

Martin D. Burke – *Curriculum Vitae*

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born: Feb. 5, 1976, Westminster, MD, USA

Education

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

Appointments

- 2021 - Professor of the Carle Illinois College of Medicine
- 2021 - Professor of the Beckman Institute for Advanced Science and Technology, UIUC
- 2021 - Affiliate of the Carle R. Woese Institute for Genomic Biology, UIUC
- 2020 - May and Ving Lee Professor for Chemical Innovation, UIUC
- 2020- Member, Rockefeller Foundation Cross-Cities COVID-19 Testing Initiative
- 2020- Participant and Co-author of National Academy of Sciences, Engineering, and Medicine
Rapid Expert Consultation: COVID-19 Testing Strategies for Colleges and Universities;
- 2019- Chemical Sciences Roundtable, National Academy of Sciences
- 2019- Founding Member of the Molecular Maker Lab Institute
- 2019 - Scientific Founder, Consultant, cystetic Medicines
- 2018 - Scientific Founder, Consultant, Ambys Medicines
- 2018 - 2021 Inaugural Associate Dean of Research, Carle-Illinois College of Medicine
- 2018 - 2021 Member of the Carle R. Woese Institute for Genomic Biology, UIUC
- 2017 - Scientific Founder, Consultant, Sfunga Therapeutics
- 2017 - 2021 Member of the Beckman Institute for Advanced Science and Technology, UIUC
- 2015 - Scientific Founder, Chair of SAB, Consultant, REVOLUTION Medicines
- 2014 - Professor, UIUC, Department of Chemistry
- 2011 - 2014 Associate Professor, UIUC, Department of Chemistry
- 2009 - Affiliate Faculty, UIUC, Department of Biochemistry
- 2009 - 2015 Early Career Scientist, Howard Hughes Medical Institute
- 2005 - 2010 Assistant Professor, UIUC, Department of Chemistry

Awards and Honors

- 2022 Member, National Academy of Medicine
2022 Fellow, American Association for the Advancement of Science
2021 Presidential Medallion, University of Illinois
2021 Johns Hopkins University Distinguished Alumnus Award
2021 LAS Impact Award, UIUC
2021 Member, American Society for Clinical Investigation
2020 Mukaiyama Award, The Society of Synthetic Organic Chemistry, Japan
2019 iCON Award, iBIO
2017 University Scholars Award, UIUC
2017 Nobel Laureate Signature Award in Graduate Education in Chemistry, ACS
2016 Maximizing Investigator's Research Award, National Institutes of Health
2016 Bristol-Myers Squibb Lectureship, Harvard University
2016 Aldrich Lectureship, McGill University and University of Montreal, Canada
2016 Burkett Lectureship, Depauw University
2015 University of 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" *Technology Review* Magazine
2008 National Science Foundation CAREER Award
2008 "Scientist to Watch" *The Scientist* Magazine
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

For a complete list of publications click [here](#) and for a short video describing the Burke Group Molecule Making Machine click [here](#), their research on Making Medicine with Chemical Building Blocks click [here](#), their research on Molecular Prosthetics click [here](#), and their research on Mitigation of SARS-CoV-2 transmission via saliva-based testing click [here](#).

101. Closed-loop optimization of general reaction conditions for heteroaryl Suzuki-Miyaura coupling, Nicholas H. Angello, Vandana Rathore, Wiktor Beker, Agnieszka Wołos, Edward R. Jira, Rafał Roszak, Tony C. Wu, Charles M. Schroeder, Alán Aspuru-Guzik, Bartosz A. Grzybowski, Martin D. Burke, *Science*, **2022**, *378*, 399-405. DOI: <https://doi.org/10.1021/acscatal.2c03245>

100. Stereospecific Csp³ Suzuki-Miyaura Cross-Coupling That Evades b-Oxygen Elimination, Antonio J. LaPorte, Yao Shi, Jason E. Hein, and Martin D. Burke, *ACS Catal.* **2022**, *12*, 10905-10912

99. A rationally designed molecular prosthetic for cystic fibrosis, A Lewandowska, I Thornell, C Soutar, K Green, J Lange, D Miller, T Tarara, T Pogorelov, C Rienstra, M Welsh, J Weers, M Burke, *J. Cystic Fibrosis* **2022**, *21*, S337.

98. A dry powder aerosol comprising a small molecule prosthetic ion-channel for treatment of people with cystic fibrosis, D Miller, T Tarara, S Lyons, M Burke, A Lewandowska, C Soutar, J Weers, *J. Cystic Fibrosis* **2022**, *21*, S229.

97. A small molecule redistributes iron in ferroportin-deficient mice and patient-derived primary macrophages, Stella Ekaputria, Eun-Kyung Choi, Manuela Sabelli, Luisa Aring, Kelsie J. Green, JuOae Chang, Kai Bao, Hak Soo Choi, Shigeki Iwase, Jonghan Kim, Elena Corradini, Antonello Pietrangelo, Martin D. Burke and Young Ah Seo *Proc. Natl. Acad. Sci. U.S.A.* **2022**, *119*, e2121400119 <https://doi.org/10.1073/pnas.2121400119>

96. Targeting fungal membrane homeostasis with imidazopyrazoindoles impairs azole resistance and biofilm formation, Nicole M. Revie, Kali R. Iyer, Michelle E. Maxson, Jiabao Zhang, Su Yan, Caroline M. Fernandes, Kirsten J. Meyer, Xuefei Chen, Iwona Skulska, Meea Fogal, Hiram Sanchez, Saif Hossain, Sheena Li, Yoko Yashiroda, Hiroyuki Hirano, Minoru Yoshida, Hiroyuki Osada, Charles Boone, Rebecca S. Shapiro, David R. Andes, Gerard D. Wright, Justin R. Nodwell, Maurizio Del Poeta, Martin D. Burke, Luke Whitesell, Nicole Robbins & Leah E. Cowen *Nature Commun* **2022**, *13*, 3634, <https://doi.org/10.1038/s41467-022-31308-1>

