS National Meeting, Special Symposium, “Boronate Chemistry in the 21st Century” Sponsored by Frontier Scientific, Salt Lake City, UT
35. March, 2009 – University of Pennsylvania, Philadelphia, PA
36. April, 2009 – UIUC College of Medicine Seminar Series, Carle Hospital and Clinic, IL
37. May, 2009 – Abbott Pharmaceuticals, Abbott Park, IL
38. May, 2009 – University of Chicago, Chicago, IL
39. May, 2009 – California Institute of Technology, Pasadena, CA
40. May, 2009 – Princeton University, Bristol-Myers Squibb Lectureship, Princeton, NJ
41. June, 2009 – Rising Organic Chemists in Catalysis Meeting, Münster, Germany
42. June, 2009 – Novartis Pharma, Basel, Switzerland
43. July, 2009 – Merck Research Laboratories, Rahway, NJ
44. July, 2009 – Schering-Plough, Kenilworth, NJ
45. July, 2009 – Hoffman-LaRoche, Nutley, NJ
46. July, 2009 – Lexicon Pharmaceuticals, Princeton, NJ
47. July, 2009 – Sanofi-Aventis, Bridgewater, NJ
48. August 2009 – Eli Lilly, Indianapolis, IN
49. August, 2009 – 238th ACS National Meeting Young Investigator’s Symposium, Washington D.C.
50. August, 2009 – Beckman Young Investigator’s Symposium, Irvine, CA
51. September, 2009 – UTSW Medical Center, Dallas, TX
52. September, 2009 – Michigan State University, MI
53. October, 2009 – Amgen Young Investigator’s Award Symposium, Amgen, Thousand Oaks, CA,
“The Prospect of Molecular Prosthetics: Small Molecules with Protein-Like Functions”
54. October, 2009 – University of California Santa Barbara, Santa Barbara, CA

55. October, 2009 – AstraZeneca *Excellence in Chemistry* Award, Wilmington, DE, “The Prospect of Molecular Prosthetics: Small Molecules with Protein-Like Functions”
56. October, 2009 – Bristol-Myers Squibb, “New Pharma” Symposium, Princeton, NJ.
57. November, 2009 – Howard Hughes Medical Institute Early Career Scientists Meeting, Janelia Farm Research Campus, Chevy Chase, MD
58. February, 2010 – Frontiers in Chemistry Symposium, Scripps Research Institute, La Jolla, CA
59. March, 2010 – 239th ACS National Meeting, “Frontiers in Chemical Biology” Symposium, San Francisco, CA, “Prospect of Molecular Prosthetics: Small Molecules with Protein-Like Functions”
60. March, 2010 – ACS/*Chem. Eng. News* International Webinar, “MIDA Boronate Building Blocks: Towards a General Platform for Small Molecule Synthesis” broadcast live from the 239th ACS National Meeting, San Francisco, CA: <http://pubs.acs.org/cen/webinar/webinar-sigma.html>
61. March, 2010 – University of Wisconsin-Madison, WI
62. March, 2010 – Cornell University, NY
63. March, 2010 – Boston College, Boston, MA
64. April, 2010 – University of California at Berkeley, Novartis Lectureship, Berkeley, CA
65. May, 2010 – Hoffman-LaRoche, Nutley, NJ
66. May, 2010 – AstraZeneca Pharmaceuticals, Boston, MA
67. May, 2010 – Boehringer-Ingelheim Pharmaceuticals, Ridgefield, CT
68. May, 2010 – BASF, Evans City, PA
69. May, 2010 – Synthesis and Applications of Boron Compounds Symposium, 93rd Canadian Society for Chemistry Conference, Toronto, Canada
70. June, 2010 – ACS/*Chem. Eng. News* International Webinar, “MIDA Boronate Building Blocks: Towards a General Platform for Small Molecule Synthesis” broadcast live from University of Illinois at Urbana-Champaign
71. June, 2010 – High Throughput Chemistry and Chemical Biology Gordon Research Conference, Les Diablerets, Switzerland
72. June, 2010 – Balticum Organicum Syntheticum (BOS 10), Riga, Latvia
73. July, 2010 – Natural Products Gordon Research Conference, Tilton, NH
74. August, 2010 – Sigma-Aldrich, Milwaukee, WI
75. August, 2010 – Merck Research Laboratories, Boston, MA
76. September, 2010 – University of Illinois at Urbana-Champaign, Urbana, IL
77. September, 2010 – Harvard University, Bristol-Myers Squibb Lectureship, Cambridge, MA
78. September, 2010 – Yale University, New Haven, CT
79. January, 2011 – UIUC Department of Biochemistry, Urbana, IL
80. March, 2011 – University of Pennsylvania Department of Biochemistry and Molecular Biophysics, Philadelphia, PA
81. April, 2011 – University of Minnesota, College of Pharmacy, Minneapolis, MN
82. April, 2011 – Bristol-Myers Squibb Unrestricted Grant in Synthetic Organic Chemistry Grantee Symposium,
83. July, 2011 – Organic Reactions and Processes Gordon Research Conference, Smithfield, RI
84. August, 2011 – Beckman Young Investigators Awards Symposium, Irvine, CA
85. August, 2011 – “*The Prospect of Molecular Prosthetics*” Arthur C. Cope Scholar Awardee Address. 243rd ACS National Meeting & Exposition, Denver, CO.
86. October, 2011 – Dow Pharmaceuticals, MI
87. October, 2011 – Western Michigan University, Kalamazoo, MI
88. October, 2011 – Kalexsyn Pharmaceuticals, Kalamazoo, MI
89. November, 2011 – Howard Hughes Medical Institute, Investigators Meeting, Chevy Chase, MD
90. November, 2011 – National Academy of Sciences *Chinese-American Kavli Frontiers of Science Symposium*, Shenzhen, China