95. MIDA Anhydride and Reaction with Boronic Acids, Aidan M. Kelly, Peng-Jui Chen, Jenna Klubnick, Daniel J. Blair, and Martin D. Burke *Org. Synth.* **2022**, *99*, 92 DOI: [10.15227/orgsyn.099.0092](https://doi.org/10.15227/orgsyn.099.0092)

94. Digitizing Chemical Synthesis in 3D Printed Reactionware, Andrius Bubliskas, Daniel J. Blair, Henry Powell-Davies, Philip J. Kitson, Martin D. Burke, Leroy Cronin, *Angew. Chem. Int. Ed.* **2022**, e202116108; *Angew. Chem.* **2022**, e202116108

93. Mitigation of SARS-CoV-2 Transmission at a Large Public University, Diana Rose E. Ranoa, Robin L. Holland, Fadi G. Alnaji, Kelsie J. Green, Leyi Wang, Richard L. Fredrickson, Tong Wang, George N. Wong, Johnny Uelmen, Sergei Maslov, Ahmed Elbanna, Zachary J. Weiner, Alexei V. Tkachenko, Hantao Zhang, Zhiru Liu, Sanjay J. Patel, John M. Paul, Nickolas P. Vance, Joseph G. Gulick, Sandeep Puthanveetil Satheesan, Isaac J. Galvan, Andrew Miller, Joseph Grohens, Todd J. Nelson, Mary P. Stevens, P. Mark Hennessy, Robert C. Parker Jr, Edward Santos, Charles Brackett, Julie D. Steinman, Melvin R. Fenner Jr, Kirstin Dohrer, Kraig Wagenecht, Michael DeLorenzo, Laura Wilhelm-Barr, Brian R. Brauer, Catherine Best-Popescu, Gary Durack, Nathan Wetter, David M. Kranz, Jessica Breitbarth, Charlie Simpson, Julie A. Pryde, Robin N. Kaler, Chris Harris, Allison C. Vance, Jodi L. Silotto, Mark Johnson, Enrique Valera, Patricia K. Anton, Lova Mwilambwe, Stephen P. Bryan, Deborah S. Stone, Danita B. Young, Wanda E. Ward, John Lantz, John A. Vozenilek, Rashid Bashir, Jeffrey S. Moore, Mayank Garg, Julian C. Cooper, Gillian Snyder, Michelle H. Lore, Dustin L. Yocum, Neal J. Cohen, Jan E. Novakofski, Melanie J. Loots, Randy L. Ballard, Mark Band, Kayla M. Banks, Joseph D. Barnes, Iuliana Bentea, Jessica Black, Jeremy Busch, Hannah Christensen, Abigail Conte, Madison Conte, Michael Curry, Jennifer Eardley, April Edwards, Therese Eggett, Judes Fleurimont, Delaney Foster, Bruce W. Fouke, Nicholas Gallagher, Nicole Gastala, Scott A. Genung, Declan Glueck, Brittani Gray, Andrew Greta, Robert M. Healy, Ashley Hetrick, Arianna A Holterman, Nahed Ismail, Ian Jasenof, Patrick Kelly, Aaron Kielbasa, Teresa Kiesel, Lorenzo M. Kindle, Rhonda L. Lipking, Yukari C. Manabe, Jade Mayes, Reubin McGuffin, Kenton G. McHenry, Agha Mirza, Jada Moseley, Heba H. Mostafa, Melody Mumford, Kathleen Munoz, Arika D. Murray, Moira Nolan, Nil A. Parikh, Andrew Pekosz, Janna Pflugmacher, Janise M. Phillips, Collin Pitts, Mark C. Potter, James Quisenberry, Janelle Rear, Matthew L. Robinson, Edith Rosillo, Leslie N. Rye, MaryEllen Sherwood, Anna Simon, Jamie M. Singson, Carly Skadden, Tina H. Skelton, Charlie Smith, Mary Stech, Ryan Thomas, Matthew A. Tomaszewski, Erika A. Tyburski, Scott Vanwingerden, Evette Vlach, Ronald S. Watkins, Karriem Watson, Karen C. White, Timothy L. Killeen, Robert J. Jones, Andreas C. Cangellaris, Susan A. Martinis, Awais Vaid, Christopher B. Brooke, Joseph T. Walsh, William C. Sullivan, Rebecca L. Smith, Nigel D. Goldenfeld, Timothy M. Fan, Paul J. Hergenrother, Martin D. Burke *Nature Commun* **2022**, 13, 3207.

<https://doi.org/10.1038/s41467-022-30833-3>

92. Using automated synthesis to understand the role of side chains on molecular charge transport, Songsong Li, Edward R. Jira, Nicholas H. Angello, Jialing Li, Hao Yu, Jeffrey S. Moore, Ying Diao, Martin D. Burke, and Charles M. Schroeder *Nature Commun* **2022**, 13, 2102. <https://doi.org/10.1038/s41467-022-29796-2>

91. Automated iterative Csp³-C bond formation, Daniel J. Blair, Sriyankari Chitti, Melanie Trobe, David M. Kostyra, Hannah M. S. Haley, Richard L. Hansen, Steve G. Ballmer, Toby J. Woods, Wesley Wang, Vikram Mubayi, Michael J. Schmidt, Robert W. Pipal, Greg. F. Morehouse, Andrea M. E. Palazzolo Ray, Danielle L. Gray, Adrian L. Gill & Martin D. Burke *Nature* **2022**, 604, 92-97. <https://doi.org/10.1038/s41586-022-04491-w>

90. A Materials Acceleration Platform for Organic Laser Discovery, Tony C. Wu, Andrés Aguilar Granda, Kazuhiro Hotta, Sahar Alasvand Yazdani, Robert Pollice, Jenya Vestfrid, Han Hao, Cyrille Lavigne, Martin Seifrid, Nicholas H. Angello, Fatima Bencheikh, Jason E. Hein, Martin D. Burke,

Chihaya Adachi, Alán Aspuru-Guzik *Advanced Materials*, 2022, in press; *ChemRxiv*. Cambridge: Cambridge Open Engage; 2022 DOI 10.26434/chemrxiv-2022-9zm65

89. Automated Synthesis for Single-Molecule Electronics, Edward R. Jira, Songsong Li, Nicholas H. Angello, Jialing Li, Jeffrey S. Moore, Martin D. Burke, Charles M. Schroeder *Bulletin of the American Physical Society*, 2022

88. Machine Learning May Sometimes Simply Capture Literature Popularity Trends: A Case Study of Heterocyclic Suzuki-Miyaura Coupling, Wiktor Beker, Rafał Roszak, Agnieszka Wołos, Nicholas H. Angello, Vandana Rathore, Martin D. Burke, and Bartosz A. Grzybowski *J. Am. Chem. Soc.* 2022, 144, 11, 4819–4827 <https://doi.org/10.1021/jacs.1c12005>

87. Iterations from the chemical cosmos, Danielle C. Loving and Martin D. Burke *Nature Synth* 1, 11–12 2022, <https://doi.org/10.1038/s44160-021-00014-z>

86. Saliva-based molecular testing for sars-cov-2 Diana Rose Ranoa, Robin L Holland, Fadi G Alnaji, Kelsie J Green, Leyi Wang, Christopher B Brooke, Martin D Burke, Timothy M Fan, Paul J Hergenrother US Patent App. 17/636,469

85. Validation of a molecular assay to detect SARS-CoV-2 in saliva, Janet L. Pitman, Arthur J. Morris, Stephen Grice, Joseph T. Walsh, Leyi Wang, Martin D. Burke, Amanda Dixon-McIver *The New Zealand Medical Journal*, 2021, 134, 1547.

84. Chemical-reaction-aware molecule representation learning, Hongwei Wang, Weijiang Li, Xiaomeng Jin, Kyunghyun Cho, Heng Ji, Jiawei Han, Martin D. Burke *arXiv* 2021; <https://arxiv.org/abs/2109.09888>

83. Hybrid amphotericin B derivatives with reduced toxicity. Martin D. Burke, Anuj Khandelwal, Jiabao Zhang, Anna SantaMaria, *US Patent* 11,198,705. 2021

82. Fungicidal Amphotericin B Sponges are Assemblies of Staggered Asymmetric Homodimers Encasing Large Void Volumes, Agnieszka Lewandowska, Corinne P. Soutar, Alexander I. Greenwood, Evgeny Nimerovsky, Ashley M. De Lio, Jordan T. Holler, Grant S. Hisao, Anuj Khandelwal, Jiabao Zhang, Anna M. SantaMaria, Charles D. Schwieters, Taras V. Pogorelov, Martin D. Burke & Chad M. Rienstra *Nature Structural & Molecular Biology* 2021, 12, 972-981 DOI: 10.1038/s41594-021-00685-4

81. Transition between Nonresonant and Resonant Charge Transport in Molecular Junctions, Songsong Li, Hao Yu, Jialing Li, Nicholas Angello, Edward R. Jira, Bo Li, Martin D. Burke, Jeffrey S. Moore, and Charles M. Schroeder *Nano Letters* 2021, 21 (19), 8340-8347 DOI: 10.1021/acs.nanolett.1c02915

80. Well-Tolerated Amphotericin B Derivatives That Effectively Treat Visceral Leishmaniasis, Christelle Morelle, Angana Mukherjee, Jiabao Zhang, Fereshteh Fani, Anuj Khandelwal, Hélène Gingras, Jocelyn Trottier, Olivier Barbier, Philippe Leprohon, Martin D. Burke, and Marc Ouellette *ACS Infectious Diseases* 2021, 7 (8), 2472-2482 DOI: 10.1021/acsinfecdis.1c00245

79. Sterol Sponge Mechanism Is Conserved for Glycosylated Polyene Macrolides, Xiaorui Guo, Jiabao Zhang, Xinyi Li, Emily Xiao, Justin D. Lange, Chad M. Rienstra, Martin D. Burke, and Douglas A. Mitchell *ACS Central Science* 2021 7 (5), 781-791 DOI: 10.1021/acscentsci.1c00148

- 78. Amphotericin B induces epithelial voltage responses in people with cystic fibrosis** Rajeev S. Chorghade, Bo Ram Kim, Janice L. Launspach, Philip H. Karp, Michael J. Welsh and Martin D. Burke *Journal of Cystic Fibrosis* **2020**, 7 (5), 781-791 DOI: 10.1016/j.jcf.2020.11.01
- 77. COVID-19 Testing Strategies for Colleges and Universities** *National Academies of Sciences, Engineering, and Medicine.* Washington, DC: The National Academies Press, **2020**
- 76. Saliva-Based Molecular Testing for SARS-CoV-2 that Bypasses RNA Extraction** Diana Rose E. Ranoa, Robin L. Holland, Fadi G. Alnaji, Kelsie J. Green, Leyi Wang, Christopher Byron Brooke, Martin D. Burke, Timothy M. Fan, Paul Hergenrother *Cold Spring Harbor Laboratory Press*, **2020** DOI: 10.1101/2020.06.18.159434v1
- 75. [Derivatives of Amphotericin B](#)**, Martin D. Burke, Arun P. Thottumkara, Kevin T. Mellem, Zachary K. Sweeney, Elena S. Koltun, *US Patent* 10,882,883. **2021**
- 74. Modular synthesis enables molecular ju-jitsu in the fight against antibiotic resistance** Daniel J. Blair and Martin D. Burke *Nature* **2020** 586, 32-33 DOI: 10.1038/d41586-020-02565-1
- 73. A Mild Method for Making MIDA Boronates** Aidan M. Kelly, Peng-Jui Chen, Jenna Klubnick, Daniel J. Blair, and Martin D. Burke *Organic Letters* **2020**, 22 (24), 9408-9414 DOI: 10.1021/acs.orglett.0c02449
- 72. Small Molecule Channels Harness Membrane Potential to Concentrate Potassium in *trk1Δtrk2Δ* Yeast**, Jennifer Hou, Page N. Daniels, and Martin D. Burke *ACS Chemical Biology* **2020**, 15 (6), 1575-1580 DOI: 10.1021/acscchembio.0c00180
- 71. A Computer Conquers Tactical Combinations**, Daniel J. Blair and Martin D. Burke *Chem.* **2020**, 6 (1), 12-13 DOI: 10.1016/j.chempr.2019.12.019
- 70. [Stereoretentive Cross-coupling Of Boronic Acids](#)**, Martin D. Burke, Ian Crouch, Jonathan Lehmann, Andrea Palazzolo, Claire Simons, *US Patent* 10,370,393. **2019**
- 69. [Amphotericin B derivatives with improved therapeutic index](#)**, Martin D. Burke, Stephen Davis, Brice E. Uno, Justin Struble, Ian Dailey, Kaitlyn C. Gray, David M. Knapp, *US Patent* 10,323,057. **2019**
- 68. Modular Syntheses of Phenanthroindolizidine Natural Products** Young-In Jo, Martin D. Burke, and Cheol-Hong Cheon *Organic Letters* **2019**, 21 (11), 4201-4204 DOI: 10.1021/acs.orglett.9b01397
- 67. Axial shielding of Pd(II) complexes enables perfect stereoretention in Suzuki-Miyaura cross-coupling of Csp³ boronic acids**, Jonathan W. Lehmann, Ian T. Crouch, Daniel J. Blair, Melanie Trobe, Pulin Wang, Junqi Li and Martin D. Burke *Nature Communications* **2019**, 10, 1263 DOI: 10.1038/s41467-019-09249-z
- 66. Small-molecule ion channels increase host defences in cystic fibrosis airway epithelia.** Katrina A. Muraglia, Rajeev S. Chorghade, Bo Ram Kim, Xiao Xiao Tang, Viral S. Shah, Anthony S. Grillo, Page N. Daniels, Alexander G. Cioffi, Philip H. Karp, Lingyang Zhu, Michael J. Welsh and Martin D. Burke *Nature* **2019**, 567, 405–408 DOI: 10.1038/s41586-019-1018-5