91. November, 2011 – University of Colorado School of Medicine, Dept. of Biochemistry and Molecular Genetics, Aurora, CO
92. February, 2012 – Columbia University, New York, NY
93. February, 2012 – Pfizer Inc, Groton, CT
94. February, 2012 – GlaxoSmithKline, King of Prussia, PA
95. March, 2012 – Eli Lilly Grantee Symposium, Indianapolis, IN
96. April, 2012 – University of Muenster, *Visiting Professorship, Student Seminar: “A Universal Platform for Small Molecule Synthesis?”* Muenster, Germany
97. April, 2012 – Max-Plank-Institute for Molecular Physiology, Dortmund, Germany
98. April, 2012 – Max-Plank-Institute for Colloids and Interfaces, Biomolecular Systems, Berlin, Germany
99. April, 2012 – Max-Plank-Institute for Coal Research, Mulheim, Germany
100. April, 2012 – University of Muenster, *Visiting Professorship, Departmental Seminar: “The Prospect of Molecular Prosthetics”* Muenster, Germany
101. April, 2012 – University of Illinois Office of Technology Management *Share the Vision Conference*, Urbana, Illinois
102. April, 2012 – Novartis Chemistry Lectureship 2012-2013, *“The Prospect of Molecular Prosthetics”* Novartis Institutes for Biomedical Research, Cambridge, MA
103. July 2012 – Novartis Chemistry Lectureship 2012-2013, Novartis Institutes for Tropical Diseases, Singapore
104. July 2012 – National University of Singapore, Singapore
105. July 2012 – Novartis Chemistry Lectureship 2012-2013, China Novartis Institutes for Biomedical Research, Shanghai, China
106. July 2012 – Jiaotong University University, Shanghai, China
107. September 2012 – Bristol University, Bristol, UK
108. September 2012 – Novartis Chemistry Lectureship 2012-2013, Novartis UK, Horsham, UK
109. September 2012 – Novartis Chemistry Lectureship 2012-2013, Novartis Institutes for Biomedical Research, Basel, Switzerland
110. October 2012 – Johnson and Johnson, Janssen Research and Development, La Jolla, CA
111. October 2012 – Amgen Pharmaceuticals, San Francisco, CA
112. February 2013 – Kent State University, Kent, OH
113. March 2013 – Amgen Pharmaceuticals, South San Francisco
114. April 2013 – University of California Irvine, Irvine, CA
115. April 2013 – Elias J. Corey Award Award for Outstanding Original Contribution in Organic Synthesis by a Young Investigator, “Making Molecular Prosthetics”, 245th American Chemical Society National Meeting, New Orleans
116. May 2013 – 5th International Symposium on Advances in Synthetic and Medicinal Chemistry, Moscow
117. June 2013 – Terpnet 2013, Kolymvari, Crete
118. July 2013 – Natural Products Gordon Research Conference, New Hampshire
119. September 2013 – Kavli Foundation Emerging Leader in Chemistry Lectureship, *“Making Molecular Prosthetics with a Small Molecule Synthesizer”*, American Chemical Society 246th National Meeting, Indianapolis, *Highlighted in US News and World Report:*
<http://www.usnews.com/news/articles/2013/09/09/molecular-prosthetics-may-give-new-hope-for-incurable-diseases>
120. September 2013 – Emerging Science Frontiers: Young Investigators *“Amphotericin B: A Prototype for Small Molecules with Protein-like Functions”* American Chemical Society 246th National Meeting, Indianapolis
121. September 2013 – Dupont, Newark, DE,
122. October 2013 – Share the Vision Showcase, UIUC, IL