- 65. FAM210B is an erythropoietin target and regulates erythroid heme synthesis by controlling mitochondrial iron import and ferrochelatase activity**, Yvette Y. Yien, Jiahai Shi, Caiyong Chen, Jesmine T.M. Cheung, Anthony S. Grillo, Rishna Shrestha, Liangtao Li, Xuedi Zhang, Martin D. Kafina, Paul D. Kingsley, Matthew J. King, Julien Ablain, Hojun Li, Leonard I. Zon, James Palis, Martin D. Burke, Daniel E. Bauer, Stuart H. Orkin, Carla M. Koehler, John D. Phillips, Jerry Kaplan, Diane M. Ward, Harvey F. Lodish and Barry H. Paw *Journal of Biological Chemistry* **2018**, 293, 19797-19811. DOI: 10.1074/jbc.RA118.002742
- 64. Peridinin Is an Exceptionally Potent and Membrane-Embedded Inhibitor of Bilayer Lipid Peroxidation** Hannah M.S. Haley, Adam G. Hill, Alexander I. Greenwood, Eric M. Woerly, Chad M. Rienstra, and Martin D. Burke *Journal of the American Chemical Society* **2018**, 140 (45), 15227-15240 DOI: 10.1021/jacs.8b06933
- 63. [Scalable synthesis of reduced toxicity derivative of amphotericin B](#)**, Martin D. Burke, Brice E. Uno, Souvik Rakshit, *US Patent* 10,087,206. **2018**
- 62. [Derivatives of amphotericin B](#)**, Martin D. Burke, Arun P. Thottumkara, Kevin T. Mellem, Zachary K. Sweeney, Elena S. Koltun, *US Patent* 9,957,290. **2018**
- 61. The molecular industrial revolution: automated synthesis of small molecules**, Melanie Trobe and Martin D. Burke *Angewandte Chemie* **2018**, 57, 4192-4214 DOI: 10.1002/anie.201710482
- 60. Solid-State NMR of highly ¹³C-enriched cholesterol in lipid bilayers** Lisa A. Della Ripa, Zoe A. Petros, Alexander G. Cioffi, Dennis W. Piehl, Joseph M. Courtney, Martin D. Burke and Chad M. Rienstra *Methods* **2018**, 138-139; 47-53. DOI: 10.1016/j.ymeth.2018.01.00
- 59. [Methods for forming protected organoboronic acids](#)**, Martin D. Burke, Graham R. Dick, David M. Knapp, Eric P. Gillis, Jenna A. Klubnick, *US Patent* 9,908,900. **2018**
- 58. Towards the generalized iterative synthesis of small molecules**. Jonathan W. Lehmann, Daniel J. Blair and Martin D. Burke *Nature Reviews Chemistry* **2018**, 2, 0115 DOI: 10.1038/s41570-018-0115
- 57. Slow release of organoboronic acids in cross-coupling reactions**, Martin D. Burke, David M. Knapp, Eric P. Gillis, *US Patent* 9,845,317. 2017
- 56. Amphotericin B derivative with reduced toxicity**, Martin D. Burke, Brice E. Uno, *US Patent* 9,738,677. 2017
- 55. The Natural Productome**, Andrea M. E. Palazzolo, Claire L. W. Simons, Martin D. Burke *Proceedings of the National Academy of Sciences* **2017**, 114 (22) 5564-5566; DOI: 10.1073/pnas.1706266114
- 54. Restored iron transport by a small molecule promotes absorption and hemoglobinization in animals** Anthony S. Grillo, Anna M. SantaMaria, Martin D. Kafina, Alexander G. Cioffi, Nicholas C. Huston, Murui Han, Young Ah Seo, Yvette Y. Yien, Christopher Nardone, Archita V. Menon, James Fan, Dillon C. Svoboda, Jacob B. Anderson, John D. Hong, Bruno G. Nicolau, Kiran Subedi, Andrew A. Gewirth, Marianne Wessling-Resnick, Jonghan Kim, Barry H. Paw and Martin D. Burke *Science*, **2017**, 356 608-615. DOI: 10.1126/science.aah3862