123. November 2013 – Howard Hughes Medical Institute, Investigators Meeting, Chevy Chase, MD
124. November 2013 – University of Illinois, Student Chapter of the American Chemical Society, IL
125. January 2014 – University of Toronto, Toronto, Canada
126. January 2014 – Queen’s University, Kingston, Canada
127. February 2014 – 10th Hirata Memorial Lectureship, Nagoya University, Japan
128. February 2014 – Kyoto University, Kyoto, Japan
129. February 2014 – Osaka University, Osaka, Japan
130. March 2014 – Massachusetts Institute of Technology, Cambridge, MA
131. April 2014 – Boston University, Boston, MA
132. May 2014 – Memorial Sloan Kettering, NY, NY
133. May 2014 – Stanford University, Stanford, CA
134. June 2014 – AstraZeneca, Manchester UK
135. June 2014 – 15th Tetrahedron Symposium, London, United Kingdom
136. July 2014 – Heterocyclic Compounds Gordon Research Conference, Newport, RI
137. July 2014 – Thieme IUPAC Prize Symposium, Budapest, Hungary
138. July 2014 – Belgian Organic Synthesis Symposium XIV, Louvain-la-Nueve, Belgium
139. July 2014 – UCB Pharmaceuticals, Louvain-la-Nueve, Belgium
140. September 2014 – Williams College, Williamstown, MA
141. September 2014 – Vertex Pharmaceuticals, Boston, MA
142. September 2014 – *Chemical and Engineering News Inaugural Virtual Symposium*
143. November 2014 – “Share the Vision Showcase” UIUC Office of Technology Management, San Francisco, CA
144. February 2015 – Howard Hughes Medical Institute, Chevy Chase, MD
145. May 2015 – American Asthma Foundation Award Symposium, San Francisco, CA
146. May 2015 – Royal Chemistry Society Grasmere Conference, Organi Division: Heterocyclic and Synthesis Group, Grasmere, UK
147. May 2015 – Syngenta, Jealott’s Hill International Research Centre, Bracknell, Berkshire, UK
148. May 2015 – Bristol Chemical Synthesis CDT-Syngenta Award, Bristol University, Bristol, UK
149. June 2015 – Gilead Pharmaceuticals, San Francisco
150. August 2015 – American Chemical Society National Meeting, “Making Molecular Prosthetics with a Small Molecule Synthesizer,” Boston, MA
151. August 2015 – American Chemical Society National Meeting, “Understanding, Optimizing, and Harnessing Amphotericin B,” Boston, MA
152. October 2015 – University of Limerick, Irish NanoWeek Conference, Ireland
153. October 2015 – Ohio State University, Columbus, Ohio
154. November 2015 – Roche Innovation Lecture Series, Roche, Basel
155. December 2015 – Royal Australian Chemical Institute and the American Chemical Society co-sponsored lecture series in Brisbane, Sydney, Melbourne, Adelaide, and Perth, Australia
156. December 2015 – Pacifichem 2015, “Small Molecule Interactions in Biomembranes” (Co-Chair) and “Organoboron Chemistry in Organic Synthesis, Biology, and Materials”, Honolulu, Hawaii
157. January 2016 – Aldrich Lectureship, McGill University, Montreal, Quebec
158. January 2016 – Aldrich Lectureship, University of Montreal, Montreal, Quebec
159. March 2016 – Florida Heterocyclic and Synthetic Chemistry, Gainesville FL
160. April 2016 – University of Buffalo, Buffalo, NY
161. May 2016 – American Asthma Foundation Award Symposium, San Francisco
162. July 2016 – XXVII European Colloquium on Heterocyclic Chemistry (EHC 2016)” Amsterdam, Netherlands.
163. August 2016 – EFMC International Symposium on Medicinal Chemistry (EFMC-ISMC) - Manchester, UK