- 53. MIDA Boronates Are Hydrolysed Fast and Slow by Two Different Mechanisms** Jorge A. Gonzalez, O. Maduka Ogba, Gregory F. Morehouse, Nicholas Rosson, Kendall N. Houk, Andrew G. Leach, Paul H.-Y. Cheong, Martin D. Burke and Guy C. Lloyd-Jones. *Nature Chemistry* **2016**, 8, 1067-1075. DOI: 10.1038/nchem.2571
- 52. Automated synthesis of small molecules using chiral, non-racemic boronates**, Martin D. Burke, Junqi Li, Eric P. Gillis, *US Patent* 9,388,131. **2016**
- 51. Methods for forming protected organoboronic acids**, Martin D. Burke, Graham R. Dick, David M. Knapp, Eric P. Gillis, Jenna A. Klubnick, *US Patent* 9,353,131. **2016**
- 50. Slow release of organoboronic acids in cross-coupling reactions**, Martin D. Burke, David M. Knapp, Eric P. Gillis, *US Patent* 9,328,102. **2016**
- 49. System for controlling the reactivity of boronic acids**, Martin D. Burke, Eric P. Gillis, *US Patent* 9,328,127. **2016**
- 48. Our Path to Less Toxic Amphotericins**, Matthew M. Endo Alexander G. Cioffi, Martin D. Burke Synlett **2015**, 27, 337. DOI: 10.1055/s-0035-1560800 *Recipient of the Thieme IUPAC Prize in Synthetic Organic Chemistry.*
- 47. [Apparatus and methods for the automated synthesis of small molecules](#)**, Martin D. Burke, Eric P. Gillis, Steven G. Ballmer, *US Patent* 9,238,597. **2016**
- 46. C3-OH of Amphotericin B Plays an Important Role in Ion Conductance**, Stephen A. Davis, Lisa A. Della Ripa, Lingbowei Hu, Alexander G. Cioffi, Taras V. Pogorelov, Chad M. Rienstra, and Martin D. Burke *Journal of the American Chemical Society* **2015** 137 (48), 15102-15104 DOI: 10.1021/jacs.5b05766
- 45. Restored Physiology in Protein-Deficient Yeast by a Small Molecule Channel** Alexander G. Cioffi, Jennifer Hou, Anthony S. Grillo, Katrina A. Diaz, and Martin D. Burke *Journal of the American Chemical Society* **2015** 137 (32), 10096-10099 DOI: 10.1021/jacs.5b05765
- 44. Nontoxic Antimicrobials that Evade Drug Resistance**, Stephen A. Davis, Benjamin M. Vincent, Matthew M. Endo, Luke Whitesell, Karen Marchillo, David R. Andes, Susan Lindquist and Martin D. Burke. *Nature Chemical Biology* **2015**, 11, 481-487. DOI: 10.1038/nchembio.1821
- 43. [Automated synthesis of small molecules using chiral, non-racemic boronates](#)**, Martin D. Burke, Junqi Li, Eric P. Gillis, *US Patent* 9,012,658. **2015**
- 42. [Slow release of organoboronic acids in cross-coupling reactions](#)**, Martin D. Burke, David M. Knapp, Eric P. Gillis, *US Patent* 9,006,463. **2015**
- 41. Synthesis of many different types of organic small molecules using one automated process**, Junqi Li, Steven G. Ballmer, Eric P. Gillis, Seiko Fujii, Michael J. Schmidt, Andrea M. E. Palazzolo, Jonathan W. Lehmann, Greg F. Morehouse, and Martin D. Burke *Science* **2015**, 347, 1221-1226 DOI: 10.1126/science.aaa5414
- 40. From Synthesis to Function via Iterative Assembly of N-Methyliminodiacetic Acid Boronate Building Blocks** Junqi Li, Anthony S. Grillo, and Martin D. Burke. *Accounts of Chemical Research* **2015** 48 (8), 2297-2307 DOI: 10.1021/acs.accounts.5b00128

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38. **Synthesis of Most Polyene Natural Product Motifs Using Just Twelve Building Blocks and One Coupling Reaction**, Eric M. Woerly, Jahnabi Roy, Martin D. Burke. *Nature Chemistry* **2014**, 6, 484-491. DOI: 10.1038/nchem.1947
37. **Amphotericin Forms an Extramembranous and Fungicidal Sterol Sponge**, Thomas M. Anderson, Mary C. Clay, Alexander G. Cioffi, Katrina A. Diaz, Grant S. Hisao, Marcus D. Tuttle, Andrew J. Nieuwkoop, Gemma Comellas, Nashrah Maryum, Shu Wang, Brice E. Uno, Erin L. Wildeman, Tamir Gonen, Chad M. Rienstra, Martin D. Burke *Nature Chemical Biology* **2014**, 10, 400-406. DOI: 10.1038/nchembio.1496
36. [Methods for forming protected organoboronic acids](#), Martin D. Burke, Graham R. Dick, David M. Knapp, Eric P. Gillis, Jenna A. Klubnick, *US Patent* 8,557,980. **2013**
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38. M.D. Burke, "Natural Productome Project" 252nd National meeting of the American Chemical Society, August 21st **2016**, Philadelphia, Presidential symposium: chemistry in the US and China.
37. M.D. Burke, "Understanding, optimizing, and harnessing amphotericin B," The American Chemical Society, **2015**
36. M.D. Burke, "Making Molecular Prosthetics with a Small Molecule Synthesizer" 250th ACS National Meeting & Exposition. August 16-20, 2015, Boston, MA
35. 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.
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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. 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.