Teaching

Fall 2006	Chem 534: "Fundamentals of Complex Molecule Synthesis"
- Fall 2008	"Teacher Ranked as Excellent" and "Teacher Ranked as Outstanding"
Spring 2007	Chemistry 237: "Structure and Synthesis" "Teacher Ranked as Excellent"
Spring 2006, 2008, 2013, 2014, 2015	Chem 536: "Introduction to Organic Chemistry Research"
Spring 2009	Chem 437: Advanced Organic Lab
Spring 2010, 2011, and 2012	Chem 436: "Organic Chemistry II" "Teacher Ranked as Excellent"
Fall 2013	Chem 535 "Graduate Student Seminar"
Spring 2014	Chem 536: "Introduction to Organic Chemistry Research"
Spring 2015	Chem 236: "Fundamental Organic Chemistry I"

Service

University of Illinois

2015	Office of Technology Management, Share the Vision Showcase
2015	UIUC College of Medicine, Organizer of Basic Science Advisory Committee
2014 – present	Medical Scholars Program, Steering Committee
2014 – present	School of Chemical Sciences Safety Committee
2014 – present	Department of Chemistry Safety Committee
2014 – present	Department of Chemistry Graduate Fellowships Committee
2012 – present	Department of Chemistry Faculty Advisor for NMR Facility
2005 – present	Department of Chemistry Graduate Recruiting Committee
2005 – present	Medical Scholars Program, ad hoc member of Admissions Committee
2005 – present	Medical Scholars Program, ad hoc member of Recruiting Committee
2010 – present	Molecular and Cellular Biology, ad hoc member of Admissions Committee
2007 – present	Founder, <i>Lab Partners</i> High School Chemistry Outreach Program http://www.scs.illinois.edu/burke/index.php?p=webphotos&Qwd=./photos/2008.06%20-%20Lab%20Partners&Qiv=thumbs&Qis=XL
2005 – 2012	Department of Chemistry Graduate Admissions Committee
2008 – 2011	Organic Faculty Search Committee
2012	Chair of NMR Spectroscopist Search Committee
2013, 2012, 2006	Pines Travel Award Selection Committee
2012, 2007	Host of the Marvel Lecture Series
2015	Host of Fuson Lectures
2011	UIUC NSF Graduate Research Fellowship Workshop, Speaker
2008	UIUC Occupational Safety and Health Committee
2007	Department of Pharmacology New Faculty Search Committee
2006	<i>Enhancing Chemistry: A Conference for Chemistry Teachers</i> , Keynote speaker
2005 – 2006	Coordinator of Organic Registration Exam

Service outside of University of Illinois

June, 2007	Ad hoc member of the National Institutes of Health Synthetic and Biological Chemistry B Study Section, Washington, D.C.
February, 2008	Panel member for the National Science Foundation Graduate Research Fellowships Chemistry II Division, Arlington, VA.
October, 2008	Panel member for the National Science Foundation CAREER Awards, Washington, D.C.

July, 2009	Ad hoc member of the National Institutes of Health Roadmap Initiative Grants Study Section, Washington D.C.
2011-2014	Panel member for the Howard Hughes Medical Institute Graduate Fellowships
October, 2013	Ad hoc member of the National Institutes of Health Synthetic and Biological Chemistry B Study Section, Washington, D.C.
February, 2014	Panel member for National Science Foundation Study Section
June, 2015	Ad hoc member of the National Institutes of Health Synthetic and Biological Chemistry B Study Section, Washington, D.C.
June, 2015	Panel member for National Institutes of Health Fellowships Panel
July 2015	National Institutes of Health “Innovate to Accelerate” Workshop

Consultantships

REVOLUTION Medicines, Redwood City, CA, 2014-present, Scientific Founder, Chair of Scientific Advisory Board, and Consultant
midasyn, Urbana-Champaign, IL, 2014, Scientific Founder and Consultant
Bristol-Myers Squibb, New Jersey and Connecticut, USA, 2008 – 2014, Consultant
Rigel Pharmaceuticals, San Francisco, California, USA, 2007 – 2014, Consultant