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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. 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. 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"
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"
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, 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 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, Greece
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*
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, Organic 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 The 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, and Adelaide, Australia
156. January 2016 Aldrich Lectureship, McGill University, Montreal, Quebec
157. January 2016 Aldrich Lectureship, University of Montreal, Montreal, Quebec
158. March 2016 Florida Heterocyclic and Synthetic Chemistry, Gainesville FL
159. April 2016 University of Buffalo, Buffalo, NY
160. Spring 2016 Burkett Lecturer, Depauw University
161. May 2016 American Asthma Foundation Award Symposium, San Francisco, CA
162. June 2016 Gordon Research Conference: Resistance, University of New England in Biddeford, Maine
162. July 2016 XXVII European Colloquium on Heterocyclic Chemistry (EHC 2016) - Amsterdam, Netherlands
163. July 2016 Sanofi-Aventis, Frankfurt, Germany
163. August 2016 EFMC International Symposium on Medicinal Chemistry (EFMC-ISMC) - Manchester, UK.
164. August 2016 American Chemical Society, Presidential Symposium – Philadelphia, PA
165. August 2016 American Chemical Society, Graduate Student Symposium – Philadelphia, PA
166. September 2016 Novartis, *Science and Technology Innovations with Disruptive Character*, Basel, Switzerland
167. April 2017 American Chemical Society, Symposium for Nobel Laureate Award for Graduate Education, San Francisco, CA
168. April 2017 Vanderbilt University, Nashville, TN
169. May 2017 Duke University, Raleigh, NC
170. May 2017 American Asthma Foundation Award Symposium, San Francisco, CA
171. May 2017 Graduate Student Symposium, SUNY Buffalo, Buffalo, NY
172. June 2017 National Organic Chemistry Symposium, ACS, UC San Diego
173. July 2017 Vita-Salute San Raffaele University, Milan, Italy
174. July 2017 University of Modena and Reggio Emilia, Modena, Italy
175. July 2017 University of Naples Federico II, Naples, Italy
176. August 2017 Kyushu University, Fukuoka, Japan
177. August 2017 ISCE/APACE Meeting, Meinwald Symposium, Kyoto, Japan
178. September 2017 International Workshop on Energy Materials Innovation, Mexico City
179. October 2018 National Institutes of Health, National Center for Translational Science, Workshop on Automated Small Molecule Synthesis
180. February 2018 Leadership Illinois Conference, Champaign, IL
181. March 2018 Emory University, Atlanta
182. April 2018 Arnold O. and Mabel M. Beckman Institute, Champaign, IL
183. May 2018 Harvard University, Cambridge, MA
184. August 2018 CIFAR Accelerated Discovery of Matter Workshop, Toronto, ON
185. September 2018 Leverhulme Research Centre for Functional Materials Design Symposium, Liverpool, England
186. September 2018 Emily's Entourage Symposium, Philadelphia, PA
187. November 2018 International Kyoto Conference on New Aspects of Organic Chemistry, Kyoto, Japan
189. May 2019 Duke University, Raleigh, NC
190. June 2019 European Hematology Association 24th Congress, Amsterdam
191. July 2019 Dial-a-Molecule Network Annual Meeting, York, UK
192. August 2019 DARPA Accelerating Molecular Discovery Kick-Off Meeting, Bethesda, MD

193. September 2019 From Synthesis to Applications: Photocatalysis & Synthetic Array Technologies Conference, Rottach-Egern, Germany
194. November 2019 Departmental Colloquium, University of Notre Dame, IN
195. January 2020 Organic Seminar, University of Colorado Boulder
196. February 2020 Gregory Fleming James Cystic Fibrosis Research Center Seminar Series, The University of Alabama at Birmingham
197. March 2020 Department of Pharmacology and Molecular Sciences Seminar, Johns Hopkins University, Baltimore, MD
198. April 2020 Royal Dutch Chemical Society (KNCV) International Symposium on Organic Chemistry, Wageningen, The Netherlands (postponed)
199. June 2020 Metals in Medicine Gordon Research Conference, Proctor Academy in Andover, NH United States (postponed)
200. August 2020 Office of the Assistant Secretary for Health, COVID-19 Surveillance Testing Educational Webinar Speaker
201. September 2020 37th Mukaiyama Award in Synthetic Organic Chemistry Virtual Symposium, Hiroshima, Japan
202. September 2020 American Public Health Association and the National Academy of Medicine, Controlling COVID-19: Surveillance, Testing and Contact Panel
203. September 2020 Council on Foreign Relations (CFR), Higher Education Webinar: Targeting, Testing, and Mitigating the Spread of COVID-19
204. October 2020 Department of Chemistry & Biochemistry Virtual Seminar, Baylor University, Waco, Texas
205. October 2020 Princeton ACS Meeting, Virtual Lecture, Piscataway, New Jersey
206. October 2020 42nd Princeton ACS Fall Organic Virtual Symposium, Princeton, New Jersey
207. October 2020 The National Academies of Sciences, Engineering, and Medicine Societal Experts Action Network: COVID-19 Testing Strategies for Colleges and Universities
208. October 2020 Rockefeller Foundation Cross-Cities Group
209. October 2020 National Academy of Science Engineering and Medicine Naval Studies Board (NSB) -U.S. Marine Corps (USMC) Meeting of Experts, Responding to the COVID-19 Pandemic
210. October 2020 Rockefeller Foundation Convening, The Path Forward: Maximizing the Impact of COVID-19 Testing
211. December 2020 Abbott Media Education Webinar: The State of COVID-19 Testing
212. December 2020 University of New Hampshire: Keeping Campus Safe – University Wide COVID Testing
213. March 2021 JCESR Artificial Intelligence (AI) for Energy Storage Workshop: Molecule Maker Lab Empowered by AI
214. March 2021 BU PDC Symposium: Mitigation of SARS-CoV-2 Transmission at a Large Public University with SHIELD: Target Test Tell Platform
215. April 2021 ACS Spring Meeting: Imagine a world where everyone can make molecules
216. August 2021 ACS Presidential Symposium
217. October 2021 University of Mumbai Virtual Lecture
218. December 2021 University of Illinois President's Advisory Council
219. January 2022 International Board for Education, Research and Development, ICETR-2022 Keynote Address
220. February 2022 University of Mumbai, Integration of Traditional knowledge with Innovations in Pharma Webinar
221. March 2022 ACS UIUC Chapter Lecture
222. March 2022 Lakeside Discovery, Chemistry of Life Processes Institute & INVO: The Science of Developing Drugs Virtual Lecture

223. April 2022 National University Singapore Virtual Lecture
224. June 2022 Metals in Medicine Gordon Research Conference Lecture
225. September 2022 MSGERC Clinical Mycology Today, Albuquerque, NM
226. September 2022 Illinois Egnyte, Chicago IL
227. October 2022 ACS Western Regional Meeting, Las Vegas, NV
228. October 2022 ACS UIUC Chapter Lecture
229. November 2022 Professional Staff Leadership Academy, UIUC
230. December 2022 NSF Research Institutes, Summit for Artificial Intelligence Leadership (SAIL), Pacific Grove, CA

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, Chem 536: “Introduction to Organic Chemistry Research”
2008, 2013, 2014, 2015
Spring 2009 Chem 437: Advanced Organic Lab
Spring 2010, Chem 436: “Organic Chemistry II”
2011, and 2012 “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”
Spring 2016 Chem 436: “Organic Chemistry II”
Fall 2016 Chem 236: “Fundamental Organic Chemistry I”
Spring 2017 Chem 535: “Graduate Student Seminar”
Spring 2018 Chem 236: “Fundamental Organic Chemistry I”
Fall 2018 Chem 534: “Fundamentals of Complex Molecule Synthesis”
Fall 2019 Chem 538: “Advanced Strategies for Synthesis”
Spring 2020 Chem 236: “Fundamental Organic Chemistry I”
Fall 2021 Chem 538: “Advanced Strategies for Synthesis”
Spring 2022 Chem 237: “Structure and Synthesis”
Fall 2022 Chem 538: “Advanced Strategies for Synthesis”
Spring 2023 Chem 237: “Structure and Synthesis”

Service

COVID-19-related service

2020 –2022 Leader, SHIELD: Target, Test, Tell

It has been difficult to control the spread of COVID-19 across the world. Large Universities have been a particularly challenging environment with transmission into surrounding communities in many cases. In the Fall of 2020 I led a large multidisciplinary team at University of Illinois at Urbana-Champaign to create a multimodal solution that successfully mitigated the spread of COVID-19 amongst 50,000 faculty, students, and staff. This “SHIELD: Target, Test, and Tell” program combines epidemiological modelling and surveillance (Target); fast and frequent testing using a novel and recently FDA Emergency Use Authorized low-cost and scalable saliva-based RT-qPCR assay for SARS-CoV-2 that bypasses RNA extraction, called covidSHIELD (Test); and digital tools that communicate test results, notify of potential exposures, and promote compliance with public health mandates (Tell). These elements were combined

with masks, social distancing, and robust education efforts. In Fall 2020, the SHIELD team performed more than 1,000,000 covidSHIELD tests while keeping classrooms, laboratories, and many other university activities open. Generally, UIUC case positivity rates remained less than 0.5%, transmission from students to faculty and staff was prevented, and UIUC recorded no spread in its classrooms or research laboratories. Transmission was also mitigated to the surrounding Champaign County community, where COVID-19 deaths were reduced >4-fold relative to expected based on an analysis comparing communities surrounding all U.S. Universities with enrollment >15,000 students, n=251. Building on this momentum, I also helped make the SHIELD platform, and our novel covidSHIELD saliva test, widely available, by helping launch SHIELD T3, SHIELD Illinois, a National Academies of Science Consensus Report on COVID-19 Testing Strategies for Colleges and Universities, and in collaboration with the NIH and Rockefeller Foundation, a K-12 Playbook. This saliva-processing protocol now forms the basis for testing the populations of over 1700 K-12 schools, colleges, and universities as well as multiple companies, municipalities throughout the United States, and in an increasing number of other countries, including New Zealand, Philippines, and Indonesia, with a total of >15 million COVID-19 tests run to date. *Nature Commun* **2022**, 13, 3207

<https://doi.org/10.1038/s41467-022-30833-3>

Service within University of Illinois

2022 – present	Chair, Democratized Drug Discovery Institute Planning Committee
2022 – present	Member, Chancellor’s Health Innovations Visioning Committee
2018 – 2021	Inaugural Associate Dean for Research, Carle-Illinois College of Medicine
2018 – 2019	DPI Health and Wellness Thematic Working Group
2017 – 2018	Chancellor’s Biomedical Translational Facility Task Force
2017	Chancellor’s Health Sciences Strategy Task Force
2017	Chancellor’s “The Next 150” Planning Meeting
2017 – 2018	Interim Associate Dean of Research, Carle-Illinois College of Medicine
2017	Head of Search Committee for Assoc. Dean of Academic Affairs, Carle Illinois College of Medicine
2017 – present	Carle Illinois College of Medicine Showcase Committee
2017 – present	Department of Chemistry, Organic Division, Faculty Search Committee
2016 – 2017	Provost’s Entrepreneurship Roundtable
2015 – present	Co-Chair SCS Service Facilities Committee
2014 – present	Department of Chemistry Safety Committee
2015 – 2016	Co-Chair Department of Chemistry Graduate Admissions Committee
2015, 2016, 2017	Office of Technology Management, Share the Vision Showcase
2012 – 2017	Department of Chemistry Faculty Advisor for NMR Facility
2014 – 2017	Medical Scholars Program, Steering Committee
2014 – 2015	School of Chemical Sciences Safety Committee
2014 – 2015	Department of Chemistry Graduate Fellowships Committee
2005 – 2015	Department of Chemistry Graduate Recruiting Committee
2005 – 2018	Medical Scholars Program, ad hoc member of Admissions Committee
2005 – 2017	Medical Scholars Program, ad hoc member of Recruiting Committee
2010 – 2018	Molecular and Cellular Biology, ad hoc member of Admissions Committee
2007 – 2015	Founder, <i>Lab Partners</i> High School Chemistry Outreach Program
2005 – 2012	Department of Chemistry Graduate Admissions Committee
2008 – 2011, 2017	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

2024 -	Standing Member, NIH R35 MIRA Study Section
October 2022	NIH Study Section Special Emphasis Panel on Antiviral and Anti-Eukaryotic-Pathogen Drug Discovery and Mechanisms of Resistance, ZRG1DCAI-B
October 2021	Chair, NIH Study Section, R35 MIRA Award
August 2021	Chair, NIAID 2021 DMID BAA-Fungal Therapeutics SEP
March 2021	Chair, NIH Study Section, R35 MIRA Award
November 2020	NIH Study Section, R35 MIRA Award
October 2020	The National Academies of Sciences, Engineering, and Medicine (NASEM), COVID-19 Testing Strategies Panel
October 2020	National Academy of Science Engineering and Medicine Naval Studies Board (NSB) - U.S. Marine Corps (USMC) Meeting of Experts, Responding to the COVID-19 Pandemic and Subsequent Infectious Disease Outbreaks Panel
October 2020	Rockefeller Foundation Convening, The Path Forward: Maximizing the Impact of COVID-19 Testing Panel/Academic Guest
September 2020	American Public Health Association and the National Academy of Medicine, Controlling COVID-19: — Surveillance, Testing and Contact Panel
September 2020	Council on Foreign Relations (CFR), Higher Education Webinar: Targeting, Testing, and Mitigating the Spread of COVID-19 Panel
2019-present	National Academy of Sciences Chemical Sciences Roundtable
November 2019	NIH Study Section, R35 MIRA Award
March 2019	NIH Study Section, R35 MIRA Award
2018-2022	Member, Damon Runyon Fellowship Award Committee
March 2018	NIH Study Section, R35 MIRA Award
November 2017	Guest Reviewer, Damon Runyon Fellowship Award Committee
October 2017	NIH National Center for Advancing Translational Sciences Workshop targeting Automated small molecule synthesis
September 2017	Mission Innovation International Clean Energy Workshop, Mexico City
March 2017	NIH Study Section, Special Emphasis Panel
March 2017	NIH Study Section, R35 MIRA Award
December 2015	Co-Organizer for International PacifiChem Conference on “Small Molecule Interactions in Biomembranes”
November 2015	NIH Study Section, Methods Development in Natural Product Chemistry SBIR/STTR
July 2015	NIH “Innovate to Accelerate” Workshop
June, 2015	National Institutes of Health Post-doctoral Fellowships, Panel member
June, 2015	NIH Study Section, Synthetic and Biological Chemistry B
February, 2014	NSF Study Section, Synthetic and Biological Chemistry B
October, 2013	NIH Study Section, Synthetic and Biological Chemistry B
2011-2014	Howard Hughes Medical Institute Graduate Fellowships, Panel member
July, 2009	NIH Study Section, Roadmap Initiative Grants
October, 2008	National Science Foundation CAREER Awards, Panel member
February, 2008	National Science Foundation Graduate Research Fellowships, Panel member
2007	NIH Study Section, Synthetic and Biological Chemistry B

Reviewer for international funding agencies, and journal reviewer for *Nature*, *Nature Chemistry*, *Nature Chemical Biology*, *Nature Synthesis*, *Nature Communications*, *PNAS*, *J. Am. Chem. Soc.*, *Angewandte Chemie*, *Chemical Science*, *ACS Catalysis*, etc.

Entrepreneurial/Consulting Activities

Founder

REVOLUTION Medicines (Nasdaq: RVMD) – Founder, Chair of Scientific Advisory Board, Consultant. Biotechnology company that leverages modular synthesis to create cancer therapeutics. Launched 2014. Started as midasyn in EnterpriseWorks/Champaign-Urbana. Moved to Redwood City, CA after merged with Stryke Therapeutics to form REVOLUTION Medicines that was funded by Third Rock Ventures and Illinois Ventures in 2014. 4 Drugs discovered at REVOLUTION Medicines are currently in clinical trials for the treatment of cancer (KRAS^{MULTI} inhibitor RMC-6236, KRAS^{G12C} inhibitor RMC-6291, Shp2 inhibitor RMC-4630, and mTORC1/4EBP1 inhibitor RMC-5552). Key paper from Burke Lab: Li et al "Synthesis of Many Different Types of Organic Small Molecules Using One Automated Process" *Science* **2015**, *347*, 1221-1226.

Kinesid Therapeutics – Founder, President, Consultant. Biotechnology company targeting molecular prosthetics for anemia and neurodegenerative disorders. Launched 2017. Champaign-Urbana. Technology transferred to and from Ambys Medicines (funded by Third Rock Ventures), Key paper from the Burke Lab: "Restored iron transport by a small molecule promotes absorption and hemoglobinization in animals" Grillo et al *Science* **2017**, *356*, 608-616.

Sfunga Therapeutics – Founder, President, Consultant. Biotechnology company targeting non-toxic fungicides based on amphotericin B. Launched 2018. Champaign-Urbana. Funded by Deerfield Management and Illinois Ventures. Key paper from the Burke Lab: "Nontoxic Antimicrobials that Evade Drug Resistance" *Nature Chem. Bio.* **2015**, *11*, 481-487.

cystetic Medicines – Founder, President, Consultant. Biotechnology company targeting molecular prosthetics for cystic fibrosis. Launched 2019. Champaign-Urbana. Funded by Deerfield Management and Illinois Ventures. Key paper from the Burke Lab: "Small molecule ion channel restores host defenses in cystic fibrosis airway epithelia" *Nature* **2019**, *567*, 405-408.

Stryke Therapeutics – Founder, President, Consultant. Biotechnology company targeting non-toxic fungicides based on amphotericin. Launched 2013. Acquired by REVOLUTION Medicines in 2014. Gray et al, "Amphotericin Primarily Kills Yeast by Simply Binding Ergosterol." *Proc. Natl. Acad. Sci. U.S.A.* **2012**, *109*, 2234-2239; Key paper from the Burke Lab: "Nontoxic Antimicrobials that Evade Drug Resistance" *Nature Chem. Bio.* **2015**, *11*, 481-487.

midasyn – Founder, Consultant. Biotechnology company targeting use of modular synthesis platform for medicine discovery. Launched 2013. Champaign, Urbana. Acquired by REVOLUTION Medicines in 2014. Key papers from Burke Lab: Gillis et al 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. Li et al "Synthesis of Many Different Types of Organic Small Molecules Using One Automated Process" *Science* **2015**, *347*, 1221-1226.

Consultant

Bristol-Myers Squibb, New Jersey and Connecticut, USA, 2008 – 2014, Consultant

Rigel Pharmaceuticals, San Francisco, California, USA, 2007 – 2014, Consultant

Ad hoc Consultant for pharmaceutical/chemical companies, including Abbott/Abbvie, Merck, Roche, Novartis, Gilead, Pfizer, GlaxoSmithKline, Astrazeneca, Scherring-Plough, Sanofi-Aventis, Eli Lilly, Amgen, Boehringer-Ingelheim, BASF, Sigma-Aldrich, Dow, Johnson and Johnson, Dupont, Vertex, UCB, Syngenta, Gilead.